KERALA VETERINARY AND
ANIMAL SCIENCES UNIVERSITY
Pookode, Wayanad, Kerala

REPORT ON

RESEARCH ACTIVITIES 2023-24

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Lakkidi (P.O), Pookode, Wayanad - 673576

Kerala State

Report on Research Activities 2023-24

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MESSAGE

Prof. (Dr.) Anil K.S.

Vice-Chancellor (i/c)

As we stand at the threshold of yet another year that has unfolded, I must acknowledge that as an institution, we remain committed to the advancement of veterinary and animal sciences. However, this mandate of the University, extends beyond the mere generation of knowledge and encompasses the strategic application of research for the welfare of all sections of society. Research at Kerala Veterinary and Animal Sciences University is admittedly guided by the principle that scientific inquiry must address real-world challenges and catalyse inclusive, sustainable development.At this juncture, we also acknowledge that the documentation of research is also equally important. This publication, a documentation of our research over the last year, is not merely a record-keeping exercise. It is a scholarly imperative that enables critical appraisal, fosters transparency, and strengthens the university's academic legacy besides serving as a conduit for translating scientific outputs into policy, practice, and innovation.

I am indeed very happy to extend my best wishes on the occasion of the release of the Annual Research Report 2023 -2024 of Kerala Veterinary and Animal Sciences University. This report stands out as a testament to the intellectual rigor and interdisciplinary collaboration that characterises our research ecosystem. Our scientists have undertaken investigations spanning animal health and production systems, molecular and cellular innovations, value chain enhancement of animal-based products, environmental sustainability, and socioeconomic impact analysis. Each project reflects our ongoing efforts to respond to emerging societal needs through evidence-based solutions.

I take this opportunity to commend the faculty and other technical personnel for their unwavering dedication, and to congratulate the Director of Academics and Research for providing the academic stewardship necessary to facilitate bringing out such a comprehensive report of research.

I hope that this report will inspire further inquiry, innovation, and impact in the years to come.

Vice-Chancellor (i/c)
Kerala Veterinary And Animal Sciences University

PREFACE

Dr. C. Latha

Director of Academics and Research

Kerala Veterinary and Animal Sciences University (KVASU), established on 14th June 2010, was conceived with the vision of advancing education, research and innovation in the domain of veterinary and animal sciences. Since its inception, the University has consistently demonstrated a deep commitment to fostering excellence in academics, research, entrepreneurship and community outreach.

In alignment with its founding objectives, KVASU has undertaken a wide array of need-based and translational research initiatives designed to address critical challenges within the livestock and animal husbandry sectors. The integration of scientific inquiry with field- level applicability remains at the heart of our research philosophy. I am pleased to acknowledge the collective efforts of our faculty, researchers and scholars in contributing meaningfully toward this mission.

It gives me great satisfaction to present before the University fraternity the Annual Research Report for the year 2023-2024, which provides a comprehensive account of the diverse research activities carried out across the University. This report captures the breadth of projects undertaken by various academic departments, including externally funded research, State Plan initiatives and postgraduate (M.V.Sc. and Ph.D.) theses. The document also details the financial support received from our esteemed funding agencies such as ICAR, NABARD/RIDF, State Planning Board, Government of Kerala and other institutional collaborations.

As we bring out this year's report, I am heartened to acknowledge and appreciate the efforts of all scientists and technical personnel who have contributed to the content of this report and the efforts of those who have meticulously compiled it as well. Their dedication, painstaking work and scholarly commitment have made this publication possible. I also thank all faculty members, scientists, scholars and administrative staff for their unwavering cooperation and sustained involvement in advancing the University's research agenda.

Director of Academics And Research
Kerala Veterinary And Animal Sciences University

ABOUT THE UNIVERSITY

Kerala Veterinary and Animal Sciences University (KVASU) was established on 14th June 2010, through Ordinance No. 44/2010, which was later replaced by Act 3/2011 of the Government of Kerala. The University was established in recognition of the growing need to strengthen and advance activities in the animal production sector. Today, KVASU is actively engaged in academics, research, extension services, and entrepreneurship development in the fields of animal, poultry production and dairy science. The Kerala Veterinary and Animal Sciences University (KVASU) is empowered to award degrees as per the provisions of Section 22 of the UGC Act, 1956, through its main campus in the regular mode, with the approval of statutory bodies or councils wherever required.

The University, along with its three constituent colleges—College of Veterinary and Animal Sciences, Pookode; College of Veterinary and Animal Sciences, Mannuthy; and Verghese Kurien Institute of Dairy and Food Technology, Mannuthy—has been granted accreditation by the Indian Council of Agricultural Research (ICAR) for a period of five years, from 28th March 2021 to 27th March 2026.

The Kerala Veterinary and Animal Sciences University (KVASU) comprises three distinct faculties: the Faculty of Veterinary Science, the Faculty of Dairy Science, and the Faculty of Poultry Science. These faculties form the academic backbone of the University, guiding teaching, research, and extension activities across a wide range of disciplines.

Currently, KVASU has seven constituent colleges offering programs in Veterinary Science, Dairy Science and Technology, Food Technology, and Poultry Science. These colleges are strategically structured to provide a comprehensive education and training ecosystem for students across the country.

To support its academic and research objectives, KVASU maintains a network of well-equipped instructional farm units. These include farms dedicated to cattle, pigs, poultry, sheep, and goats, enabling hands-on training and applied research. The University also operates advanced teaching animal health facilities, equipped with modern infrastructure to facilitate clinical teaching and veterinary care. In addition, off-campus clinical services are available, offering both in-patient and out-patient care, thereby bridging academic training with real-world veterinary service. These integrated facilities enhance practical training, research, and outreach in animal health and production.

A defining feature of the Kerala Veterinary and Animal Sciences University (KVASU) story so far has been its remarkable and rapid growth. What began as a modest institution with just two faculties, three constituent colleges, and around 600 students has evolved into a comprehensive and dynamic academic ecosystem. Today, the University encompasses three faculties and seven constituent colleges, with a current student strength around 3000. This expansion is not limited to physical infrastructure alone—it reflects a tenfold multiplication in the range and depth of academic programs offered.

In addition to its core academic structure, KVASU now includes five schools, eight specialized research and service centres, fifteen farms and research stations, and eight All India Coordinated Research Projects (AICRPs). This trajectory of growth highlights KVASU's transition from a limited academic base to a multifaceted institution contributing significantly to education, research, and extension in veterinary, animal, dairy, food, and poultry sciences.

Over the past decade, the Kerala Veterinary and Animal Sciences University (KVASU) has attracted and invested over ₹400 crores in infrastructure development, resulting in rapid and significant institutional growth. This strategic investment has led to the creation of state-of-the-art facilities, prominently including the Dr. K. R. Narayanan Teaching Veterinary Clinical Complex and the Dr. Verghese Kurien Institute of Dairy and Food Technology**,** which stand as landmarks of the University's commitment to excellence in education and research. It is noteworthy that the Kerala Veterinary and Animal Sciences University (KVASU) houses tthree NABL-accredited laboratories, each equipped with state-of-the-art facilities and high-end equipment. These laboratories were established through funding under the EFC scheme of the Indian Council for Agricultural Research (ICAR), reflecting the University's strong emphasis on maintaining high standards in research and diagnostic capabilities. Adding to this infrastructure, the University is developing a referral, analytical, and diagnostic laboratory for supporting livestock farming and diagnosis of zonnotic diseases with BSL 3 facility sponsored by NABARD under the RIDF scheme. This upcoming project is poised to become a flagship facility of KVASU and promises to be a true jewel in the crown, further strengthening the University's leadership in veterinary and animal sciences research and service delivery.

KVASU has also actively pursued productive academic and training collaborations with renowned institutions both in India and abroad. Notable international partnerships include those with the University of Edinburgh**,** the University of Western Australia**,** the University of Georgia, and the University of Minnesota. Domestically, the University maintains strong ties with premier organizations such as the Indian Council for Agricultural Research (ICAR)**,**

National Institute for Animal Nutrition and Physiology, Bangalore (NIANP), Central Institute of Fisheries Technology, Kochi, Kerala (CIFT), ICAR National Research Centre on Meat, Hyderabad (NRCM) Central Coastal Agricultural Research Institute, Goa (CCARI), DBT National Institute of Animal Biotechnology, Hyderabad (NIAB) and National Dairy Development Board, Gujarat (NDDB) enabling enriched academic exchange, joint research, and capacity building.

The Kerala Veterinary and Animal Sciences University (KVASU) currently has a strong academic team comprising 255 faculty members**,** of whom 200 hold doctoral degrees**,** reflecting the institution's commitment to academic excellence and advanced research. One of the University's significant strengths is its favourable student–teacher ratio of 1:10, which compares highly favourably with the global average of 1:15 to 1:20 in bioscience education. This allows for more personalized attention, enhanced mentorship, and improved learning outcomes.

Recognizing the need to continuously expand student opportunities, KVASU has doubled its undergraduate intake and increased postgraduate opportunities five-fold over the years. In response to the evolving needs of the job market, the University has also launched several MS, MSc, PG diploma, diploma and Technology enabled distance courses aimed at equipping students with practical skills and enhancing their employability in the short term.

The Kerala Veterinary and Animal Sciences University (KVASU) has taken proactive steps to foster an entrepreneurial ecosystem by initiating the establishment of start-ups, encouraging students to develop and pursue their own innovative ventures. The University's academic approach emphasizes problem-based learning over traditional lecture-centric methods, promoting critical thinking and real-world application of knowledge. In line with emerging industry demands, KVASU places a strong focus on market-driven education and offers a range of skill development courses aimed at enhancing the employability and entrepreneurial potential of its graduates.

To uphold and enhance the quality of its academic initiatives, the University has established an Internal Quality Assurance Cell (IQAC). In addition to its core functions as outlined in the UGC NAAC guidelines**,** the Internal Quality Assurance Cell (IQAC) of the Kerala Veterinary and Animal Sciences University (KVASU) undertakes several additional responsibilities aimed at enhancing institutional performance. Beyond monitoring and supporting quality-related activities, the IQAC plays a pivotal role in preparing applications for national and international

rankings and awards**,** thereby contributing to the University's visibility and reputation. Furthermore, to ensure the effective implementation of academic standards, a Minimum Standards Assessment Cell is also operational within the University. This Cell specifically supports the Career Advancement Scheme (CAS) by evaluating and maintaining the required benchmarks, thereby reinforcing KVASU's commitment to academic excellence and faculty development.

The Kerala Veterinary and Animal Sciences University (KVASU) publishes a peer-reviewed scientific journal titled the Journal of Veterinary and Animal Sciences, which serves as a platform for disseminating original research in the fields of veterinary and animal sciences, as well as dairy technology. The journal stands as a testament to the University's academic rigor and research excellence. It is a matter of pride for the University that the journal has been consistently improving in its rankings and ratings by various national and international evaluation agencies year after year, reflecting its growing recognition and impact in the scientific community.

Reinforcing its commitment to quality and industry relevance, the University Meat Technology Unit has earned a prestigious ISO certification, underscoring KVASU's adherence to the highest standards in meat processing and safety. The Meat Technology Unit is marketing 80 products, while the Dairy Plant is marketing 30 high-demand products for the public. The Fourth Convocation of KVASU, held on May 20th, 2023, was a momentous occasion, graced by the Hon'ble Governor of Kerala and Chancellor of the University, who conferred degrees and diplomas upon the graduating students, recognizing their academic achievements and contributions.

Demonstrating its commitment to innovative and future-ready teaching methodologies, KVASU hosted the launch workshop of the Blended Learning Platform (BLP) on September 16th, 2023, as part of the National Agricultural Higher Education Programme (NAHEP). Supported by the Indian Council of Agricultural Research (ICAR) and the Indian Agricultural Statistics Research Institute (IASRI), this initiative integrates offline and online learning, providing a dynamic and interactive platform that enhances student engagement through visual and virtual tools. The BLP reflects KVASU's progressive approach to education, ensuring that its faculty and students remain at the forefront of modern teaching and learning practices.

The Directorate of Entrepreneurship focuses on building the capacity of farmers and entrepreneurs through outreach programs, model farms, and support for self-help groups. It

conducts need-based research, workshops, exhibitions, and seminars. The Publication Division manages University publications, while the Technology-Enabled Distance Learning Centre offers various distance learning courses. The Centre for Livestock Development and Policy Research and the Regional Research and Training Centre at Thiruvananthapuram support policy research and training in collaboration with government agencies. The Academic Staff College offers faculty career advancement and training programs. The Directorate promotes commercialization of innovations to boost productivity and employment, especially benefiting farmers. It also runs the Student Entrepreneurship Scheme to guide students in startup development, complemented by the recently launched Technology Business Incubation Division at Mannuthy. The Directorate of Student Welfare oversees student welfare and NSS activities.

KVASU has launched multidisciplinary and multi-institutional research collaborations to tackle emerging life science challenges, leading to the creation of specialized centers such as the Centre for Animal Adaptation to Environment & Climate Change Studies, the School of Bio-energy & Waste Management, and the School of One Health and Zoonoses.

This year has been particularly remarkable for KVASU, with faculty members securing 22 externally funded research projects, publishing 38 books or book chapters, and contributing 349 articles to peer-reviewed journals along with 118 articles in conference compendia. The University community also achieved notable recognition, earning eighty three awards across faculty and student categories, and celebrating the granting of one patent, a testament to KVASU's growing research and innovation footprint.

The University's entrepreneurial outreach supports farmers and farmer groups in starting and expanding their businesses. KVASU remains committed to advancing food security and safety in Kerala and across India. Having completed fourteen successful years, KVASU is well-positioned to continue its journey toward academic excellence and stakeholder support, embodying its motto, "Ideas in Action."

KERALA VETERINARY AND ANIMAL SCIENCES UNIVERSITY

RESEARCH POLICY

1.0 PURPOSE

This policy sets the framework to spearhead research at the Kerala Veterinary and Animal Sciences University (KVASU) consistent with its policy on research. The research policy shall help to –

a. Identify core areas of research
b. Give direction to research activities carried out in different disciplines of basic science, veterinary science, animal science, poultry science, dairy science and food science
c. Promote multi-disciplinary and multi-institutional research
d. Instill quality in research through healthy competition among faculty members for seeking research funds
e. Act as the lead guide with a clear-cut policy on research and extension
f. Envisage programs for human resource development

2.0 ORGANISATIONAL SCOPE

This is a University-wide policy and exceptions are to be accepted only with due approval by the Research Council.

3.0 VISION

The University aspires to be recognised nationally and internationally as the University of choice, in nurturing meritorious/ renowned veterinarians, dairy/poultry/livestock product technologists, professionals and students in related disciplines by entrenching a strong research culture. The research undertaken shall (a) promote sustainable and profitable animal production systems (b) provide quality care and veterinary services (c) assure food safety, quality and security of the State (d) disseminate modern scientific knowledge and skill (e) foster professionalism in animal welfare and ethics (f) promote One Health approach (g) aim to alleviate adverse effects of climate change and (h) help the government modify/formulate policies based on scientific information and data.

4.0 MISSION

Sustainable animal production and development through -

a. Scientific breeding and production of superior quality stock and germplasm
b. Model livestock and poultry enterprises and integrated farming systems
c. Cost-effective interventions in feeds and feeding
d. State-of-the-art hospitals, accredited laboratories, advanced diagnostics and superior vaccines for better diagnosis, treatment and control of animal diseases, food-borne diseases and management of infertility
e. Production and standardisation of value added food products
f. Internationally competent graduates/professionals who can foster and promote veterinary, animal science, poultry and dairy research
g. Control and prevention of zoonotic diseases
h. Effective livestock waste management
i. Conservation and utilisation of animal biodiversity
j. Animal welfare measures in veterinary and animal science research
k. Conduct of research ethically and preventing research misconduct
l. Mitigation of adverse effects of climate change

5.0 CORE AREAS OF RESEARCH

5.1 Animal Production and Management

a. Conservation, characterisation, evaluation and improvement of livestock and poultry
b. Development of new strains of livestock and poultry suitable for local climatic conditions and for disease resistance
c. Application of biotechnological tools for improvement of livestock and poultry production
d. Model housing systems for optimum utilisation of genetic potential of animals through micro-environmental interventions in different ecological zones
e. Adoption of scientific management practices and less labour intensive technologies in routine farm operations

f. Developing of feeds and fodders and its preservation strategies; cost-effective feeding schedules/feed formulations appropriate for small, medium and large animals/poultry based on the availability of feed ingredients, fodder, other raw materials and unconventional feedstuffs to make animal farming sustainable and economically viable

g. Interventions to reduce antimicrobial residues in the human food chain and mitigation measures for antimicrobial resistance

h. Alternative feed additives to enhance nutritive value and nutrient utilisation in animals and poultry

i. Integration of bio-fuel technologies, value addition of farm wastes and utilisation of renewable energy sources for higher net farm income

j. Impact of climate change on animal production

k. Mitigation of greenhouse gas emissions and their effect on climate change

l. Development of reproductive technologies for augmenting fertility and production in livestock and companion animals

m. Area specific mineral mixture

5.2 Animal Health

a. Development of diagnostics, vaccines and vaccination protocols, for detection and control of diseases of farm and companion animals

b. Advanced techniques for diagnosis of viral, bacterial, rickettsial, fungal, algal, protozoan and metazoan diseases and diseases due to prions and commercialisation of technologies including vaccines

c. Impact of climate change on animal health, surveillance/ seromonitoring of diseases in animals and birds and developing disease outbreak forecasting models for emergency preparedness

d. Improved strategies for treatment and control of diseases of livestock, companion animals and poultry

e. Optimise reproductive health in farm and companion animals by modern diagnostic and treatment strategies

f. Exploring the transmission dynamics of zoonotic diseases and its effective control through One Health approach

g. Investigations on diseases of livestock, companion animals and poultry

h. Investigations on the use of drugs, hormones and other chemicals in food animals to ensure food safety and mitigation strategies to avoid their imprudent use

i. Design, development and commercialisation of health food for supporting and promoting health of companion animals

j. Biosecurity as a means to prevent introduction of infectious agents to farms and other facilities

5.3 Improvement in Veterinary Care/ Support Service

a. Research, development and refinement of medical / surgical treatment and advanced diagnostic approaches to sustain and improve health of farm, companion and wild animals in captivity

b. Research and development of newer drugs and molecules including ethnoveterinary products for animal health care

c. Field / problem oriented research in veterinary care and treatment

d. Development of standard protocols for prophylactic and therapeutic procedures in veterinary practise

e. Biomedical research including development and use of biomaterials; development of medical and surgical animal models for human diseases

f. Collaborative regenerative medicine and instrumentation research

5.4 Biotechnology

a. Molecular characterisation of domestic animal diversity and marker assisted selection

b. Genome sequencing and application of bioinformatic tools for genetic improvement of livestock and poultry

c. Artificial intelligence and machine learning approaches in animal and veterinary sciences

d. Development of diagnostic kits and biomarkers

e. Multi-omic approaches in improving health and productivity in livestock and poultry

f. Research on embryo transfer technology, oestrous synchronisation and assisted reproductive technologies

g. Biotechnological interventions for manipulating rumen ecosystem and improving productivity

h. Use of nanotechnology in animal health, production and reproduction

i. Pharmacogenomics for drug discovery and development

5.5 Livestock Products and Value Addition

a. Food safety and quality assurance

b. Starter culture technology and fermentation for novel dairy products

c. Physico-chemical modification of food components for the development of designer foods

d. Consumer-friendly packaging techniques for customer confidence - including freshness indicators

e. Rapid food diagnostics and safety assessment of meat, milk, eggs and other food matrices

f. Methods to assess, forecast and prevent microbiological and chemical hazards and unethical practices in animal products

g. Functional foods/probiotics/post-biotics /diabetic/dietetic/fortified foods

h. Process standardisation of Ayurveda based dairy products

i. Plant-based meat alternatives and cultured meat/vegan foods/convenient foods

j. Sustainable/alternative/green technologies for meat/milk/food processing and packaging

k. Farmer-friendly animal and carcass grading systems for different species in collaboration with national agencies

l. Development of blueprints for long distance transport of frozen/chilled carcasses and meat cuts

m. Enriching the nutritional value of animal products through soil enrichment, alternate feeding regimes and post-harvest interventions

n. Valorisation of waste from abattoir, dairy and food enterprises into high end products including biomaterials, pet foods and industrially relevant products

o. Development of animal, poultry and aqua feed formulations using rendered products

p. Alternate, and green technologies for animal transport, slaughter houses, waste disposal, carcass handling and storage

q. Climate adaptation of animals and its effect on meat quality

5.6 Extension and Economics

a. Facilitating multidimensional, qualitative and quantitative research in technology transfer in the animal production, health care, composite pet management post production processing and marketing of animal products

b. Multi component and multi-dimensional researches on coping up strategies of the stakeholders for climate smart animal agriculture

c. Methodologies to manage disasters for sustainable animal husbandry

d. Fostering entrepreneurial skills in the student community through participatory research

e. Applied and action research to augment the livelihood status of the stakeholders

f. Capacity building of various groups of people involved in the animal husbandry and allied sector

g. Effective use of media including Mobile App for technology and information delivery in animal husbandry sector

h. Planning and development of strategies, policies and procedures to augment the animal husbandry sector

i. Economics of animal farming, companion animal management and post-harvest technologies

j. Marketing and pricing strategies of animals or their products

k. Human resources planning management and development in the animal husbandry and associated sectors

l. Facilitation of intellectual property rights in animal husbandry research, production sector and its management

m. Assessment of consumer trends with respect to novel products, extended storage life, healthy tag (low fat, low calorie, healthy fats and functional food) and development of such products

n. Trends in consumer behaviors and aspirations and market analysis

5.7 Other Core Areas

a. Need-based/ Problem-oriented research and adaptive research to address the demands of farming community and general public of Kerala State with special emphasis on emerging and re-emerging diseases and human, animal and environmental health

b. Animal welfare

c. Livestock waste management and recycling

d. Rearing of pet animals and birds as livelihood

e. Organic farming systems, integrated farming models, nutrient cycling, vector borne disease control

f. Laboratory animal breeding and development of animal models

g. Research on wildlife

h. Human-wildlife interactions with special reference to sustainable equitable development and human health

h. Veterinary forensics

i. Establishment of translational research platforms

6.0 OUTCOME

a. Growth and development of animal production systems in the State of Kerala

b. Food security and safe and hygienic food production for the state

c. Self-sufficiency in production inputs and animal products

d. Early detection and prevention of diseases leading to a healthy animal population

e. Availability of state of art animal care and treatment modalities

f. Improving farmers' income through interventions in animal production systems

g. Establishment of research collaboration with national and international organisations of repute

h. Clean, green and ethical animal production

7.0 SUMMARY

The Kerala Veterinary and Animal Sciences University research policy is framed with an emphasis on research leading to sustainable, environment friendly development in animal production, thereby assuring food safety and security. It focuses on animal welfare and health by embracing cutting edge technologies in the field of animal health care and treatment. It also envisages to build entrepreneurial capabilities, extend its reach to emerging fields of science and technology and to foster collaboration with external agencies to bring about the best in both realms. The ultimate aim of the policy is to improve the livelihood security of the farmers of the State.

RESEARCH PROJECTS

1. External Aided Projects

Sl No	Principal Investigation officer	Funding Agency	Title of the project	Total outlay (Rs)
1	Dr. Lali F. Anand	DST SERB	Genomic approach for genetic improvement and conservation of important aquaculture species, *Etroplus suratensis* and *Trachinotus blochii* under changing climate scenario	1830000
2	Dr Anilkumar K Dr Radhika G (from Feb 2024)	ICAR	FPT Scheme for Frieswal bulls	44,58,881
3	Dr. Ajith Y.	DAAD	DAAD-RISE Worldwide-2023 scheme	NA
4	Dr. Ajith Y.	Science and Engineering Research Board, Department of Science and Technology, Government of India	DST-SERB Start-up Research Grant-2022 Corroborating host-vector-pathogen interplay in subclinical forms of arthropod-borne hemoparasitic diseases in goats	29,40000
5	Dr. V. N. Vasudevan	National Livestock Mission	Development of Innovative Technologies for Meat Animal Appraisal and Meat Production, Value Addition and Waste for Augmenting Farmer's Income and Entrepreneurship (Started on 1-3-2024)	158.78 Lakhs
6		SERB DST	Role of parkin mediated mitophagy in metastatic melanoma in the *in vivo* mouse and *in vitro* anoikia models	18.3 lakhs

7	DR. Ambily R.	ICMR	Molecular characterisation, antibiogram and geospatial analysis of leptospiral isolates from Kerala	3750538 Rs/-
8	Dr Bindu Lakshmanan	KSCSTE	Development of recombinant protein based diagnostic kit for visceral schistosomosis and sero-epidemiological study of the infection in ruminants	12.57 lakhs
9	Dr. Asha Rajagopal	ANRF (DST-SERB)	Semiochemical based tick control strategies for the sustainable mitigation of haemoprotozoan / rickettsial diseases in ruminants	29.414lakhs
10	Dr. Deepthi Vijay	INGSA-Asia	Addressing Antimicrobial Resistance in India: A One Health Action Plan	0.6 lakh
11	Dr Bibu John Kariyil	NMPB	Bioactivity guided Fractionation and Isolation of Bioactive Compounds from Thespesia populnea medicinal plant with Anticancer potential against triple negative breast cancer	21.328 lakhs
12	Dr Suresh N Nair,	KSCSTE	Development of an Eco-friendly smart Organogel based Drug delivery system for administration of antibiotics in Aquaculture and evaluation of its efficacy as targeted drug delivery system in fishes	Rs. 17.22 Lakhs
13	Dr Bibu John Kariyil	ICAR NASF	Development of Small molecular weight bioactivities and polysaccharides from Marine and coastal bivalves to develop prospective nutraceutical products	33.0696 lakh
14	Dr.Deepa PM	IIL, Hyderabad	An open label randomized multicentric study to assess safety and immunogenicity of IndianImmunologicals Limited manufactured infectiousbovine rhinotracheitis recombinant vaccine(inactivated) in cattle	Rs.30,44,600

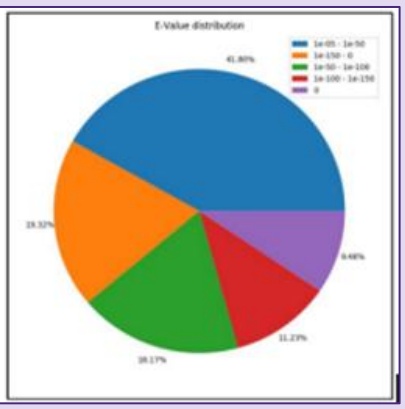
15	Dr.S.Senthil Murugan	ICAR	Promoting Dairy heifer rearing practice for Sustainable Livestock farm based livelihoods to tribal youth in Wayanad District, Kerala under ICAR Scheduled Caste Sub Plan 23-24	40.0 lakhs
16	Dr. Aswathi P B	DST-SERB	DST-SERB Karyashala	4,00,000/-
17	Dr. Anju Varghese	KSCSTE	Oriental bovine theileriosis: characterization of pathogenic genotypes of *Theileria orientalis* from Kerala and development of recombinant protein-based diagnostics	21.02 lakhs
18	Dr. Jess Vergis	ICAR-National Agricultural Science Fund	Exploiting encapsulated nanoparticle conjugated phytochemicals to combat antimicrobial resistance in poultry	4828184.00
19	Dr. A.K Beena Professor & Head Department of Dairy Microbiology	Kerala State	Revolving fund starter culture	0.5
20	Dr. A.K Beena Professor & Head Department of Dairy Microbiology	NABARD	Developing & Establishing a cost Effective method to produce Dehydrated Dairy starters for Prospective Entrepreneurs of the State	7.98
21	Dr. S. Sankaralingam	ICAR	Poultry improvement for eggs	66.5lakhs
22	Dr. A. Prasad, Associate Professor & Head, LRS, Thiruvazhamkunnu	Directorate of Cashewnut and Cocoa Development (DCCD)	Establishment of demonstration plot with high density in cashew	Out of Rs. 2,40,000

Research Highlights

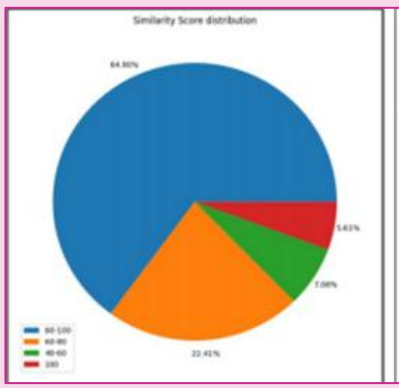
Genomic approach for genetic improvement and conservation of important aquaculture species, *Etroplus suratensis* and *Trachinotus blochii* under changing climate scenario

The study generated de-novo transcriptome assembly of *Trachinotus blochii* and *Etroplus suratensis* that are the key information to develop genomic tools to combat the challenges in the aquaculture industry of both the species. In *T. blochii*, differentially expressed transcripts were found to be 3442 ($p \leq 0.05$) between larval and adult stages. The comparison between liver and muscle tissues revealed that 6558 transcripts were differentially expressed. The differential expression analysis between *E. suratensis* maintained at different salinities revealed that 228 transcripts were differentially expressed ($p \leq 0.05$) in gills. The comparison between muscle tissues of fishes differed in growth rate revealed that 439 transcripts were differentially expressed.The ddRAD sequence data was generated for *T. blochii* and *E. suratensis* collected from eastern coast and western coast of India.

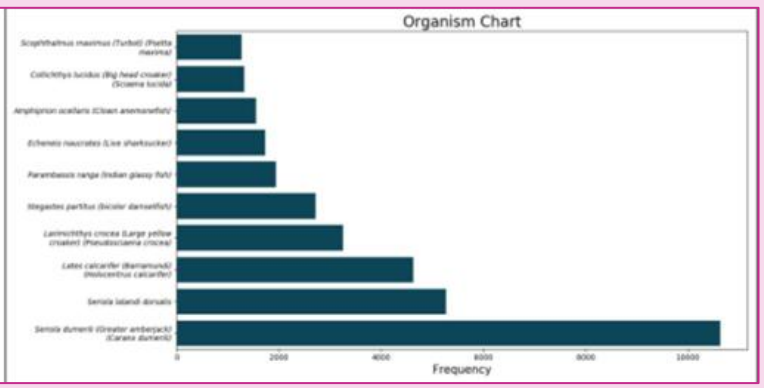
1.a) Trachinotus blochii (adult)



1.b) E-Value distribution of Trachinotus blochii

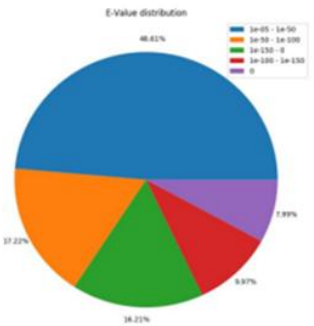


1.c) BLASTX similarity score distribution

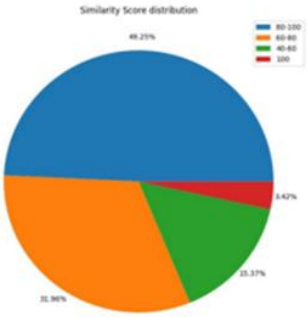


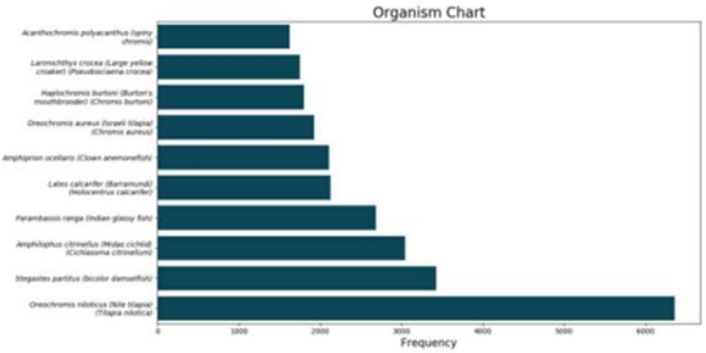
1.d) Organism annotation of *Trachinotus blochii*

1.e) *Etroplus suratensis* (adult)



1.f) E-Value distribution of *Etroplus suratensis*





1.g) BLASTX similarity score distribution

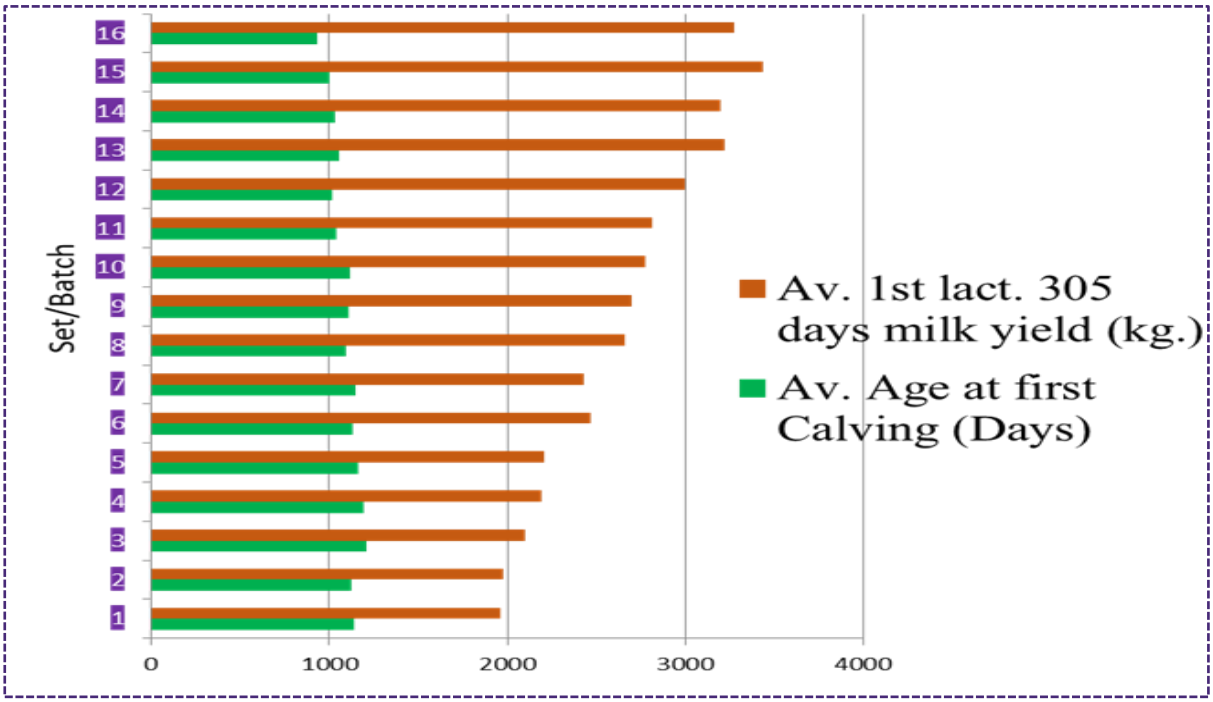
1.h) Organism annotation of *Etroplus suratensis*

FPT Scheme for Frieswal bulls

The scheme started in 1992 and more than 1,50,000 inseminations were done using semen supplied from the project and the number of female calves born from 1992 exceeds 13,500.Considering an advantage of 500kg per animal compared to contemporaries in first lactation, estimated increased milk production of the progenies in the first lactation is 60,65,500Kg.The age at first calving of progenies was recorded as 1136 ± 13 days in the progenies of first batch of bulls currently it is 1018.23 ± 11.24 days. During the period from 1992 to 31.12.2023, 43067(including 6 pregnancies confirmed from nominated mating) pregnancies from the project were confirmed. The average first lactation yield of progenies increased from 1958.01 ± 26.4 Kg in the progenies of first batch of bulls to 3278.24 ± 75.30 Kg in progenies of 16th batch of bulls.Socio- economic status of dairy farmers in Thrissur district is continuously collected and analysed.Elite females with milk production above 4500 litres were identified and used for nominated mating to obtain bull calves for progeny testing.

The arrangement of veterinary services and supply of inputs like dewormers, feed / feed supplements and expert advice of scientists are made available to farmers of project area. Under the project SCSP farmers were supplied with inputs like cattle feed, mineral mixture and milking pail. Constant follow up of the status of progenies ensures frequent visit of field workers in farmer's houses.Seminars and discussions conducted at different centres ensure dissemination of latest knowledge to the farmers in the field of animal management, nutrition and breeding.

Set wise Progeny performance from 1st to 16th set



Feed distribution and Seminar at ICAR FPT field centre

Visit by ICAR CIRC officials to CBF, Thumburmuzhy

DAAD-RISE Worldwide-2023 scheme

Hosted German DVM student from LMU, Munich to carry out six week internship at KVASU with fellowship from DAAD

Corroborating host-vector-pathogen interplay in subclinical forms of arthropod-borne hemoparasitic diseases in goats

- To map ectoparasitic arthropods identified from goats and probe the shreds of evidence on their emerging vector potential in hemoparasitic diseases.
- To characterize genetic variability of pathogenic species/strains in subclinical forms of vector-borne hemoparasitic diseases in goats**.**

Development of Innovative Technologies for Meat Animal Appraisal and Meat Production, Value Addition and Waste for Augmenting Farmer's Income and Entrepreneurship

Under the National Livestock Mission (DAHD, GoI) initiative, innovative technologies are being developed to enhance meat animal appraisal, meat production, value addition, and waste valorization to increase farmers' income and promote entrepreneurship. Key activities include the selection of research personnel (SRF & YP), procurement of essential chemicals, and training research staff on MS-based proteomics for advanced meat quality analysis.

Infrastructure improvements, such as laboratory modifications and new equipment purchases, have been implemented to facilitate cutting-edge research. Meat samples were

collected for analysis, with standardization of total heme pigment and hemoglobin estimation completed. Additionally, histological examinations of muscle microvasculature were conducted, contributing to a deeper understanding of meat quality parameters. These advancements aim to bridge the gap between scientific innovation and practical application, ultimately benefiting both farmers and meat processors.

Role of parkin mediated mitophagy in metastatic melanoma in the *in vivo* mouse and *in vitro* anoikia models

Production of two new stable cell lines for studying mitophagy in live animals with minimal invasive techniques. B16-F10 melanoma cell line was used to develop cell lines with overexpressed Parkin by competent cell preparation and plasmid transformation utilizing E. *coli* strain, DH5α. The plasmid was isolated by alkaline lysis and gravity column method. The isolated plasmid DNA was analysed by agarose gel electrophoresis and was transfected into the cells followed by selection and stable cell line preparation. Standardization of tumor development in mice and evaluation of tumor growth dynamics was done followed by evaluation of tumor tissues for mitophagy markers. Further the role of parkin in assisting tumor dissemination *via* the anoikia model and in *vitro* assays are being analysed. The transfected cell lines were found to be more resistant to certain drugs confirming that mitophagy promotes survival.

Molecular characterisation, antibiogram and geospatial analysis of leptospiral isolates from Kerala

Microscopic agglutination test of serum samples from dogs revealed Grippotyphosa and Bataviae as the most prevalent serovar. Hardjo was the most prevalent serovar in cattle. Real time PCR and MLST standardised. Spatio temporal distribution of different serovars of Leptospira analysed

Development of recombinant protein based diagnostic kit for visceral schistosomosis and sero-epidemiological study of the infection in ruminants

A PCR-RFLP protocol for differentiation of S. spindale and S. indicum was standardised. Recombinant 22.6 kDa tegument protein of S. spindale (rSs22.6) was expressed and purified in E. coli BL21 competent cells and established the diagnostic sensitivity and specificity of the novel protein. Serodiagnostic ELISA protocols was standardised. The 14-3-3 tegument andprotein coding gene of S. spindale was amplified and cloned.

Development of recombinant protein based diagnostic kit for visceral schistosomosis and sero-epidemiological study of the infection in ruminants

The agro-ecological zone wise prevalence of tick vectors in cattle was determined during pre-monsoon season. The prevalence of Rhipicephalus annulatus, R. microplus, Hemaphysalisbispinosa and H. intermedia were recorded in malayoram, midland and coastal agroecological zones during the pre-monsoon season. In malayoram and midland zones, H. bispinosa was found predominant with a prevalence of 46.4 % and 52.6 %, respectively while R. microplus was identified to be the most prevalent species in the coastal zone (66.1%).

Addressing Antimicrobial Resistance in India: A One Health Action Plan

The project has successfully conducted three workshops: two offline and one online for assessing current strategies and way forward for addressing AMR. a World Café workshop held on September 27, 2024, at the Academic Staff College, Mannuthy, engaged 25 senior veterinary surgeons to examine critical issues of AMR in veterinary sector and assess the status of AMR action plans. An online focus group discussion on October 10, 2024, brought together 15 veterinarians working in diagnostic laboratories and public health specialists to evaluate the challenges in AMR surveillance. The valuable insights gathered from these two sessions served as a foundation for shaping the themes and discussions at the conclave, ensuring a well-rounded, evidence-based approach to addressing AMR in a One Health framework. The culminating event, AMR Conclave 2024: Strengthening One Health Action Plan, was held on November 20, 2024, at Hotel Ashoka Inn, Thrissur, in collaboration with

INGSA-Asia and ReAct Asia Pacific. This event, commemorating 'World Antimicrobial Resistance Awareness Week', gathered distinguished experts and stakeholders from diverse sectors resulted in the formulation of actionable strategies for AMR containment, in the form of Report and Recommendations

Bioactivity guided Fractionation and Isolation of Bioactive Compounds from Thespesia populnea medicinal plant with Anticancer potential against triple negative breast cancer

1. Developed the chromatographic profile of the methanolic extract of Thespesia populnea
2. Developed the chromatographic profile of the active fractions of Thespesia populnea having anticancer activity
3. Standardized the protocol for the separation of two bioactive fractions having anticancer activity
4. Identified four molecules from Thespesia populnea having anticancer activity
5. Standardized the protocol for the commercial isolation of two bioactive molecules
6. Derived the structure of the bioactive molecules by NMR studies
7. The mechanism of action of these four bioactive molecules were also found out.

Development of an Eco-friendly smart Organogel based Drug delivery system for administration of antibiotics in Aquaculture and evaluation of its efficacy as targeted drug delivery system in fishes

1. Standardised the protocol for preparation of organogel using Soyabean oil and beeswax and its characterization was done using FTIR
2. Incorporated oxytetracycline into the prepared organogel and the incorporation was confirmed by FTIR
3. Prepared the OTC –organogel incorporated fish feed and conducted the palatability studies in fishes
4. Single dose oral pharmacokinetics was done in Anabas fishes
5. It was found that oxytetracycline produces toxicity to aquatic arthropods and such toxicity is dependent on duration of exposure and not on concentration of OTC
6. Standardized a modified protocol for anaesthesia in fishes using a combination of ethanol and clove oil
7. Developed a protocol for assessment of Daphnia magna as a model organism for aquatic toxicity
8. Developed Artemia salina as a model organism for aquatic toxicity

Development of Small molecular weight bioactivities and polysaccharides from Marine and coastal bivalves to develop prospective nutraceutical products

1. Evaluated the therepeutic potential and safety of sulphated glycosaminoglycan from Perna virdis in in vitro and in vivo models of inflammation, dyslipidemia and diabetes
2. Evaluated the therapeutic potential and safety of sulphated glycosaminoglycan from Saccostrea cucullata in in vitro and in vivo models of inflammation, dyslipidemia and diabetes
3. Evaluated the therapeutic potential and safety of sulphated glycosaminoglycan from Perna indica in in vitro and in vivo models of inflammation, dyslipidemia and diabetes
4. Evaluated the therapeutic potential and safety of sulphated glycosaminoglycan from Geloina erosa in in vitro and in vivo models of inflammation, dyslipidemia and diabetes

An open label randomized multicentric study to assess safety and immunogenicity of IndianImmunologicals Limited manufactured infectiousbovine rhinotracheitis recombinant vaccine(inactivated) in cattle

The objective of the study was to evaluate the safety of “Infectious Bovine Rhinotracheitis Recombinant Vaccine (Inactivated)” developed and manufactured by Indian Immunologicals Limited in vaccinated animals in comparison with the animals in control arm.

To study the frequency of adverse events and serious adverse events occurring in vaccinated animals in comparison with the animals in control arm. Number of serious adverse events occurring after vaccination and during follow up period.

To determine immune response of “Infectious Bovine Rhinotracheitis Recombinant Vaccine (Inactivated)” developed and manufactured by Indian Immunologicals Limited in cattle.

To study the effect of vaccine on milk yield. Milk yield in animals of the lactating group will be monitored for 5 days before vaccination and 9 days post-vaccination.

The vaccine gave good immunogenicity during the study period and no adverse reaction observed during this period. Effect of vaccination in reduction of milk production and feed intake was negligible

Promoting Dairy heifer rearing practice for Sustainable Livestock farm based livelihoods to tribal youth in Wayanad District, Kerala under ICAR Scheduled Caste Sub Plan 23-24

Organised, need based interventions for livelihood upliftment of Scheduled Caste clusters by supply of Heifers. Supplied heifers to beneficiaries belonging to Schedule Castes, in various parts of Wayanad Dist. under PI, Dr.S.Senthil Murugan. Gave Entrepreneurship and skill development training on Animal Husbandry and Veterinary Practices for Scheduled Caste beneficiaries for 14 days as part of ICAR SC SP 23-24 at CVAS, Pookode under the PI, Dr.S.Senthil Murugan.

DST-SERB Karyashala

KARYASHALA is a noble endeavour of Government of India by Science and Engineering Research Board (SERB) under Accelerate Vigyan Scheme to improve research productivity of promising PG and PhD students from universities and colleges through high-end workshops on specific themes. This program aims to provide opportunities to acquire specialized research skills.

The eight day long workshop entitled Advanced training on poultry production with special emphasis to recent techniques in antimicrobial resistance and food safety was conducted from 19/7/23 to 26/7/23 at College of Veterinary and Animal Sciences Pookode. 20 students from 8 different colleges participated in this workshop. Sessions on various topics related to the theme of this event was handled by experts from respective departments. 3 external faculties were also invited to deliver lectures.

Exploiting encapsulated nanoparticle conjugated phytochemicals to combat antimicrobial resistance in poultry

A technology entitled “Green nano-antibacterial technology: Chitosan-encapsulated nanosilver entrapped cinnamaldehyde and thymol to combat antimicrobial resistance in poultry” was developed and commercialised under this project. The encapsulated phytochemical compounds developed in this study effectively inhibited bacterial growth, improved survival rates, and combat antibiotic resistance while maintaining food safety standards. The compounds were found safe according to OECD guidelines, with no residues detected in vital organs or breast muscles of treated poultry, ensuring consumer safety. No adverse effects on the gut microbiome were observed, and the compounds exhibited targeted delivery with >80% release at alkaline pH in the intestine, reducing the required dose and production costs.

Developing & Establishing a cost Effective method to produce Dehydrated Dairy starters for Prospective Entrepreneurs of the State

The present study utilized fermented skim milk coagulum as the feed for the fluidized bed dryer (FBD), thereby subjecting acid-stressed cells to the drying process, which may have influenced their viability and performance. The resulting FBD powder successfully formed a good-quality coagulum with a pleasant lactic taste when used at a 0.02% level for up to one month. However, as storage progressed, the coagulum produced became less appealing. Nevertheless, the final product remained satisfactory, demonstrating the high feasibility of fluidized bed drying for preparing mother cultures. Although the drying process never exceeded two hours for feed quantities ranging from 750 g to 850 g, proper cleaning and sanitation of the FBD were found to be critical in maintaining product quality. Despite no significant differences in viable counts between the powders (NBD 13 and HH2), their performance varied between cultures, particularly in solubility and activity (rate of acid production). Notably, HH2 underperformed in terms of product texture from day 45 onwards, and its optimal incubation temperature preference shifted. In contrast, NBD 13 powder exhibited more consistent performance.

Poultry improvement for eggs

In 2023-24, AICRP on Poultry Breeding, Mannuthy Center, KVASU evaluated the S-7 generation of native chicken germplasm from 28 to 40 weeks of age. The egg weight at 28 weeks of age was 43.04, which decreased by 0.91g compared to the previous generation. The hen day egg production up to 40 weeks of age was 89.44, which increased by 13.69 compared to the previous generation. The center has also evaluated the S-34 generation of IWN and IWP strains of White Leghorn up to 28 weeks of age. The egg weight at 28 weeks of age was 48.84 and 49.34 for IWN and IWP strains, respectively, which increased by 0.83g and decreased by 0.61g, respectively. The center has generated a revenue of Rs.20.07 lakhs and has supplied 1,08,000 germplasms during the year. The number of farmers who benefitted through the germplasm supply from the center during the current year was 840.

Establishment of demonstration plot with high density in cashew

Six units of frontline technology demonstration (FLTD) plots on high density planting in cashew with eight cashew varieties (Priyanka, Sulabha, Kanaka, Dharasree, Dhana, Poornima, Raghav and Anakkayam-1) were established at LRS, Thiruvazhamkunnu, Palakkad during the financial year 2022-23 and 2023-24 in a phased manner. Each unit established under the project had an area of one hectare and high density planting (5m x 5m spacing) with latest production

Inaugration of the FLTD programme by Honurable MLA of Mannarkad, Adv. N. Shamsudheen

technologies were demonstrated in the field so that 400 cashew grafts were planted in each unit of 1 ha. The planting operations of the project were done by labour provided by MGNREGS unit of Kottoppadam Panchayath and the planting materials (2400 cashew grafts) were purchased from Cashew Research Station, Kerala Agricultural University.

General awareness were created on new technologies in cashew farming viz., high yielding cashew varieties, high density system of planting, integrated nutrient pest and disease management practices among the farmers and students visited the station. The programme helped to impart knowledge on basic and advanced cashew cultivation practices and also encouraged farmers to adopt high yielding varieties, cropping systems, high density planting systems, INM/IPM practices for boosting the cashew productivity.

Visit of farmers to the FLTD plots on 'high density planting in cashew'

2. ICAR Network Projects

Sl No	Name of Principal Investigator	Name of the project	Department	Outlay per annum (lakhs)
1	Dr. Arun George	All India Network Programme on Ethno Veterinary Medicine	Department of Clinical Medicine, Ethics and Jurisprudence, CVAS Mannuthy	5.14
2	Dr. K. Syamala	ICAR-NBAGR scheduled caste sub plan SC-SP project for socio economic development of goat farmers of Parakode block, Kerala	Centre for Advanced Studies in Animal Genetics and Breeding, Mannuthy	7.1
3	Dr. Rejeesh R	Network centre of Dairy Microbes (ICAR- NCVTC, Hisar, Haryana)	College of Dairy Science and Technology, Thiruvananthapuram	2.0
4	Dr. R. Thirupathy Venkitachalapathy	AICRP on Malabari Goat Improvement	Centre for Advanced Studies in Animal Genetics and Breeding, Mannuthy	25.0
5	Dr. R. Thirupathy Venkitachalapathy	AICRP on pigs	Centre for Pig Production and Research, Mannuthy	39.79
6	Dr. S. Sankaralingam	AICRP on Poultry breeding, Mannuthy centre	AICRP on Poultry for Eggs, Mannuthy	83.19
7	Dr. K. Anilkumar/ Dr. Radhika G	Field Progeny Testing Scheme	Centre for Advanced Studies in Animal Genetics and Breeding, Mannuthy	41.5561
8	Dr. R. Thirupathy Venkitachalapathy	ICAR- Network Project on Animal Genetic Resources	Centre for Advanced Studies in Animal Genetics and Breeding, Mannuthy	11.0

Research Highlights

All India Network Programme on Ethno Veterinary Medicine

Conducted *in vivo* trial of antifungal and anti-inflammatory activity of AJ-AI ointment in clinical cases of canine dermatophytosis and was found to be effective. Green synthesised silver nanoparticles from aqueous extract of *Acalypha indica.*

Techno textural studies and molecular characterization of lactic acid bacteria from indigenous fermented milk product samples collected across Kerala

Significant Findings

- Submission of eleven promising strains of lactic acid bacteria to VTCC as well as NCBI GenBank.
- Successfully accessioned *Lacticaseibacillus rhamnosus* AMB 120 (VTC DM 647B) in ICAR-NBAIM with no NAIMCC-IDA-19.
- Developed folate enriched yoghurt using *Lacticaseibacillus paracasei ssp tolerance* IDK 220 (VTC DM 649B)
- Aerobically grown *Lacticaseibacillus rhamnosus* AMB 120 (VTC DM 647B) showed maximum viability at 90 days during refrigerated storage without any intermittent subculturing.
- Combination of *Pediococcus acidilactici* (MTCC 7442) and *Lactiplantibacillus plantarum* IDK 120 (VTC DM 648 B) resulted desirable sensorial attributes in fiber enhanced semi-dry fermented carabeef sausages incorporating wheat bran.
- Successful in isolating strains of lactic acid bacteria capable of producing curd with perfect texture and good lactic feel**.**

ICAR- AICRP on Goat Improvement (Malabari Goat)

In 2023-24, total of 217 farmers have been registered including 148 women. 1302 animals were registered under this project. Total flock strength was 3548 animals. Population growth recorded was 92.30 %. Genetic trend of body weights was positive for all age groups. Kidding rate was 1.71. Percentage of singles, twins and triplets were 41.07, 47.77, 10.14 and 1.03, respectively. A total of 18 bucks were distributed among the farmers and multiplier flocks. Mortality rate was 2.63 % in the project area. As capacity building, 1 training on offline mode were conducted to 30 farmers with 1 day duration. Two one day training to Assistant

Directors, AHD, Kerala state. Published seven research papers in the peer reviewed International / National Journals and 1 MSc, 1PG and 1 PhD student works were also completed during 2023-24. The net return per month per goat is increased from Rs. 1192.00 to Rs.1259.00. Total budget outlay was Rs.33.30 lakhs(ICAR share (75%) Rs.25.00 lakhs and State share (25%) Rs.8.3 lakhs).

AICRP on Pig

All India Co-ordinated Research Project on Pigs was started in this Centre on 01-08-1993. As per the technical programme a foundation stock of indigenous pigs was established in the Centre the same were raised for cross breeding with Large White Yorkshire. Basic information with respect to management, disease prevalence and nutrition were collected in Desi stock. Inter-se mating of 75% crossbreds was done during the year 2023-24. The outbreaks of African swine fever in many parts of Kerala lead to severe damage to pig farming. The training and field extension activities were stopped to protect the nucleus herd from ASF outbreak. The salient achievements during the year are listed below. During the year 23-24, a total of 708 piglets (75% cross) were distributed to 86 beneficiaries. An income of 17.85 lakhs was generated by the centre during the period. Feed conversion efficiency of 3.65 was achieved during the period. Rain water harvesting systems, costing more than 16 lakhs were established. Three scientific articles and one popular article were published during the period. Also contributed a chapter to the University training manual One scientific paper was presented in the international symposium Documented two success stories from the field unit

ICAR CIRC FIELD PROGENY TESTING OF FRIESWAL BULLS

Achievements/Outputs:

- ICAR FPT being a continuing project from 1992 has performed 1,54,452 numbers of artificial inseminations, produced 13,850 numbers of female calves and reported 3057 numbers of first lactation records of progenies from 1992 till date.
- Considering an advantage of 500kg per animal compared to contemporaries in first lactation, estimated increased milk production of the progenies in the first lactation is 69,25,000Kg.
- The age at first calving of progenies decreased from 1136 ± 13 days in 1996 to 1018.23 ± 11.24 days in 2024.

- The average first lactation yield of progenies increased from 1958.01 ± 26.4 Kg in 1997 to 3278.24 ± 75.30 Kg in December 2024.
- The arrangement of veterinary services and supply of inputs like dewormers, feed / feed supplements and expert advice of scientists are made available to farmers of project area.
- Under the project SC and ST farmers were supplied with inputs like cattle feed, mineral mixture and milking pail.
- Seminars and discussions conducted at different centres ensure dissemination of latest knowledge to the farmers in the field of animal management, nutrition and breeding.

Photo 1. Frieswal herd - Cattle Breeding Farm, Thumburmuzhy

Photo 2. Elite cow at Veeroloppadam field centre of FPT Scheme

- Developed regression factors for predicting the 305 days milk yield based on the test day yield at monthly and fortnightly intervals which has got lot of practical application for prediction of milk yield under field conditions.
- A new project proposal for "Development of Cattle Breeding Farm at Thumburmuzhy into a Frieswal Bull Mother Farm" was submitted to ICAR-CIRC, Meerut on July 2024. To initiate the proposal immediately, permission was granted by ICAR-CIRC, Meerut to appoint an Inseminator cum Data Recorder at Cattle Breeding Farm, Thumburmuzhy (CBFT). There are 230 Frieswal cows at CBFT, of which 26 are now identified as elite cows with more than 4500 Litres per lactation and nominated mating of these elite cows with ranked bull semen is performed to produce genetically superior calves.

ICAR- Network Project on Animal Genetic Resources

The project started in November 2023 with total financial outlay of Rs. 11 lakhs with an objective to characterize/ conserve indigenous animal genetic resources of Kerala (Cattle, Kuttanad duck other native AnGR of Kerala). Survey conducted in two districts, namely Ernakulam (Angamaly, Koovapady and Kothamangalam blocks) and Thrissur (Chalakudy block) revealed the distribution of indigenous cattle popularly known as "Periyar cattle" also called as Kuttampuzha/Aandukanni. Farmers and plantation workers rear these animals for milk/meat. Free range rearing system is practiced in the rubber/palm plantation by the plantation workers.

Animals are small in size with short legs. Four coat color variations were observed, predominantly brown followed by black, red and grey. Mixed colors and combination with specific markings are also noticed. Tail is long and almost touches the ground. Horn pattern of this particular breed is very specific with three main patterns. Males have straight horns which are laterally upward and pointed or curved inwards. Females have straight horns (laterally upward) or curved horns with two patterns either pointed inwards or pointed outwards. Hump is prominent in males and small in females. Adult body weight of the cattle ranged from 140 to 200 kg, with an average of 165.50±17.40 kg. Birth weight of calves ranged from 9 to 14kg. The recorded body length, height at withers, chest girth and paunch girth were 98.80±6.35cm, 101.12±4.72cm, 132.22±5.53cm and 139.15±6.06cm, respectively. Milk yield ranged from 1.5- 3.5 litres per day with peak yield of 3.25 litres during the lactation. The lactation length ranged from 160-200 days. The fat, SNF, protein, lactose and minerals of milk was 4.50, 9.10, 3.50, 4.90 and 0.70 percent, respectively. The ethno- veterinary practices (32nos) were also documented.

3. State plan Projects

Sl No	Name of the Project	Department
1	Conservation of Vechur cattle of Kerala	CBF Thumburmuzhy
2	Conservation and maintenance of Ankamali pigs of Kerala	CPPR Mannuthy
3	Conservation and Evaluation of Malabari and Attappady Black Goats	University sheep and goat farm, Mannuthy
4	Nutritional and Genetic interventions for breed improvement of native Malabari goats of Kerala	Dept of Nutrition, AGB, Pookode
5	Sustainable *Ex situ* Conservation of Vechur and Kasargode Cattle	CASAGB
6	Enhancement of productivity at Cattle Breeding Farm, Thumburmuzhy	CBF, Thumburmuzhy
7	A comparative analysis of productive and reproductive performance of different purebred pigs under intensive management systems in Wayanad district of Kerala	ILFC, Pookode
8	Assessing the performance of Murrah Buffalo Herd for Milk and Meat production in Hot and Humid Climate of Kerala	ULF & FRDS
9	Productivity enhancement of livestock and poultry by optimizing the management strategies in different agro climatic regions of Wayanad district.	LPM, Poultry Science Extension, Pookode
10	Scientific Approaches for Rabbit Productivity Improvement for Enhancing Farmer's Income in Kerala	CASAGB
11	Evaluation of genomic and proteiomic markers associated with adapatation, disease resistance and production performance of livestock species of Kerala	SAAPBT, Mannuthy
12	A molecular approach in elucidating heat tolerance, disease resistance and reproductive robustness of indigenous cattle of Kerala	CASAGB, Mannuthy
13	Comprehensive health care of livestock, pet animals and birds in Wayanad district	Dept.Veterinary Clinical Medicine, PM, Pookode
14	Investigations on the anatomical factors involved in different clinico-pathological conditions affecting various domestic species and its application in field conditions	Dept. of Anatomy, Pathology, Mannuthy

15	Augmenting productivity of livestock through genomic and nutritional interventions	Dept.AGB, Nutrition, Statistics, Mannuthy
16	Molecular markers for thermo-tolerance and strategies for alleviation of thermal stress in ruminants	Dept.Biochemistry, Physiology, Mannuthy
17	Genome wide scan for the identification of genetic markers related to economic and functional traits in livestock and poultry	CASAGB
18	Augmenting clinical practice in university referral Veterinary Hospitals, Ambulatory clinics and clinical departments to improve health and productivity of animals	Director of Clinics, Pookode
19	Empowering Clincial Veterinary Services for Comprehensive Livestock Health Coverage In Wayanad And Neighbouring Districts	TVCC, Pookode
20	Universal Veterinary Health Coverage for Optimizing Productivity of Livestock	TVCC, Mannuthy
21	Comprehensive health care management of animals and birds under field condition	TVCC, Mannuthy
22	Empowering Farm Animal Health Care Services for Enhancing Production	UVH, Kokkali
23	Comprehensive health care of livestock and pet animals	Surgery and Radiology, AROG, Preventive Medicine Mannuthy
24	Novel diagnostic techniques for economically important bacterial, viral and parasitic diseases of large ruminants	Dept.Microbiology, Parasitology, Pathology Mannuthy
25	Development of diagnostics and mining of lead molecules for the control of parasitic disease/ infection	Dept. Parasitology, Pharmacology and Toxicology, Pookode
26	Evaluation and development of antimicrobial and anti-inflammatory herbal formulations for dermatological diseases of livestock and pet animals	Department of Clinical medicine and Pharmacology, Mannuthy
27	Augmenting the quality and safety of foods of animal origin and waste valorization for entrepreneurship facilitation	Dept. LPT, VPH, Dairy Science, Mannuthy

28	A multidisciplinary approach to combat concealed threats in dairy food chain	Dean, VKIDFT
29	Modification of Milk components to increase the bio availability and nutritive valueof Milk based products	Dean, VKIDFT
30	Technological Interventions for Improving Socio- economic conditions of Dairy Entrepreneurs through Value addition of Dairy products	Dean, VKIDFT
31	Establishment of research and extension facilities for development and dissemination of new dairy products and services.	CDST, KLMD
32	Upgradation of Dairy and Food Processing Operations in KVASU Dairy Plant	KVASU Dairy Plant, Mannuthy
33	Interventions to Enhance the Quality and Safety of Dairy and Food Products	KVASU Dairy Plant, Mannuthy
34	Application of fermentation technology: Process optimisation of daily staples	CDST, Pookode
	Process standardization of cereal supplemented low calorie functional dairy products and evaluation of its nutritional profile and engineering properties	CDST, Pookode
35	Development of functional food products by value addition of underutilized phytochemical rich pulses and grains	VKIDFT
36	Impact of Chemical and Microbial Contaminants on milk quality	CDST, TVM
37	Development of Functional Milk and Meat Products and Safety Assessment of foods of animal origin	Dept.Dairy Science, LPT VPH Pookode
38	Strengthening of department laboratories of College of Dairy Science and Technology, Pookode	CDST, Pookode
39	Investigation on the impacts of vector-borne haemoparasitic diseases in goats	TVCC, Mannuthy

40	Addressing One Health Priority areas through Research, Capacity building and Development of Knowledge products	COHEART, Pookode
41	Early and definitive identification of disease emergence in animals and birds in the scenario of extreme climatic change in farm animals, poultry and pets to support the sustainable and healthy farming in northern Kerala through strengthening of post mortem and diagnostic facilities	Dept. Microbiology Pathology, Pookode
42	Prevalence of zoonotic diseases among companion animals and pet birds in Kerala	School of Zoonoses, Public Health and Pathobiology, Mannuthy
43	"Silent Valley Farm Platform" for developing sustainable livestock production system.	LRS, Thiruvazhamkunnu
44	Augmenting activities of KVASU-CWS for implementing the One Health Action Plan at the human-wild animal-ecosystem interface under WGRI-WRTW	CWS, Pookode
45	Bottling of purified compressed bio gas and production of bio-fertilizer from biogas plant slurry	School of Bio-energy Studies and Farm Waste Management, Mannuthy
46	Livestock advisory based on weather forewarning	CAADECCS, Mannuthy
47	Strengthening of the elephant study centre, CVAS, Mannuthy for better welfare and conservation of captive elephants in Kerala through efficient healthcare and management	Elephant Study Centre, Mannuthy
48	Hatchery Waste Disposal and its effective utilization	CASPS, Mannuthy
49	Physiological, biochemical and morphological variations due to environmental stresses in crossbred and indigenous farm animals	Dept. Biochemistry, Physiology and Anatomy, Pookode
50	Strengthening the Centre for Livestock Development and Policy Research, Thiruvananthapuram	CLDPR, TVM
51	Strengthening of Bioscience Research and Training Centre, Thiruvananthapuram	BRTC, TVM

52	Strengthening of Veterinary Clinical Laboratory at University Veterinary Hospital, Kokkalai, Thrissur	UVH, Kokkali
53	Strengthening of NABL acredited Radio Immuno Assay Laboratary	CIL, Mannuthy
54	Strengthening of central instruments, Laboratary and instrumentation centre	CIL, Mannuthy
55	Strengthening of centres-- Central Instrumentation Facility (NABARD-RIDF)	CIF, CVAS, Pookode
56	strengthening of centres-- centre for ethnopharmacology"Chemical profiling and pharmacology of biologically active secondary metabolites by HPTLC/HPLC/GC-MS systems and its comparison with standard drugs"	Centre for Ethanopharmacology, CVAS, Pookode
57	Strengthening of Feed Mill	Head, Feed Mill Nutrition, Mannuthy
58	Strengthening of NABL accredited Feed Analysis Laboratory	Head NABL Nutrition, Mannuthy
59	Strengthening of NABL accredited Quality Control Laboratory	Head, NABL, VPH, Mannuthy
60	Strengthening of School of Animal Nutrition and Feed technology	SANFT, Mannuthy
61	Revamping and Maintaining Laboratory Animal and Large Animal Facilities at CVAS, Pookode	Laboratory animal facility, Pookode
62	Strengthening CAADECCS for Climate Change Preparedness in Livestock Sector	CAADECCS, Mannuthy
63	Strengthening of Centre for Advanced Studies in Animal Genetics & Breeding	CASAGB

64	Strengthening the meat production, preservation, value addition and capacity building facilities of Meat Technology Unit	Meat Technology, KVASU
65	Strengthening of Facilities at Academic Block of College of Avian Sciences and Management, Thiruvazhamkunnu. Palakkad	CASM, Thiruvazhamkunnu
66	Strengthening of Centre for Meat Type Duck Production at Avian Research Station, Thiruvazhamkunnu	ARS, Thiruvizhamkunnu
67	Strengthening of Integrated Rural Poultry Production Centre	ARS, Thiruvizhamkunnu
68	Improving backyard poultry production by supplying crossbred chicks from improved hens	AICRP
69	Selection for eighth week body weight in Kuttanad ducks to produce a broiler duck line	UPDF
70	Augmenting backyard poultry production in Kerala	UPDF
71	Interdisciplinary research in Poultry Science for developing climate resilient birds for Kerala and to establish a cost-effective production system through breeding, nutritional and management intervensions	CASM, Thiruvazhamkunnu
72	Advanced mycotoxin testing facility for poultry feed	CASPS, Mannuthy
73	Conservation, Characterization and Popularization of Native varieties of Poultry in Kerala	CASPS, Mannuthy
74	Standardisation of in-ovonutrition and vaccination in chicken and development of strategies for enhancement of poultry welfare in production systems by resource integration in selected five districts of Kerala	Dept. LPM, AHE, Poultry Science, Mannuthy
75	Field Progeny Testing (FPT) of Crossbred bulls	CASAGB, Mannuthy
76	AICRP on Goat Improvement (25% of State Share)	CASAGB, Mannuthy

77	Evaluation of performance of crossbred pigs (25% share of AICRP on pigs)	CPPR, Mannuthy
78	Poultry improvement for Eggs (25% State share of AICRP	AICRP, (Poultry), Mannuthy
79	Scaling up of production of piglings	CPPR, Mannuthy
80	Artificial Insemination for improving reproductive efficiency in pigs	CPPR, Mannuthy
81	Development of a sustainable goat farming model for Wayanad District	ILFC, Pookode
82	Strengthening of Instructional Livestock Farm Complex, CVAS, Pookode	ILFC, Pookode
83	Strengthening of Livestock Research Station Thiruvazamkunnu	LRS, Thiruvazhamkunnu
84	Updating the benchmarks of state animal production	Directorate of Farms
85	Strengthening of Base Farm, Kolahalamedu as knowledge dissemination hub on latest technologies and innovations in dairy farming (2023-2024	Base Farm, Kolahalamedu
86	Revamping of Small Animal Breeding station	SABS, Mannuthy
87	Strengthening of university Goat and Sheep Farm	USGF, Mannuthy
89	Increasing productivity of Cross-bred Cattle of University Livestock Farm, Mannuthy	ULF & FRDS
90	Optimizing the production performance of various poultry species maintained in Poultry Farm, ILFC, Pookode	ILFC, Pookode

Research Highlights

Strategies for Improving the Fodder Production at Cattle Breeding Farm, Thumburmuzhy

Significant improvements were implemented at the Cattle Breeding Farm (CBF), Thumburmuzhy, to strengthen the fodder bank and enhance farm productivity. Various high-yielding fodder varieties were cultivated and distributed to farmers as planting material. Dedicated fodder plots served as demonstration units during educational visits and training sessions for farmers, students, and trainees from B.V.Sc & AH, B.Tech (Dairy Technology), and Dairy Diploma programs. These units provided practical exposure to advanced fodder cultivation techniques, waste management practices, irrigation methods, water conservation, and composting techniques.Animal farming at the CBF was successfully integrated with the cultivation of agricultural crops such as coconut, arecanut, pepper, and various fruit trees. This integration significantly boosted the farm's annual income and fostered a sustainable farming model. The complementary relationship between animal husbandry and crop cultivation enhanced the overall productivity by recycling resources and maximizing the use of available land and organic inputs.Awareness programs and farm visits (excluding periods of infectious disease outbreaks) were regularly organized for school children to promote interest in environmental conservation, organic farming, and ecosystem-based agriculture.As part of the fodder improvement strategy, over 5 tonnes of green fodder are now produced daily to meet the nutritional requirements of the livestock at CBF. The farm also engages in the sale of agricultural products, including fruits, nuts, and spices, contributing further to its income and outreach to the farming community.

Strategies for Improving the Fodder Production of Kerala State

The Cattle Breeding Farm, Thumburmuzhy, in association with ULF & FRDS, Mannuthy, has made significant advancements in fodder production and sustainable dairy farming practices. Land development efforts led to the successful establishment of fodder plots on 30

Golden Jubilee Forage Garden

Hill top comfort station and waiting rooms for farm labourers at fodder production area

acres, incorporating sprinkler irrigation and scientific agronomic techniques such as fertilizer use, slurry application, and farmyard manure integration. Dairy cattle nutrition was enhanced through the inclusion of high-quality tree fodders like Subabul, Calliandra, Moringa, and Gliricidia, supplementing grass fodder to ensure a balanced diet. Training on intensive fodder cultivation was provided to 60 farmers, and practical learning was enriched through the

production of 6.5 tonnes of silage by B.V.Sc & AH internship students. With a total output of 2,098.57 tonnes of green fodder in 2023–24 and the sale of 27.73 tonnes of dry cow dung powder, the farm has strengthened its resource utilization and outreach. The establishment of the Golden Jubilee Forage Garden, featuring 26 high-yielding fodder varieties under the AICRP of IGFRI, Jhansi, stands as a key initiative, serving as a dynamic platform for farmer training and public awareness on advanced fodder cultivation and sustainable livestock management.

Conservation, Characterization and Improvement of Tellichery chicken breed of Kerala

The farm has made commendable progress in the conservation and propagation of two native poultry breeds—Tellicherry and Mannuthy Red. As part of this initiative, approximately 25,000 hatching eggs and 10,000 chicks of these indigenous breeds were produced and supplied to farmers across Kerala. This effort not only supports the conservation of valuable genetic resources but also empowers local farmers by promoting sustainable backyard poultry farming. It is estimated that the distributed germplasm will result in the production of nearly 15 lakh eggs at the farmers' premises, contributing significantly to rural livelihoods and local food security.

Conservation of Vechur cattle of Kerala

The conservation of Vechur cattle, a valuable indigenous breed, has been successfully carried out through strategic measures such as timely artificial insemination, resulting in an improved conception rate and a steady increase in population from the existing stock. Efforts focused on

preserving the germplasm of this native breed while also providing a **foundation stock** for future research and genetic improvement programs. A dedicated demonstration unit for Vechur cattle has been maintained to showcase breed characteristics and management practices. In addition, regular **vaccination and veterinary care** were ensured to maintain herd health and support sustainable conservation efforts.

Conservation and maintenance of Ankamali pigs of Kerala

The farm has undertaken the conservation of the pure line Ankamali pigs, a native pig breed, with focused efforts on **evaluating their reproductive and growth performance** under farm conditions. In addition to conserving the pure line, the program also emphasized the propagation of Ankamali pig progeny among local farmers to support rural pig farming and preserve indigenous genetic resources. Furthermore, **crossbreeding initiatives** were carried out by mating Ankamali pigs with **exotic breeds** to develop improved crossbred lines, aiming to enhance productivity while retaining desirable traits of the native breed.

Nutritional and Genetic interventions for breed improvement of native Malabari goats of Kerala

A comprehensive study was conducted on InDel polymorphisms in the PRDM6, MSTN, IGF2BP1, and GHR genes in Malabari goats, with a focus on identifying genetic markers associated with growth and nutrient utilization. As part of the nutritional management efforts, ration formulations were standardized for Malabari goats reared for both meat (broiler goat) and milk production**.** Least-cost and optimized kid starter rations were developed and recommended to enhance growth rates and production efficiency. These efforts contributed to identifying potential genetic markers for selective breeding to improve nutritional efficiency. Additionally, the Weende method was employed for proximate analysis of goat rations, ensuring precise evaluation of feed composition and supporting evidence-based nutritional planning.

Enhancement of productivity at Cattle Breeding Farm, Thumburmuzhy

Farm productivity witnessed significant improvement, marked by higher conception rates**,** increased milk yield**,** and enhanced **revenue generation** from the sale of milk and animal by-products. These outcomes were achieved through the adoption of optimal management practice**s** and the provision of high-quality feed and fodder, effectively augmenting the individual potential and productivity of animals. The farm also focused on **infrastructure**

recovery, successfully **re-establishing facilities damaged during the August 2018 landslide**, including the repair of critical equipment and implements. Adequate facilities were provided to support **research and education** at undergraduate, postgraduate, and doctoral levels in veterinary and dairy sciences. Additionally, comprehensive **training programs** were conducted for **internship students, dairy farmers, professionals, and entrepreneurs**. To promote awareness and interest in livestock farming, **educational visits** to the field, fodder plots, and animal sheds were organized for **school children**, fostering early engagement with agriculture and animal husbandry.

A comparative analysis of productive and reproductive performance of different purebred pigs under intensive management systems in Wayanad district of Kerala

Significant advancements were made in piggery management with the introduction of a new Duroc breeding pair from KLDB, aimed at improving genetic diversity and productivity. Comprehensive screening for Brucellosis was conducted to ensure herd health and biosecurity. Housing conditions were upgraded to enhance animal welfare, and **special management** interventions were implemented for pre-weaning piglets, ensuring better survival and growth rates. Additionally, feeding facilities for sows were improved, contributing to enhanced reproductive performance. With a focus on better management practices and health care, particularly for piglets, the farm achieved noticeable gains in overall **productivity and performance**.

Assessing the performance of Murrah Buffalo Herd for Milk and Meat production in Hot and Humid Climate of Kerala

The farm has developed sustainable management protocols tailored for Murrah buffaloes thriving in the hot and humid climate of Kerala. Research was conducted to evaluate the reproductive performance of Murrah buffaloes under different feeding regimens specific to

Kerala's climatic conditions, alongside a comprehensive study on the economics of Murrah buffalo production. To disseminate knowledge and best practices, the farm organized **in-house** training programs on buffalo management targeted at veterinarians, students, and farmers, thereby enhancing skills and promoting effective buffalo husbandry in the region.

Productivity enhancement of livestock and poultry by optimizing the management strategies in different agro climatic regions of Wayanad district.

Research efforts focused on assessing the impact of heat stress on Large White Yorkshire breed and crossbred pigs, as well as the effects of various environmental stressors on poultry production. Studies examined changes in blood biomarkers indicative of heat stress, providing insights into physiological responses. Additionally, gene expression profiles were evaluated to understand the molecular alterations occurring during thermoneutral periods compared to **heat** stress conditions, contributing to improved strategies for managing heat stress in livestock.

Development of a project model and strategies for effective management of infertility and augmenting milk production of dairy cows in selected areas of Wayanad district

A comprehensive study was conducted in the Wayanad district to assess the prevalence of production diseases, including hoof disorders, metabolic diseases, and infertility problems in high-producing dairy cattle. The research explored **risk factors** such as stress, nutrition, endocrinological imbalances, climatic influences, metabolic dysfunctions, and infectious agents contributing to these conditions. Based on these findings, effective **corrective measures and treatment protocols** were developed and implemented at the field level to address both production diseases and infertility issues in crossbred cattle. Model strategies for intervention were designed to enhance fertility management and hoof health, aiming for broader replication. Special emphasis was placed on the role of hoof disorders in causing stress and impacting production and fertility, leading to targeted approaches for prevention and treatment to improve overall cattle productivity.

Investigations on the anatomical factors involved in different clinico-pathological conditions affecting various domestic species and its application in field conditions

Samples were collected from the carcasses of various dog breeds to study the histological and morphological characteristics of the skin**,** including the microvascular patterns under normal conditions as well as in cases of cutaneous neoplasms and other inflammatory skin diseases. Clinical samples were thoroughly evaluated using advanced diagnostic techniques such as

cytology, histopathology, PCR, and immunohistochemistry (IHC). Definitive diagnoses were established through clinical sample analysis and post-mortem examinations, enabling accurate disease identification. Based on these findings, tailored recommendations for treatment and disease prevention were provided to farm and pet animal owners, supporting better animal health management.

Molecular markers for thermo-tolerance and strategies for alleviation of thermal stress in ruminants

An assessment of heat stress in Holstein Friesian crossbred cows in Kerala during early lactation revealed an 18.5% reduction in milk yield attributable to thermal stress. Both ambient temperature and relative humidity were identified as contributing factors, with stress evident even at moderate conditions of 27°C temperature and over 54% relative humidity. These findings underscore the need for implementing micro-environmental modifications tailored to the diverse agro-climatic zones of Kerala to alleviate heat stress and ensure sustainable cattle production. Concurrently, studies have been initiated to evaluate and compare the behavioral, physiological, biochemical, and endocrine responses of crossbred calves under thermo-neutral and heat stress conditions within climate-controlled environments. This research aims to elucidate the thermoregulatory and adaptive mechanisms employed by cattle in response to heat stress. Additionally, investigations into the impact of heat stress on milk fatty acid profiles and the expression of the stearoyl-CoA desaturase (SCD) gene in both crossbred and Vechur cattle showed no significant differences in milk composition or SCD gene expression between breeds or across the selected periods. These comprehensive studies contribute to a better understanding of heat stress effects on dairy cattle, informing strategies for improving animal welfare and productivity under changing climatic conditions.

Novel diagnostic techniques for economically important bacterial, viral and parasitic diseases of large ruminants

A total of 27 nasal swabs were collected from goats suspected of respiratory tract infections, and PCR assays were standardized for detecting viral pathogens such as Parainfluenzavirus, Respiratory Syncytial Virus, and PPR virus, as well as bacterial pathogens including *Pasteurella multocida*, *Mannheimia haemolytica*, and *Mycoplasma* spp. Among these, four samples tested positive for *Mycoplasma* spp. and three for *Pasteurella multocida*. Additionally, clinical and necropsy samples from 50 small ruminants were examined, with definitive diagnoses made in 41 cases. The predominant diseases identified were bacterial infections

including Pasteurellosis, clostridial infections, Colibacillosis, mycoplasmosis, and Johne's disease, with some cases involving mixed bacterial infections. Severe endoparasitism was observed in six cases, and hemoprotozoan parasites such as *Theileria* and *Anaplasma* were detected in eight cases, often associated with other infections. PPR was diagnosed in four cases, while rabies virus was confirmed in two cases (one goat and one cow). Immunohistochemistry revealed that variation in surfactant protein SFTPA1 levels influences respiratory disease pathology across species. Furthermore, blood samples from 50 goats across Kerala were analyzed for hemoparasites; microscopy detected *Theileria* in 14 and *Anaplasma* in 6 samples. PCR assays, standardized for genus-level detection and species-level identification of *Theileria*, confirmed *Theileria* in 21 (42%) and *Anaplasma* in 11 samples, while no *Babesia* spp. were detected. These findings provide valuable insights into the diverse bacterial, viral, and parasitic infections affecting small ruminants, enhancing diagnostic and disease management strategies in the region.

Enhancement of animal health and productivity through development of rapid, accurate disease control measures for infectious diseases of viral aetiology Genomic Characterisation of IBDV

Infectious Bursal Disease Virus strains isolated from field outbreaks across Kerala were subjected to whole-genome sequencing. Analysis using nucleotide BLAST and sequence comparisons revealed the presence of two classical attenuated strains alongside five very virulent IBDV strains circulating in the region. This genomic insight enhances understanding of the diversity and virulence spectrum of IBDV strains in Kerala, providing vital information to improve disease surveillance, control, and prevention strategies.

Transcriptomic Analysis of IBDV in Chickens: A comprehensive RNA sequencing (RNA-Seq) study was conducted on unvaccinated 18-day-old chickens inoculated with IBDV. Significant differential gene expression was observed on days two and five post-infection compared to control chickens. Pathway enrichment analyses through Kyoto Encyclopedia of Genes and Genomes (KEGG) and Gene Ontology (GO) databases identified key dysregulated genes and biological processes affected by the virus. Selected genes were validated by real-time PCR, confirming the transcriptomic changes induced by IBDV infection. These findings provide deeper insights into host-virus interactions and the molecular mechanisms driving IBDV pathogenesis, supporting the development of novel therapeutic targets and improved vaccine formulations.

Evaluation of Anti-Rabies Neutralising Antibody Response in Vaccinated Pet Dogs:

Blood samples from approximately 300 vaccinated pet dogs were collected for assessing humoral immunity against rabies. Serum separation was performed, and an indirect ELISA assay is underway to measure anti-rabies neutralizing antibodies. Furthermore, a pseudovirus-based neutralization assay will be used to precisely quantify neutralizing antibody levels. These investigations aim to evaluate the efficacy of rabies vaccination in pet dogs, providing crucial data to refine vaccination strategies and enhance rabies control measures.

Augmenting the quality and safety of foods of animal origin and waste valorization for entrepreneurship facilitation

An epidemiological study was conducted to assess the prevalence of key zoonotic bacterial, viral, and parasitic infections in domestic cats, dogs, and pet birds. Molecular techniques were employed for accurate identification of the pathogens detected, and diagnostic protocols were standardized to enhance detection of these zoonotic agents. Capacity building and awareness programs were organized for stakeholders to improve understanding and management of zoonotic diseases. Among the findings, Campylobacter species were isolated and molecularly confirmed from pet birds and cats, with 17.69% of bird samples and 10% of cat samples testing positive for Campylobacter jejuni and Campylobacter coli. Rabies virus was detected in 11.76% of cat samples and 44.26% of dog samples suspected of infection. Virulent Marek's disease virus was identified by PCR in turkeys from Kollam district. Additionally, multidrug-resistant (MDR) strains of Escherichia coli and Salmonella were detected in pet birds from Thrissur district, highlighting concerns regarding antimicrobial resistance in companion animals.

Interventions to Enhance the Quality and Safety of Dairy and Food Products

The dairy plant conducted comprehensive chemical and microbiological analyses of milk and milk products, including MBRT testing on approximately 8 samples per day, to ensure quality standards. A total of 650 kulfi units were supplied, accompanied by the provision of quality-checked milk and dairy products to consumers. Internship training programs were offered to students from various colleges, enhancing practical learning experiences. To facilitate better visitor engagement, an exhibition room was established to provide virtual exposure to dairy plant activities, along with additional seating facilities for visitors and customers. The quality control wing was strengthened through the acquisition of a bacteriological incubator, antibiotic detection test kits, glassware, and reagents. Routine monitoring of pasteurized cow and buffalo

milk was maintained through regular chemical and microbiological analyses. Furthermore, an annual maintenance contract was secured for the milk analyzer to ensure uninterrupted service and accurate testing. To improve customer convenience and boost sales, a digital payment system was implemented at the dairy plant sales counter, making the facility more consumer-friendly.

Addressing One Health Priority areas through Research, Capacity building and Development of Knowledge products

The project aims to undertake One Health research focusing on emerging public health threats, such as antimicrobial resistance (AMR) in *Escherichia coli* isolates from diverse sources. It seeks to build capacities among key stakeholder groups—including Forest/Wildlife, Animal Husbandry, and Public Health Departments—as well as One Health workers, to enhance their ability to respond effectively to challenges posed by zoonotic diseases and food safety concerns in the targeted project landscapes. Additionally, the initiative will develop knowledge products to promote and mainstream the One Health approach across sectors.

Early and definitive identification of disease emergence in animals and birds in the scenario of extreme climatic change in farm animals, poultry and pets to support the sustainable and healthy farming in northern Kerala through strengthening of post mortem and diagnostic facilities

Animal disease diagnostic facilities were provided to the public, offering rapid and accurate identification of specific etiological agents and disease processes through advanced molecular methods. The histopathology laboratory was enhanced by incorporating various immunohistochemical markers for improved tumor diagnosis in tissue samples, thereby strengthening diagnostic capabilities and supporting timely disease management.Genotyping of identified viral pathogens. Enhanced diagnostic facilities were provided to farmers, the public, and students, offering valuable learning opportunities for both undergraduate and postgraduate programs. In 2023, post-mortem diagnostic services were conducted on 834 animals and birds, facilitating effective disease management strategies. Cytological and biopsy examinations of 170 patient samples enabled the diagnosis of malignant conditions, supported by molecular studies of tumor pathologies using quantitative PCR (qPCR). These combined post-mortem, cytological, and histopathological analyses contributed to accurate diagnosis of various neoplastic diseases affecting livestock, pets, and poultry.

Physiological, biochemical and morphological variations due to environmental stresses in crossbred and indigenous farm animals

Comprehensive studies were conducted on the morphology, histology, and histochemistry of the umbilical cord, placenta, and endocrine organs across various domestic animal species, providing valuable insights into their structural and functional characteristics. Additionally, molecular responses to chemical stress were assessed in both crossbred and indigenous farm animals, focusing on the cellular impact of environmental toxins. In particular, the effects of 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)—a potent environmental contaminant—were evaluated on cellular health and function. These investigations contribute to understanding how toxic environmental agents affect livestock at the cellular and molecular levels, with implications for animal health, reproductive performance, and farm productivity

Strengthening of Bioscience Research and Training Centre, Thiruvananthapuram

Milk samples and teat swabs were collected from cattle suspected of mastitis across various organized farms in Thiruvananthapuram. The California Mastitis Test (CMT) was used as a preliminary screening tool to detect subclinical mastitis. Positive samples underwent standard microbial culture techniques to isolate bacterial pathogens. Identification of the isolates was carried out through detailed morphological examination, colony characteristics, and biochemical testing. To assess antimicrobial resistance, isolates were subjected to the antibiotic disc diffusion method, revealing the presence of multidrug-resistant strains of *Escherichia coli* and *Staphylococcus aureus*. Ongoing studies involve Polymerase Chain Reaction (PCR) analyses to detect biofilm-forming genes, virulence factors, and antibiotic resistance genes, aiming to unravel the complex mechanisms underlying mastitis pathogenesis and resistance. This integrated approach is expected to provide valuable insights for developing effective management and treatment strategies to combat mastitis in cattle populations.

Detection of subclinical mastitis in milk samples by California mastitis test

***Staphylococcus aureus* showing resistance to beta-lactam antibiotics indicated by the zone of inhibition**

Strengthening of NABL accredited Quality Control Laboratory

The laboratory successfully maintained its NABL accreditation under ISO 17025:2017 by adhering to stringent quality standards and completing all necessary accreditation procedures. **A** surveillance audit was conducted and the accreditation was renewed, valid until January 2025, demonstrating compliance with international testing and calibration standards. During the year 2023-24, the laboratory examined a total of **402 water samples** under the NABL scope, conducting comprehensive physical, chemical, and microbiological analyses. Key tests included coliform count, Escherichia coli count, faecal streptococcal count (MPN)**,** and presence/absence tests for coliforms, ensuring water quality and safety. Laboratory staff underwent capacity-building trainings to continuously enhance their technical skills and maintain high-quality service standards. These efforts reinforce the laboratory's commitment to providing reliable and accredited water testing services.

Strengthening of Centre for Meat Type Duck Production at Avian Research Station, Thiruvazhamkunnu

The farm supplied a substantial number of poultry birds and products to farmers, including **317** adult birds, 4,177 ducklings, 988 grown-up birds, and 28,576 table eggs, supporting diversified poultry farming. Vaccination, medication, and nutritional supplements were provided to **5,482** ducks, ensuring improved health and productivity of the flocks. The farm also produced both hatching and table eggs as part of its ongoing breeding and production activities. To promote education and skill development, training programs and farm visits were organized for BSc PPBM students of CASM College and BVSc students, offering practical exposure and hands-on learning opportunities in poultry management and health care. These integrated efforts have enhanced poultry production, farmer support, and academic collaboration.

Improving backyard poultry production by supplying crossbred chicks from improved hens

The farm successfully produced Triveni chicks and distributed them to backyard farmers through Egger Nurseries, supporting sustainable rural poultry farming. During the period, approximately 25,000 hatching eggs and 10,000 chicks were produced and supplied to needy farmers, enabling improved poultry production at the grassroots level. The germplasm provided is expected to result in the production of about 2.5 million eggs annually at farmers' premises, significantly enhancing local egg availability. In addition, 50,000 table eggs and 10 tonnes of manure were supplied, contributing to both nutrition and organic farming inputs. These efforts

have greatly supported small-scale farmers by providing quality poultry resources and promoting integrated, self-sustaining poultry systems.

Augmenting backyard poultry production in Kerala

During the period of 2023-2024, the farm made significant contributions to poultry propagation and breed conservation by distributing around 50,000 Gramasree parent stock chicks to Regional Poultry Farms. Additionally, approximately 200,000 commercial Gramasree chicks were hatched and supplied to government-approved Egger Nurseries and needy farmers, supporting large-scale commercial poultry production. To promote breed diversity, 96,000 exotic and native chicks were distributed to interested farmers for propagation and maintenance of various poultry breeds. Furthermore, about 33,000 quail chicks were supplied to different farmers, enhancing quail farming in the region. These combined efforts have strengthened poultry farming infrastructure, biodiversity, and farmer livelihoods across Kerala

Interdisciplinary research in Poultry Science for developing climate resilient birds for Kerala and to establish a cost-effective production system through breeding, nutritional and management intervensions

Research facilities were significantly strengthened through the procurement of essential new equipment and movable partitions, enhancing both capacity and operational efficiency. A total of 12 movable partitions were acquired to facilitate organized and flexible research setups. Key laboratory instruments including a cooling centrifuge, vortex mixer, multipette starter kit, ATC probe, and two Testo 174 H devices were also procured, supporting advanced experimental work and precise data collection. Concurrently, new crossbred chickens were produced and their performance was studied up to 8 weeks of age, with further studies underway to evaluate long-term growth and productivity. These developments reflect a concerted effort to upgrade research infrastructure and expand knowledge on poultry genetics and management.

Standardisation of in-ovonutrition and vaccination in chicken and development of strategies for enhancement of poultry welfare in production systems by resource integration in selected five districts of Kerala

The farm successfully completed the third phase of a comprehensive field survey on poultry production systems across selected districts of Kerala, gathering critical data to understand and improve local poultry practices. Experimental trials were conducted on the preparation of enriched aerobic compost from poultry carcasses, resulting in the development of a value-

added product; however, further research and standardization are needed to optimize this composting technique. Emphasizing knowledge transfer, technical advice and guidance were provided to farmer entrepreneurs, school students, and other visitors to the integrated poultry production units, fostering awareness of sustainable poultry management. Additionally, a preliminary model for an integrated poultry production system was developed, highlighting the importance of poultry welfare and effective waste management to promote environmentally responsible and economically viable poultry farming.

Evaluation of performance of crossbred pigs (25% share of AICRP on pigs)

The farm successfully produced crossbred piglets by mating indigenous gilts with exotic boars, focusing on enhancing growth and reproductive performance traits. Piglets exhibiting improved growth rates were distributed to progressive farmers to promote better productivity and profitability in pig farming. This initiative also provided valuable practical exposure to students, who participated in data collection, analysis, and interpretation related to growth and reproductive metrics. Through these efforts, piglets with superior growth performance were made readily available to farmers, supporting genetic improvement and the advancement of swine production in the region.

The poultry improvement program successfully contributed to the production and distribution of high-performing egg-laying strains, holding a 25% state share in the All India Coordinated Research Project (AICRP) for poultry. A notable achievement was the development of the strain **cross** ILM-90 (Athulya), capable of producing 305 eggs per year, enhancing productivity for poultry farmers. Continuous selection and breeding efforts improved the IWN and IWP strains of White Leghorn, strengthening their performance and adaptability. During the reporting period, approximately 20,000 hatching eggs, 15,000 chicks, 5,000 adult birds, 122,000 table eggs, and 24 tonnes of manure were produced and supplied to 480 beneficiary farmers, supporting poultry farming livelihoods. Additionally, 40,000 germplasms including ILM-90 (Athulya) chicks and hatching eggs were distributed, expected to yield around 2.5 million eggs annually at farmers' premises. Infrastructure improvements included the

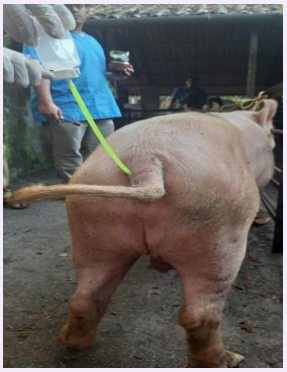
installation of 1,600 single bird cages in Cage House 1, and the repair and epoxy painting of welded meshes on the side walls of Brooder Houses 1 and 2, ensuring better housing and management of poultry. These combined efforts have significantly contributed to improving egg production and supporting the poultry industry in the region.

Scaling up of production of piglings

The farm successfully increased piglet production, supplying a total of 1,250 p**iglets** to farmers, thereby supporting local pig farming and contributing to rural livelihoods. To address water scarcity challenges, the farm implemented effective water recycling systems, reusing wastewater to minimize wastage and enhance resource efficiency. Additionally, **rainwater** harvesting structures were established with technical support from government agencies, significantly improving water conservation and ensuring a reliable water supply for farm operations. These sustainable water management practices not only mitigated water shortages but also promoted environmental stewardship. Alongside production improvements, the farm actively engaged in internship and practical training programs, providing valuable hands-on experience to students in piggery management and reinforcing knowledge transfer to the next generation of livestock professionals.

The farm has made significant strides in improving reproductive efficiency in pigs through the promotion and advancement of artificial insemination (AI) techniques. Facilities at the AI laboratory were upgraded to support **the** collection, preservation, and quality assessment of semen from selected high-genetic-merit Large White Yorkshire (LWY) boars. Rigorous evaluation of the *in viv*o fertility of preserved semen fractions ensured the use of high-quality genetic material for breeding. The production of chilled semen of superior genetic value enabled the generation of piglets with enhanced traits, which were subsequently supplied to farmers to improve herd quality. Extensive awareness campaigns and training programs were conducted for farmers, students, and internship trainees, emphasizing the benefits and best practices of AI in pig production. These efforts contributed to the dissemination of advanced

reproductive technologies, boosting piglet production and overall farm productivity. Notably, research outcomes related to these initiatives have been accepted for publication, underscoring the scientific rigor and impact of the work.



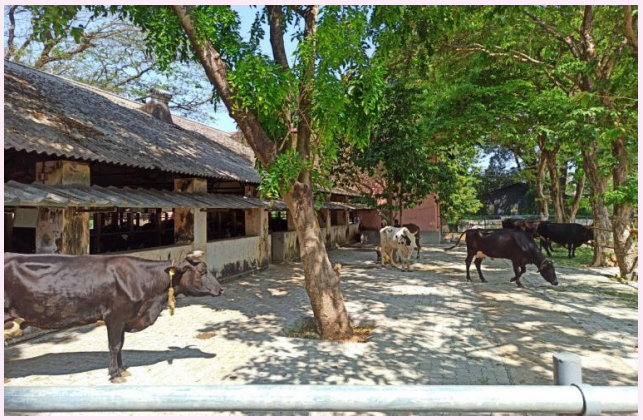
Development of a sustainable goat farming model for Wayanad District

Significant advancements have been made in enhancing farm infrastructure, animal welfare, and research capabilities to promote sustainable and efficient animal production. Housing facilities for livestock were substantially improved, ensuring better living conditions and welfare standards for the animals, which directly contributed to increased productivity. To safeguard farm assets and personnel, a modern fire extinguisher system was installed, improving safety measures across the facilities. Essential repairs were undertaken on irrigation pump sets and slurry pumping systems, along with maintenance of tankers used for distributing slurry in fodder fields, thereby optimizing water management and nutrient recycling through goat manure and other organic fertilizers.

Veterinary health services were bolstered with comprehensive vaccination campaigns, notably against Foot and Mouth Disease (FMD), safeguarding herd health and reducing disease-related losses. Expert consultations on improved management practices were provided to farmers, enabling the adoption of best practices for enhanced animal care and production efficiency. Research facilities catering to Master of Veterinary Science (MVSc) students were upgraded, fostering advanced research and practical learning opportunities essential for the development of innovative animal health and production strategies.Extension activities played a pivotal role in knowledge dissemination. Participation in the Pooppoli exhibition at Kerala Agricultural University (KAU) provided a platform to showcase farm innovations and engage with the farming community. Regular visits by farmers and students to the farms were organized, promoting hands-on learning and greater awareness of modern livestock management techniques.A major focus has been the updating of benchmarks for animal rearing practices in Kerala. This initiative involved evaluating and improving the genetic makeup of crossbred cattle by introducing **sexed semen and premium bull semen** procured from the Kerala Livestock Development Board (KLDB). The progenies from these advanced breeding materials are being closely monitored to assess improvements in milk yield and overall animal

performance. Recognizing the need to modernize dairy operations, farmers were trained in contemporary milking systems, including the use of mechanized milking parlors, to enhance efficiency and milk quality. To further support farmers, seminars and demonstration sessions were regularly conducted on the Mannuthy campus and affiliated farms, focusing on vaccination procedures, animal health management, and sustainable farming practices. These sessions aimed to empower farmers with updated knowledge and practical skills to improve their livestock enterprises. Addressing human resource challenges, solutions were implemented to resolve issues faced by students and laborers across 13 farms and allied units under Kerala Veterinary and Animal Sciences University (KVASU). This ensured smoother operations, better work environments, and enhanced coordination among farm staff and trainees, ultimately contributing to the overall success and productivity of the university's farm network. Together, these multifaceted efforts reflect a holistic approach to advancing animal production systems in Kerala, combining infrastructural upgrades, genetic improvement, health management, farmer education, and research to build a resilient and progressive livestock sector.

Increasing productivity of Cross-bred Cattle of University Livestock Farm, Mannuthy



The farm enhanced reproductive and production efficiency through strategic nutrient supplementation, hormonal treatments**,** and targeted nutritional interventions to maximize individual animal milk production potential. During 2023–24, the farm produced 285,663 kg of milk and facilitated hands-on learning by training 80 internship students **and** 6 fodder crop development personnel, while also hosting over 1,000 farmers who participated in demonstrations and educational sessions. Approximately 50 animals, including calves, were sold to farmers, promoting livestock dissemination. Key farm development activities included the establishment of two fenced open paddocks with ad libitum watering adjacent to the milch cattle shed and the installation of a rainwater harvesting tank to support sustainable water use. Routine health monitoring encompassed blood, urine, milk, and dung analyses, along with **stress hormone (cortisol) assessments**. Comprehensive veterinary care was provided, including treatment for bacterial mastitis, Foot and Mouth disease, theileriasis, metabolic disorders, and infertility, ensuring optimal animal health and productivity.

Technological Interventions for improving socio economic condition of Dairy entrepreneurs through value addition of Dairy products- Department of Dairy Technology, VKIDFT, Mannuthy

As a part of this project developed phytochemicals enriched value added dairy products. Also, developed a Ready to cook instant kaalan mix**.** An investigation was undertaken to profile the physico-chemical and sensory aspects of Kaalan and establish a standardized preparation process. To align with present-day market demands, an instant Kaalan variant was formulated, its shelf-life determined, and nutritional profiling executed via INFOGEST in-vitro gastrointestinal simulation studies. In the formulation of instant Kaalan, both vegetables and the coconut-buttermilk-spice mixture underwent distinct dehydration processes under controlled conditions. The developed product was found to be statistically similar to control for most of the nutritional parameters, with a shelf-life of six months at room temperature. The reconstituted instant Kaalan (RIK) demonstrated statistically high levels of dietary fiber, polyphenols, flavonoids, curcumin content, and antioxidant activity, establishing the functional superiority of the product.

Modification of Milk components to increase the bio availability and nutritive value of Milk based products- Department of Dairy Chemistry, VKIDFT, Mannuthy

This project developed dairy and products by incorporating mineral-rich / fiber-rich components, thereby improving their health benefits and meeting consumer expectations for nutritious foods. The study involved formulating various products with these enrichments and conducting comprehensive analyses of their physical, chemical, nutritional, and functional properties.

A multidisciplinary approach to combat concealed threats in dairy food chain- plan project- Department of Dairy Microbiology, VKIDFT, Mannuthy

The sanitation protocol of the milk processing unit was identified as a critical factor influencing the quality of processed milk. Public awareness on food safety concerns was effectively created through outreach programs conducted in association with professional organizations, as well as through consultancy services under the revolving fund scheme. Physicochemical and microbiological analyses of market milk samples revealed that most of them failed to comply with the prescribed quality standards. Further investigation identified the presence of Gram-negative, proteolytic, and lipolytic *Serratia liquefaciens* in market milk samples, which exhibited beta hemolysis and gelatin liquefaction, indicating their spoilage potential. Currently,

efforts are ongoing to develop a sanitation protocol aimed at mitigating the presence of such biofilm-forming organisms in dairy processing environments.

Development of functional food products by value addition of underutilized phytochemical rich pulses and grains- VKIDFT, Mannuthy

Mayonnaise being a popular dip used in the market while also highly perishable, a vegan alternative formulation and study of properties using popular and under utilised pulses were undertaken. The study involved checking the emulsion stability and rheological properties as well as nutritional properties of vegan mayonnaise formulated from horse gram and green gram. Pulse milk was prepared from soaked blanched deskinned and dried powder of pulses like green gram and horse gram. Mayonnaise is standardised with the addition of sunflower oil to the milk along with spices. Proximate composition, physical characteristics, rheological properties, and emulsion stability were analysed and compared with a commercial sample. Observations from the study indicated that the pulse vegan mayonnaise showed a better nutritional profile, comparable emulsion stability and rheological properties. With its superior nutritional, sensory, and rheological qualities, mayonnaise made from pulses promised to be a better vegan substitute.

4. PhD and PG Projects

Sl. No	Title of the Thesis/Dissertation	Degree Awarded	Department
1	Detection and characterisation of bacterial and viral agents associated with neonatal diarrhoea in calves	PhD	Department of Veterinary Microbiology
2	Multidrug resistance profiling of bacterial pathogens in bovine mastitis and in vitro therapeutic interventions using silver nanoparticles	PhD	Department of Veterinary Epidemiology and Preventive Medicine
3	Assessment of linkage of clones of drug-resistant Escherichia coli among broiler chicken and farmed fish and the efficacy of synthesised nanoparticles on recovered isolates	PhD	Department of Veterinary Public Health
4	Ecological epidemiology and immunodiagnosis of tuberculosis in captive Asian elephants (elephas maximus)	PhD	Department of Veterinary Epidemiology and Preventive Medicine
5	Biological, anthropogenic and ecological factors contributing to the emergence of human-tiger conflict in Wayanad district of Kerala	PhD	Department of Livestock Production Management
6	Analysis of differential expression of microrna in lipopolysaccharide challenged lymphocytes of vechur and crossbred cattle	PhD	Department of Veterinary biochemistry
7	Prediction of protein coding genes in rumen metagenomic reads of cattle with machine learning based approach	PhD	Department of animal genetics and breeding
8	Influence of season on follicular development and oocyte competence in crossbred dairy cattle	PhD	Department of Animal reproduction, gynecology and obstetrics
9	Evaluation of cutaneous wound healing in captive asian elephant(*Elephas maximus*)	PhD	Department of Veterinary Surgery and Radiology,

10	Antineoplastic effect of semecarpus anacardium nut milk extract and *tinospora cordifolia* stem extract in tumor induced mouse model	PhD	Department of animal genetics and breeding
11	Fertility of cryopreserved Malabari buck semen on post-thaw supplementation of goat seminal plasma	PhD	Department of animal production, gynecology and obstetrics
12	Evaluation of calf rearing practices to develop new strategies for producing healthy replacement heifers	PhD	Department of livestock production management
13	Profiling of Non-Classical Renin Angiotensin Aldosterone System in Cardiac Diseases in Dogs	PhD	Veterinary Clinical Medicine
14	Clinico therapeutic studies of pyoderma in dogs and in vitro efficacy of green synthesised silver nano particles using *azadirachta indica* against staphylococcus epidemidis isolates	PhD	Veterinary Epidemiology and Preventive Medicine
15	Physiological effects of soyabean isoflavones as oestrogen agonists on ovarian receptor dynamics of layer chicken	PhD	Veterinary Anatomy
16	Comparison of whole blood transcriptome profiles of vechur cattle and high and low milk producing crossbred cattle of Kerala	PhD	Animal Genetics and Breeding
17	Detection of selection signatures, single nucleotide variants and functional candidate genes for production traits based on whole genome re-sequencing of indigenous goat breeds of Kerala	PhD	Animal Genetics and Breeding
18	Immunohistochemical evaluation of cancer stem cells in canine mammary tumours using biomarkers	PhD	Veterinary Pathology
19	Evaluation of tiletamin -zolazepam and tiletamine-zolazepam-isoflurane anesthesia in xylazine/dexmedetomidine and butorphenol premedicated goats	PhD	Veterinary Surgery and Radiology

20	Structural integrity of digital cushion and its relevance as a predictor of claw horn disruption lessions in crossbred cattle of Kerala	PhD	Veterinary Anatomy
21	Responses of Malabari and Attapady black goats to multiple stressors	PhD	Livestock Production Management
22	*In vitro* embryo production by supplementing oocyte maturation medium with follicular fluid exosomes	PhD	Animal Reproduction, Gynaecology and Obstetrics
23	Diversity analysis of chara and chemballi varieties of Kuttanad ducks	PhD	Poultry Science
24	Transcriptomic and proteomic profiling of peripheral blood mononuclear cells of Vechur and crossbred cattle of Kerala challenged with *Theileria Annulata*	PhD	Animal Genetics ad Breeding
25	Isolation and characterisation of the seminal plasma protein PDC-109 in Vechur bull and its effect on in vitro sperm fertility and cryopreserv ability	PhD	Animal Reproduction, Gynaecology and Obstetrics
26	Expression profiling and molecular characterisation of Bone Morphogenetic Protein 4, Kit Ligand and Homeobox A10 Genes in native goat breeds of Kerala	PhD	Animal Genetics ad Breeding
27	Rerouting of fermentative metabolism of Lactic acid bacteria to respiratory metabolism for improved performance of starter concentrates	Ph D	Department of Dairy Microbiology, VKIDFT, Mannuthy
28	Instant Kaalan-Process optimization and metabolomic studies	Ph D	Department of Dairy Technology, VKIDFT, Mannuthy
29	Formulation of Hypoallergic whey protein supplement with enhanced Iron bioavailability	Ph D	Department of Dairy Chemistry, VKIDFT, Mannuthy
30	Efficacy of dry cow therapy on the persistence of common contagious pathogens in bovine udder in Wayanad district	MVSc	Department of Veterinary Epidemiology and Preventive Medicine

31	Effect of dietary supplementation of banana inflorescence with probiotic on growth performance in broiler chicks	MVSc	Department of Animal Nutrition
32	Multimodal balanced general anesthesia using tiletamine, zolazepam, butorphanol, dexmedetomidine, propofol and lignocaine in dogs	MVSc	Department of Veterinary Surgery and Radiology
33	Detection and molecular characterisation of viruses associated with reproductive dysfunction in pigs with special reference to porcine teschovirus	MVSc	Department of Veterinary Microbiology
34	Early diagnosis of pseudopregnancy in goats by ultrasonography and therapeutic management using cloprostenol sodium	MVSc	Department of Animal Reproduction Gynaecology and Obstetrics
35	Evaluation of pro-inflammatory cytokines and acute phase proteins of post-partum dairy cows with subclinical endometritis and its effect on fertility	MVSc	Department of Animal Reproduction, Gynaecology and Obstetrics
36	Pathology of ocular and adnexal lesions in dogs with special reference to expression of ATP-binding cassette g2 protein in corneo-conjunctival lesions	MVSc	Department of Veterinary Pathology
37	Effect of dietary incorporation of encapsulated probiotics on growth performance of large white yorkshire crossbred piglets	MVSc	Department of Animal Nutrition
38	Nerve conduction studies for localisation of neurological lesions in paralytic dogs and its therapeutic management	MVSc	Department of Veterinary Clinical Medicine, Ethics and Jurisprudence
39	Clinico-biochemical and ultrasonographic evaluations of hepatobiliary disorders in domestic cats	MVSc	Department of Veterinary Clinical Medicine, Ethics and Jurisprudence

40	Molecular detection of major pathogens associated with infectious abortions of domestic pigs	MVSc	Department of Veterinary Epidemiology and Preventive Medicine
41	Clinico-epidemiological and therapeutic studies on renal dysfunction in cats with special reference to *leptospira* spp. And feline coronavirus	MVSc	Department of Veterinary Epidemiology and Preventive Medicine
42	Molecular diagnosis and therapeutic studies of respiratory mycoplasmosis in goat of Wayanad district	MVSc	Department of Veterinary Epidemiology and Preventive Medicine
43	*In vivo* pharmacokinetics of faropenem alone and in combination with encapsulated cecropin a-(1-7) melittin against multi-drug resistant Escherichia coli in broiler chicken	MVSc	Department of Veterinary Pharmacology and Toxicology
44	*In vivo* pharmacokinetics of meropenem alone and in combination with cationic antimicrobial peptide, cecropin a- (1-7) melittin against multi-drug resistant escherichia coli in broiler chicken	MVSc	Department of Veterinary Pharmacology and Toxicology
45	Clinico-diagnostic and therapeutic management of dermatophytosis in cats	MVSc	Department of Veterinary Epidemiology and Preventive Medicine
46	Characterisation of lactic acid bacteria from raw milk of wayanad district with emphasis on technological properties	MVSc	Department of Dairy Science
47	Comparative evaluation of the antimicrobial activity of *kaempferia galanga* and *curcuma longa* against multi-drug resistant non-typhoidal salmonella spp. In broiler chicken	MVSc	Department of Poultry Science
48	Survival prognosis of canine neonates delivered by medical assistance and caesarean section	MVSc	Department of Animal Reproduction, Gynaecology and Obstetrics

49	Assessment of the status and job satisfaction of private veterinary practitioners in Kerala	MVSc	Department of Veterinary and Animal Husbandry Extension
50	Livestock rearing practices among the tribal farmers of Wayanad district of Kerala	MVSc	Department of Veterinary and Animal Husbandry Extension
51	Effect of dietary incorporation of sukumaragritham residue on growth performance of malabari kids	MVSc	Department of Animal Nutrition
52	Clinico-therapeutic studies on tracheal collapse in dogs	MVSc	Department of Veterinary Clinical Medicine, Ethics and Jurisprudence
53	Standardisation and quality evaluation of kozhiada, a malabari shelf stable snack	MVSc	Department of Livestock Products Technology
54	Development and quality evaluation of dehydrated porridge mix containing chicken meat powder	MVSc	Department of Livestock Products Technology
55	Detection of polymorphisms of the olfactory receptor family 51 sub-family h member 1 gene and the association of different genotypes with theileria infection in crossbred and vechur cattle of Kerala	MVSc	Department of Animal Genetics and Breeding
56	Source tracing of drug-resistant *klebsiella pneumoniae* causing human respiratory tract infections from domestic animals and environment	MVSc	Department of Veterinary Public Health
57	Effect of supplementation of probiotics and postbiotics from *lactobacillus plantarum* and prebiotics in growth performance of broiler chicken	MVSc	Department of Animal Nutrition
58	Effect of supplementation of essential oils from *glycyrrhiza glabra* and *zingiber officinale* on performance of broiler chicken	MVSc	Department of Animal Nutrition
59	Molecular typing of canine parvovirus and clinico-pathological studies on canine parvoviral enteritis in dogs of Kerala	MVSc	Department of Veterinary Epidemiology and Preventive Medicine

60	Etiopathological and therapeutic studies on gangrenous mastitis in goats	MVSc	Department of Veterinary Epidemiology and Preventive Medicine
61	Comparison of the biogas production potential of four types of full-scale biogas plants utilizing cow dung as feedstock	MVSc	Department of Livestock Production Management
62	Immunohistochemical evaluation of muts homologue 2 protein in various cutaneous tumours in dogs	MVSc	Department of Veterinary Pathology
63	Assessment of traditional and molecular methods for the estimation of post-mortem interval in dogs	MVSc	Department of Veterinary Pathology
64	Effect of vitamin b12 and folic acid in reversing the tumorigenic effect of 2,3,7,8-tetrachlorodibenzo-p-dioxin on the mcf-7 cells	MVSc	Department of Veterinary Physiology
65	Efficacy of green synthesised zinc oxide-calcium oxide nanocomposites against multi-drug- resistant bacterial pathogens of public health importance	MVSc	Department of Veterinary Public Health
66	Endometrial m-RNA expression of receptors for oestrogen, progesterone, oxytocin and prostaglandin in crossbred cows exhibiting normal and prolonged oestrus	MVSc	Department of Animal Reproduction, Gynecology and Obstetrics
67	Blood transfusion studies in anaemic cats	MVSc	Department of Veterinary Clinical Medicine, Ethics and Jurisprudence
68	Detection and molecular characterisation of rabies virus from animals in Kerala based on nucleoprotein and glycoprotein genes	MVSc	Department of Veterinary Microbiology
69	Secondary complications of renal disease and its clinical management in dogs	MVSc	Department of Veterinary Clinical Medicine, Ethics and Jurisprudence

70	Gross and histopathological evaluation of respiratory system of cats with special reference to common respiratory viral pathogens	MVSc	Department of Veterinary Pathology
71	Polyvinyl alcohol - hydroxyapatite composite ceramic as a bone graft substitute in rat calvarial defect model	MVSc	Department of Veterinary Surgery and Radiology
72	Clinical efficacy of procedural sedation combined with femoral and sciatic nerve blocks for stifle and tibial surgeries in dogs	MVSc	Department of Veterinary Surgery and Radiology
73	Antifungal susceptibility profiling of mycotic isolates from reproductive tract of postpartum cows	MVSc	Department of Animal Reproduction, Gynecology and Obstetrics
74	Evaluation of foetal survivability by analyzing foetal maturity and foeto-maternal disproportion in dogs	MVSc	Department of Animal Reproduction, Gynecology and Obstetrics
75	Prognostic evaluation of uterine torsion based on haemato-biochemical and ultrasonographical changes due to multiple organ dysfunction syndrome in goats	MVSc	Department of Animal Reproduction, Gynaecology and Obstetrics
76	The effect of heat stress on the physiological parameters and blood biomarkers in Malabari goats	MVSc	Department of Livestock Production Management
77	The effect of thermal stress on physiological parameters and stress biomarkers in large white Yorkshire and crossbred pigs	MVSc	Department of Livestock Production Management
78	The role of 2,3,7,8-tetrachlorodibenzo-p-dioxin as an endocrine disruptor in granulosa cells and the effect of vitamin b12 and folic acid on its reversal	MVSc	Department of Veterinary Physiology
79	Immunohistochemical evaluation of the dna mismatch repair system protein mutl homologue 1 in mammary gland neoplasms of dogs	MVSc	Department of Veterinary Pathology

80	In vitro and in vivo evaluation of entero protective effect of probiotics (lactobacillus and bifidobacterium sp.) of dairy origin	MVSc	Department of Dairy Science
81	Comparison of multimodal anaesthesia protocols with isoflurane and sevoflurane maintenanace in geriatric canine patients	MVSc	Department of Veterinary Surgery and Radiology
82	Effects of moringa (Moringa oleifera) leaf extract and nisin on quality and shelf life of Japanese quail meat	MVSc	department of livestock Products Technology
83	Follicular fluid exosome supplementation on in vitro maturation competence of bovine oocytes exposed to heat stress	MVSc	Department of animal Reproduction, Gynecology and obstetrics
84	Expression profiling of micro RNA in lipopolysaccharide challenged peripheral blood mononuclear cells of cattle	MVSc	Department of Veterinary Biochemistry
85	Characterization of acid soluble collagen from daggertooth pike conger (*Muraenesox cinereus*) and its application in wound healing	MVSc	Department of Veterinary Biochemistry
86	Foeto-maternal haemodynamics and combined thickness of uterus and placenta for prediction of time of whelping in canines	MVSc	Department of Animal Reproduction, Gynecology and Obstetrics
87	Effects of probiotics in corn replaced rice based diet in broiler chicken	MVSc	Department of Poultry science
88	Medical management of canine pyometra with prostaglandin analogue and progesterone receptor antagonist	MVSc	Department of Animal Reproduction, Gynecology and Obstetrics
89	Development and evaluation of enrobed chicken nuggets incorporated with millets and hydrocolloids	MVSc	Department of Livestock Products Technology, College of Veterinary and Animal sciences
90	Feeing value of grass silage incorporated with propionic acid and bacterial inoculam in cross bred heifers	MVSc	Department of Animal Nutrition

91	Dietary supplementation of selected essential amino acids in large white Yorkshire piglets	MVSc	Department of Animal nutrition
92	Uterine fluid clearance and uterine artery haemodynamics as early indicators of cystic endometrial hyperplasia-pyometra in sub fertile female dogs	MVSc	Department of animal reproduction, gynecology and obstetrics
93	Induction of oestrus using long term and short term progressive based protocols in anoestrous goats	MVSc	Department of animal reproduction gynecology and obstetrics
94	Assessment of seroprevalence and molecular diagnosis of leptospirosis in cats	MVSc	Department of Veterinary microbiology
95	B-mode ocular ultrasonography for diagnosis and treatment of glaucoma in dogs	MVSc	Department of Veterinary Surgery and Radiology,
96	Development and standardisation of flavoured egg milk	MVSc	Department of poultry science
97	Welfare of weanling large white Yorkshire piglets on different bedding materials	MVSc	Livestock Production Management
98	Effect of forced aeration and turning on the quality of livestock manure compost	MVSc	Livestock Production Management
99	Effect of energy supplementation using maize and soy lecithin during late gestation on production performance of crossbred cattle	MVSc	Animal Nutrition
100	Effect of different levels of protein in total mixed ration on growth performance in vechur cattle	MVSc	Animal Nutrition
101	Goat production system and extent of adoption of scientific practices in Androth and Kavaratti islands of Lakshadweep	MVSc	Animal Nutrition
102	The cattle production systems of selected islands of Lakshadweep : current practices and future prospects	MVSc	Livestock Production Management
103	Prevalence of multiple anthelmintic resistance in *Haemonchus contortus* of caprines	MVSc	Veterinary Parasitology

104	Dietary inclusion of garden cress seed (*lepidium sativum*) in growing rabbits	MVSc	Animal Nutrition
105	Evaluation of synthetic analogue of assembly pheromone for tick control in ruminants	MVSc	Department of Veterinary Parasitology
106	Quality assessment of cow milk in different seasons in Thrissur district	MVSc	Livestock Production and Management
107	Effect of heat stress on milk fatty acid profile and expression of stearoyl-coenzyme a desaturase gene in crossbred and vechur cattle	MVSc	Veterinary Biochemistry
108	Association of mucin 6 genotypic variants with gastro- intestinal parasitic resistance traits in Malabari goats of Kerala	MVSc	Animal Breeding and Genetics
109	Isolation and Characterisation of *Avibacterium paragallinarum* from Poultry in Kerala	MVSc	Department of Microbiology
110	Molecular Characterisation of Antibiotic Resistance of Bacteria Isolated from the Reproductive Tract of Subfertile Dogs during Oestrus	MVSc	Department of Microbiology
111	Production performance of Tellicherry and red variety of desi chicken under intensive and backyard systems and determinants of knowledge and adoption of recommended practices by poultry farmers	MVSc	Poultry Science
112	Studies on E and N cadherins as epithelial mesenchymal transition markers in canine mammary tumours	MVSc	Dept. of Veterinary Pathology
113	Pathological, immunohistochemical and molecular studies of parvo, rota and corona viral gastroenteritis in dogs and cats	MVSc	Dept. of Veterinary Pathology
114	Evaluation of protective effect of *murraya koenigii* extract in experimentally induced acute pancreatitis in rat	MVSc	Dept. of Veterinary Pathology
115	Screening of Synergistic Viral Infections in Porcine Circovirus-2 infected Piglets and comparative evaluation of IL-6 and TNF-a	MVSc	Dept. of Veterinary Pathology

116	Immunohistochemical localisation of phosphatase and tensinhomlog elected on chromosome 10 and p53 in relation to hormone receptors in canine mammary tumours	Mvsc	Dept. Of Veterinary Pathology
117	Genomic characterisation of cellulolytic bacteria from dung of elephant and horse	MVSc	Animal Nutrition
118	Influence of dietary levels of rumen undegradable protein on growth of crossbred calves	MVSc	Animal Nutrition
119	Phenotypic and Genotypic characterisation of Candida SPP. Isolated from Dogs and their *in vitro* antifungal resistance	MVSc	Dept. of Veterinary Epidemiology and Preventive Medicine
120	Modulation of oestrogenic Activity by methanolic Extracts of Bark and Flower of *Saraca asoka* in MCF-7 Cell Line	MVSc	Dept. of Veterinary Pharmacology and Toxicology
121	Evaluation of wound healing activity of *cissus quadrangularis* and *chromolaena odorata* in methicillin resistant *staphylococcus aureus* infected wound in wistar rats	MVSc	Veterinary Pharmacology and Toxicology
122	Evaluation of anticancer activity of *sida alnifolia* and *eupatorium triplinervis* in MDA-MB-231 cell line	MVSc	Pharmacology and Toxicology
123	Antineoplastic activity of apigenin through inhibition of histone deacetylase in daltons lymphoma ascites cell line	MVSc	Pharmacology and Toxicology
124	Impact of heat stress on physio-biochemical parameters during early lactation of crossbred dairy cattle	MVSc	Veterinary Physiology
125	Evaluation of autologous platelet rich fibrin gel for treatment of sole ulcer in dairy cattle	MVSc	Veterinary Surgery and Radiology
126	Minimal invasive percutaneous tube cystostomy using three-way foley catheter for management of obstructive urolithiasis in goats	MVSc	Veterinary Surgery and Radiology

127	Efficacy of tunica vaginalis collagen-hydroxyapatite scaffold implantation on bone healing in multiple fracture of long bones in dogs	MVSc	Veterinary Surgery and Radiology
128	Comparative evaluation of linear and phased array transducers in ultrasonographic diagnosis of lung diseases of dogs	MVSc	Veterinary Clinical Medicine, Ethics and Jurisprudence
129	Symmetric dimethyl arginine asa biomarker for early detection of renal injury associated with brugianfilariosis in dogs	MVSc	Veterinary Clinical Medicine, Ethics and Jurisprudence
130	Isolation and molecular characterisation of fowl adenovirus from broiler chicken	MVSc	Veterinary Microbiology
131	lamellar keratoplasty using preserved canine amniotic membrane alone and in combination with mitomycin-c for the treatment of pigmentary keratitis in dogs	MVSc	Veterinary Surgery and Radiology
132	Consumer preferences and awareness about safety and quality of meat and products	MVSc	Veterinary And Animal Husbandry Extension
133	Antibacterial activity of proline-rich antimicrobial peptides isolated from goat spleen	MVSc	Veterinary Pharmacology and Toxicology
134	Structure and Vascular Pattern variations of the tumour microenvironment and associated lymph node in Murine Model of triple negative breast cancer	MVSc	Veterinary Anatomy
135	Development and efficacy assessment of a customized percussive stunner for rabbits	MVSc	Livestock Production Management
136	Knowledge and adoption of scientific and hygienic meat production practices by fresh chicken retail entrepreneurs in selected municipal cooperations of Kerala	MVSc	Animal Husbandry
137	Development of Restructured Beef for value addition and enhanced tenderness	MVSc	Livestock Products Technology
138	Association of common bacterial pathogens in urinary tract infections in dogs with selected biomarkers	MVSc	Veterinary Epidemiology and Preventive Medicine

139	Occurrence of l*eptospira* spp. in peri-domestic rats and associated environment in Thrissur, Kerala	MVSc	Veterinary Public Health
140	Effect of dietary supplementation of postbiotics derived from *lactobacillus plantarum* on growth performance, immune status and intestinal salmonella spp count of broiler chicken	MVSc	Poultry Science
141	Effect of dietary supplementation of vitamin e and selenium on semen quality and fertility in white pekin ducks	MVSc	Poultry Science
142	Evaluation of platelet rich fibrin membrane in healing of deep corneal ulcers in dogs	MVSc	Veterinary Surgery and Radiology
143	Immunopathological studies on infectious bronchitis with or without infectious bursal disease and Newcastle disease in chicken	MVSc	Veterinary Pathology
144	Effect of layered double hydroxide - doxycycline hydrogel on healing of infected wounds in dogs	MVSc	Veterinary Surgery
145	Screening for salmonella species and shigella species in chicken shawarma	MVSc	Veterinary Public Health
146	Occurrence of campylobacter spp. In cats, pet birds and rats and in vitro antibacterial effect of aqueous *couroupita guianensis* flower extract	MVSc	Department of Veterinary Public Health
147	Shredded arecanut spathe as replacement for paddy straw in total mixed ration for crossbred calves	MVSc	Animal Nutrition
148	Development of folate enriched yoghurt incorporating lactic acid bacterial isolates from natural sources	MVSc	Dairy Science
149	Efficacy of buserelin, cabergoline and nutraceuticals on semen quality of subfertile male dogs	MVSc	Animal Reproduction, Gynaecology and Obstetrics
150	Ultrasonographic grading of uterus and prognostic evaluation of medically managed cystic endometrial hyperplasia-pyometra complex in bitches	MVSc	Animal Reproduction, Gynaecology and Obstetrics

151	Induction of whelping with a combination of progesterone receptor antagonist and prostaglandin E1 analogue	MVSc	Animal Reproduction, Gynaecology and Obstetrics
152	Effects of short-term mobile phone radiation on Tulsi plant on its morphological features	MSc	Wild Life Studies
153	A study on the acute toxic effects of diclofenac and amoxicillin in *danio rerio*	MSc	Wild Life Studies
154	Activity pattern of smaller mammals in winter using camera traps in Khetolai, Rajasthan	MSc	Wild Life Studies
155	Estimation of defecation rate and age determination based on dung size in the captive Asian elephant (*Elephas maximus*)	MSc	Wild Life Studies
156	Determining the presence of salmonella species and its antibiotic resistance in captivesnakes of MVR Snake Park, Kannur	MSc	Wild Life Studies
157	Microhabitat specificity of nyctibatrachus frogs in riparian habitats, basic description of their call structure and threats to their population in selected sites of Wayanad district	MSc	Wild Life Studies
158	Nesting status evaluation of white-bellied sea eagle *(Haliaeetus leucogaster)* in northern Kerala	MSc	Wild Life Studies
159	Nesting site selection of woolly-necked stork (*ciconia episcopus episcopus, boddaert* 1783) in Kerala	MSc	Wild Life Studies
160	Factors affecting the communal roosting behaviour of birds at Panamaram Heronry, Wayanad district	MSc	Wild Life Studies
161	Assessment of public perspectives and prey decline as possible threats to otters in selected sites of Wayanad	MSc	Wild Life Studies
162	Diversity, abundance and forage plant association in relation with proboscis length of selected butterfly species in Kerala veterinary and animal sciences university's Pookode campus	MSc	Wild Life Studies

163	Evaluation of the efficacy of two deterrents (herboliv® and borep®) aganist crop raiding wild animals	MSc	Wild Life Studies
164	Surgical management of traumatic spinal injuries in snakes using modified microplate spinal fixation technique	MSc	Wild Life Studies
165	Molecular characterisation of *amblyomma integrum* (deer tick)	MSc	Wild Life Studies
166	Molecular characterization of paragonimus species among wild animals	MSc	Wild Life Studies
167	Analysis of heavy metal residues in spider webs of common funnel web spider (*hippasaa gelenoides*) by atomic absorption spectrometer	MSc	Wild Life Studies
168	Determination of virulence genes and antibiotic resistance of *Escherichia coli* isolated from heronry birds in various parts of Kerala	MSc	Wild Life Studies
169	Niche partitioning and phylogenetics of langur species in selected areas of southern western ghats, India	MSc	Wild Life Studies
170	Roosting ecology of house sparrow (passer domesticus) in kvasu campus, Pookode, Wayanad, Kerala	MSc	Wild Life Studies
171	Nesting status of olive ridley sea turtles (*lepidochelys olivacea*) in Kasaragod coast, Kerala and its conservation aspects	MSc	Wild Life Studies
172	Measurement of knowledge, attitude and practices among the public residing around the Indian flying fox (*pteropus medius*) roosting site	MSc	Wild Life Studies
173	Understanding people's perception of snakes and snakebite remedies at Kannur district, Kerala	MSc	Wild Life Studies
174	Morphological and molecular characterisation of *bertiella studeri* from a monkey	MSc	Wild Life Studies

175	Phylogenetic analysis of nilgiri tahr (*nilgiri tragushylocrius*) using mitochondrial cytochrome b gene	MSc	Wild Life Studies
176	People's perception on human- bonnet macaque *(macaca radiata*) conflict with special reference to a selected sacred grove of Calicut, Kerala	MSc	Centre For Wildlife Studies
177	People's perception of human-elephant conflict in Vythiri panchayath of Wayanad district	MSc	Centre For Wildlife Studies
178	Evaluation of cytotoxic potential of methanolic extract and fractions of *Cyclea peltata* leaves in MCF-7 cell lines	MSc	Department of Veterinary Biochemistry
179	Cytotoxic potential of methanolic extract of *Cucrbita pepo L* seed and its fractions in MCF-7 cell lines	MSc	Department of Veterinary biochemistry
180	Antibacterial activity of silver nanoparticles of *Chromolaena odorata* extract loaded carrageenan-gelatin hydrogel against multidrug resistant bacteria	MSc	Department of Veterinary biochemistry
181	*In vitro* evaluation of anti-inflammatory activity of methanol extract of *Erythrina variegata* stem bark and its fractions	MSc	Department of Veterinary biochemistry
182	Isolation and characterization of staphylococcus supp. in different brands of m ilk powders marketed in Thrissur district	MSc	Department of dairy science
183	Antioxidant activity of herbal yoghurt incorporated with tulsi (*ocimum sanctum*) and cinnamon (*cinnamomum zeylanicum*)extracts	MSc	Department of dairy science
184	Molecular characterisation of coding region of ineterleukin-4 gene of vechur and crossbred cattle	MSc	Department of veterinary biochemistry
185	Synthesis, characterisation and evaluation of antibacterial effect of lactoferrin conjugated silver nanoparticles	MSc	Department of veterinary biochemistry
186	Modelling the productive lifetime of female goat	MSc	Department of veterinary biochemistry,

187	Utilization Of Expolysaccharide Producing *Streptococcus thermophilus* and *Lactobacillus bulgaricus* for enhancing rheological and sensory attributes of low-fat yoghurt	MSc	Department of dairy Science
188	Development and quality evaluation of Functional Yoghurt Prepared with *Lactobacillus rhamnosus* GG and carrot (*Daucus carota L.*)	MSc	Department of dairy Science
189	Molecular detection of leptospira from environmental samples	MSc	Microbiology
190	Assessment and modelling of pre-weaning kid mortality	MSc	Biostatistics
191	Molecular characterisation of bacterial and viral pathogens associated with respiratory tract infections in dogs	MSc	Veterinary Microbiology
192	Management practices, production performance and marketing methods in backyard poultry production system	MSc	Animal Science
193	Evaluation of poultry carcass composting using different inoculums	MSc	Animal Science
194	Molecular detection of antibiotic resistance in leptospiral isolates from Kerala	MSc	Veterinary Microbiology
195	Isolation, identification and anti-microbial sensitivity testing of *Escherichia Coli* and salmonella spp. From pet birds with gastro-intestinal ailments	MSc	Veterinary Microbiology
196	Molecular typing of staphylococcus aureus isolated from canine pyometra	MSc	Veterinary Microbiology
197	Antibiogram of bacterial isolates from anterior vaginal swabs and faecal material of dogs affected with pyometra	MSc	Veterinary Microbiology
198	Genomic imprinting and allele-specific expression of caprine insulin-like growth factor 2 gene	MSc	Animal Production and Biotechnology

199	Evaluation of apototic activity and infiltration of cd8+ lymphocyte subsets in the microenvironment of murine model of triple negative breast cancer	MSc	Animal Production and Biotechnology
200	Estimation of taurine and l-carnitine in plasma of dogs with dilated cardiomyopathy by high-performance liquid chromatography	MSc	Veterinary Biochemistry
201	Evaluation of serum biochemical status, endocrine profile and oxidative stress in Malabari does during periparturient period	MSc	Veterinary Biochemistry
202	Effect of soyabean meal incorporated diet on expression of oestrogen receptor alpha in non-gonadal tissues of layer chicken	MSc	Veterinary Biochemistry
203	Role of reactive oxygen species and epigallocatechin-3-gallate in the stemness of breast cancer cells	MSc	Veterinary Biochemistry
204	Effect of elevated Carbondioxide environment on the Microflora of raw milk	M.Tech	Department of Dairy Microbiology, VKIDFT, Mannuthy
205	An assessment of resistance and virulence of enterococcal isolates from Dahi/ Thairu samples	M.Tech	Department of Dairy Microbiology, VKIDFT, Mannuthy
206	Effect of *Plectranthus Amboinicus* on oxidative stability of vechur ghee	M.Tech	Department of Dairy Chemistry, VKIDFT, Mannuthy
207	Process optimization for flavor enhancement of Ghee	M.Tech	Department of Dairy Chemistry, VKIDFT, Mannuthy
208	Evaluation of Autochthonous lactobacilus species as Adjunct cultures in improving the techno functional properties of Feta cheese from Malabari Goat milk.	M.Tech	Department of Dairy Microbiology, VKIDFT, Mannuthy
209	Enzymatic profiling of indigenous Lactic Acid Bacteria for food fermentations	M.Tech	Department of Dairy Microbiology, VKIDFT, Mannuthy

210	Technological characterization of functional paneer prepared from Buffalo milk treated with B-cyclodextrin and Thyme essential oil.	M.Tech	Department of Dairy Chemistry, VKIDFT, Mannuthy

Research Highlights

Induction of parturition using a combination of progesterone receptor antagonist, mifepristone, and misoprostol, a prostaglandin E1 analogue

The combination of mifepristone and misoprostol (5 µg/kg q4h) demonstrated significant merit in whelping management by ensuring successful induction, enhancing uterine contractions, and improving neonatal survival rates, making it particularly valuable in settings with limited clinical access.

Postpartum reproductive performance of Vechur cows treated with Ovsynch and progestins

The treatment of anoestrous postpartum Vechur cows with Ovsynch or a combination of Ovsynch and progesterone is successful in inducing oestrus, thereby reducing the calving to first service and calving to conception interval.The initial 10 mL of the sperm-rich fraction of Large White Yorkshire boar semen exhibited superior preservability at 15°C compared to the rest of the sperm-rich fraction and whole semen.

***In vitro* embryo production by supplementing oocyte maturation medium with follicular fluid exosomes**

The beneficial role of follicular fluid exosomes in enhancing bovine oocyte maturation, fertilization rates, and early embryonic viability in vitro was proved.

Semen characteristics and in vivo fertility of microencapsulated buck spermatozoa after chilled preservation

Microencapsulation of buck spermatozoa enhanced the viability, acrosome integrity, functional membrane integrity, and fertility of chilled-preserved buck spermatozoa, maintaining good motility and viability for up to four days.

Timing Elective Caesarean section or induction of whelping based on sonographic extra-embryonic determinants and foetal lung maturity in canines

Using ICC measurements in mid-gestation allowed precise scheduling of elective CS, ensuring safe delivery of healthy puppies while challenging the necessity of cervical dilatation and supporting the benefits of preparturient CS in justified obstetric cases.

Isolation and characterization of the seminal plasma protein PDC-109 in vechur bull and its effect on in vitro sperm fertility and cryopreservability

Exposure of cauda epididymal sperm to PDC-109 protein induced a time and concentration dependent decline in sperm quality and significantly compromised cryopreservability by reducing viability, motility, acrosomal integrity, and membrane cholesterol content.The impact of PDC-109, a protein in Vechur bull semen, on sperm function and fertility, particularly during cryopreservation was studied. It was found that PDC-109 reduced sperm quality during cryopreservation process, highlighting the need for improved cryopreservation techniques to enhance fertility and conservation of the Vechur breed. PCR amplification and sequencing of SVSP109 gene exon 1 and 4 identified an SNP at the intronic region near to exon1 and the population was identified as monomorphic for exon 4

Uterine fluid clearance and uterine haemodynamics as early indicators of cystic endometrial hyperplasia - pyometra in subfertile female dogs

Medical management was effective in early grades of CEH-P complex but had limited success in cases with advanced endometrial changes (grades C and D), where morphological abnormalities persisted despite treatment. A study was conducted to evaluate the prognosis of medical treatment for cystic endometrial hyperplasia-pyometra complex (CEH-P) in bitches by grading uterine conditions through ultrasound. It involved 21 bitches with pyometra, categorized into four groups based on uterine damage severity. The results indicated that ultrasonographic grading, particularly using the resistive index (RI), could guide treatment decisions, with bitches in Group II (minimal damage) recovering more quickly and amoxicillin-clavulanate being the most effective antibiotic.

Development and quality evaluation of functional yoghurt prepared with *Lactobacillus rhamnosus* GG and carrot (*Daucus carota* L.) juice.

Ten lactic acid bacterial isolates sourced from natural soucres, available in the Department of Dairy Science, CVAS Mannuthy, were screened to assess their potential for folate production. Higher folate yield of 17.67±1.78 µg/L was observed from Lacticaseibacillus paracasei compared to the standard Lactobacillus rhamnosus (NCDC 18) which yielded 11.38±0.91 µg/L. Enhanced folate production was achieved at a temperature of 42°C for a fermentation

duration of 4 hours. Research proved that addition of Lacticaseibacillus paracasei could be a viable approach for developing folate-enriched yogurt with acceptable sensory quality.

Evaluation of calf rearing practices to develop new strategies for healthy replacement heifers

Majority of farmers in Kerala were unaware of pre-weaning calf feeding management practices. The survey highlighted the need for educating farmers about colostrum feeding and feeding of calf starter. Ad libitum milk feeding for the first five weeks of age and feeding of calf starter supplemented with essential oils and roughages had enhanced growth and development of calves. Despite the higher body weight and growth, the IGF-I gene was lower expressed in second and third months of age in ad libitum milk fed calves which suggested a long term effect of greater nutrient intake on physiological and molecular mechanisms. Digestibility of nutrients and rumen development of calves were not affected by the ad libitum milk feeding and supplementation of essential oils.

Effect of forced aeration and turning on the quality of livestock manure compost

Composting can be done by different methods. Forced aeration and turning method was chosen for the research work. The quality of compost was assessed by analyzing the physic chemical parameters. Experiment was conducted for 45 days in three different manure viz., cattle, goat and poultry having three control groups and six treatment groups.The forced aeration and turning were done by electric blower and garden shovel, respectively. Changes in organic carbon, nitrogen, phosphorus and potassium was estimated at the beginning and end of composting. A greater reduction in organic carbon was noticed in cattle, goat and poultry manure in turning, control and forced aeration group of composting respectively. Greater change in nitrogen was observed in control group of cattle, whereas similar impact was noticed in turning group of goat and poultry manure. There was no significant difference in pH at the end of composting between the treatments and control group in case of cattle and goat manure. Forced aeration in poultry manure had greater significance ($p<0.01$) in pH at the end of composting compared to other.

A greater reduction in change in weight was noticed in the forced aeration group of composting. The highest temperature was noticed on 17th and 18th day of composting in case of poultry manure and for goat on 17th day, for cattle within three days of composting. The C/N ratio reduced at the end of composting and attained adequate ratio of mature compost.

Based on the manurial value, forced aeration had good impact in goat and poultry manure composting.

Quality assessment of cow milk in different seasons in Thrissur district

The present study was undertaken in Thrissur district to assess the variation in cow milk quality during the rainy and summer seasons and to document the various management practices adopted by the dairy farmers. Twenty five farms with a minimum of ten crossbred cows were randomly selected from Thrissur district. Three crossbred cows in mid lactation were chosen from each farm and utilized for the study. Based on the comprehensive findings of this study, it can be concluded that the summer season exhibited enhanced total milk production and improved milk composition. The slightly higher fat percentage observed in the summer can be attributed to the diligent adoption of effective summer management practices by the majority of dairy farmers.The present study also investigated various management practices adopted by dairy farmers in Thrissur district. Most of the farmers had more than 20 years of experience and followed good management practices to mitigate heat stress. The heat alleviation measures used in these farms included fans in 96 per cent of the farms, an east-west orientation in 68 per cent of the farms, showers and foggers in four per cent of the farms and automatic drinker facilities in 28 per cent of the farms. Eighty per cent of the farms fed their cattle twice a day with nutritious feed and fodder. Milking was done twice a day with 64 per cent of the farms practicing hand milking and 36 per cent of the farms employing milking machines.

Welfare of weanling Large White Yorkshire piglets on different bedding materials

Welfare of weanling Large White Yorkshire piglets on different bedding materials was studied by using growth parameters, aggression and behavioural indicators. Forty weanling Large White Yorkshire piglets were selected for the study during the post-monsoon season (Oct-Jan) at Centre for Pig Production and Research, Mannuthy, Thrissur, Kerala. Animals were divided into four treatment groups ten piglets each. In treatment group T1, the animals were reared on concrete floor with no bedding (control) and in treatment group T2, the animals were reared on wood shavings as bedding of 10 cm thicknes s. In treatment groups T3 and T4, the animals were reared on paddy husk and paddy straw as bedding of 10 cm thickness respectively. The growth parameters like feed conversion efficiency, average daily gain, final weight and weight gain had no significant difference between treatment groups except for the daily feed intake where there was a significant higher daily feed intake for all other groups with bedding materials than the concrete floored group (T1). The serum cortisol levels had no significant differences between treatment groups during different days of study period but was found to

be decreasing during the mid and end phase of the study period for the groups with the bedding materials when compared to the concrete floored group. The skin lesion score of animals of treatment T1 and T4 were statistically different from T3 in the tail region on 0th day of the study period. The tear staining score of animals of treatments T1 and T4 at week 5 for both left and right eyes were found statistically different. Physiological parameters like pulse rate, respiratory rate and surface body temperature at different times of a day had no significant differences between treatment groups. Morphometric parameters like chest girth and height at withers had no significant differences between treatment groups except for body length where there was significant higher value for concrete floored group than paddy straw bedded group. It can be concluded that there was no considerable effect of the type of bedding material on the welfare of weanling Large White Yorkshire piglets but only an effect of the presence or absence of any bedding material could be seen from the study. Indicators like behavioural studies, tear staining score, skin lesion score, salivary cortisol level and assessment of growth parameters have promising potential to evaluate the welfare of weanling piglets.

Responses of Malabari and Attapady Black goats to multiple stressors

A comparative study was conducted to assess the potential of native Indian goat breeds viz. Attapady Black and Malabari to tolerate thermal and nutritional stress by recording their physical, physiological, hematological, biochemical responses and the differential expression of stress genes. The results proved the superior adaptive capacity of Attapady Black and Malabari goats to the stressful environmental conditions provided during the study. The higher expression of HSP70 in Attapady Black goats indicates their superior thermal adaptability. These two breeds could withstand the future ambient temperature rise and decrease in feed availability, and they also have proved to possess the potential to regain their reproductive capacity shortly even after a severe drought-like situation. Hence these animals could be a great asset to the animal production sector of the country amidst the climate change scenario.

Goat production system and extent of adoption of scientific practices in Androth and Kavaratti islands of Lakshadweep

Lakshadweep is a group of 36 islands, out of which 10 islands are inhabited, out of which two islands with the highest human population viz., Androth and Kavaratti islands were selected as the area of study. This study deals with the goat production system and the extent of the adoption of scientific practices in the Androth and Kavaratti islands of Lakshadweep. The data collection was carried out through personal interviews using a pre- semi-structured interview schedule.The data relating to the socio-economic profile of the farmers revealed that most of

the farmers from both Androth and Kavaratti islands belonged to the age group of 50 to 62 years. The majority of the goat farmers were men in both Androth and Kavaratti islands and most of them were married and educated. In Androth island joint and nuclear families of the farmers were equally distributed. Meanwhile, in Kavaratti, more than half of them belonged to a joint family. None of the farmers in Androth had attended training on goat rearing and only 6 per cent of the goat farmers in Kavaratti attended the training The majority of the farms in Androth and Kavaratti were with flock sizes of small (6-15 goats). All the farmers from both islands were practicing feeding of animals twice a day. The majority of the goat farmers fed their animals commonly with a small quantity of concentrates along with rice, vegetable, and fruit waste. They usually fed locally available tree leaves as roughage. None of the farmers provided drinking water throughout the day. Only 14.0 per cent of farmers in Androth and 10.0 per cent in Kavaratti adopted vaccination for goats which was only against tetanus. Most of the goat farmers were practicing deworming of animals in both islands but without seeking advice from a veterinary doctor before deworming. All the farmers from Androth and 66.0 per cent of farmers from Kavaratti reported that Livestock Inspector (LI) was the veterinary service provider and the usual place of veterinary services was the veterinary hospital.

The coconut leaf, banana leaf, wild almond leaf, fig leaf, breadfruit leaf, Leea indica, coconut leaf, sea hibiscus leaf, banyan tree leaf, Premna serratifolia, portia tree leaf, and noni plant leaf were fed to animals. The pH of water from Androth ranged from 7.06 to 7.52 and in Kavaratti, the range was from 6.85 to 7.28. The water turbidity in Androth was in a range from 0.4 to 2.1 NTU and in Kavaratti with a range of 0 and 1 NTU. The chloride values of groundwater collected from Androth and Kavaratti were 71.67 ± 12.494 mg/l and 133.33 ± 22.161 mg/l respectively. The pH value of the soil samples collected from the study areas was in the range of 7.7 to 8.1 (Androth) and 7.5 to 8.5 (Kavaratti).

The cattle production systems of selected islands of Lakshadweep: current practices and future prospects

This comprehensive study was carried out in Lakshadweep islands to understand the cattle farming practice and its problems and prospects. Lakshadweep archipelago consists of 10 inhabited islands and five islands with the highest cattle population viz., Minicoy, Amini, Kavaratti, Androth and Agatti islands were selected for the study. From each island, 20 cattle farmers were randomly selected so that a total of 100 farmers formed the respondents of the study.Most of the farmers from the selected islands were less than 40 years of age and mostly men with an experience of less than 10 years. Most common method of rearing practiced in all

islands was tethering except in Androth where it was semi-intensive system. The majority of the dairy farmers in Minicoy, Amini and Agatti islands had no housing All the farmers in all the islands fed their animals with feed having concentre to roughage ratio of 40:60 and the commonly used roughages were tree leaves and local grasses. Artificial insemination facility was not available and farmers depended on natural breeding. The majority of the dairy farmers de-wormed their animals and all the farmers practiced vaccination against FMD. Most of them practiced the sale of milk and animals and it was observed that none of them sold cow dung as manure. It could be observed that low level of adoption of scientific practices among the cattle farmers across the islands and lack of knowledge was the major reason. It could be concluded that cattle farmers in the islands of Lakshadweep are still depending on conventional management practices and in need of government assistance to promote scientific practices to ensure self-sustained cattle farming.

Development and efficacy assessment of a customised percussive stunner for rabbits

- The developed percussive stunner ensured complete unconsciousness in rabbits, unlike the percussive blow method, which led to inadequate stunning in some cases.
- Made using mild steel and recycled springs from automobile engines, making it an affordable and practical alternative.
- Meat from the stunner group had lower pH after storage, indicating better freshness and shelf stability.
- Cooked meat from the stunner group had better flavor, juiciness, and overall acceptability compared to the percussive blow group.
- Meat from stunned rabbits had lower haeme iron content, which may help improve oxidative stability.
- Development of Restructured beef for value addition and enhanced tenderness
- Restructured beef steaks with 50 per cent type II quality chunks and 50 per cent type III quality minced cuts can be prepared with improved sensory attributes
- Vacuum tumbling helps in improving and enhancing the texture, tenderness and cohesiveness of the product
- Vacuum packed standardised restructured beef steaks with 50 per cent type II quality chunks and 50 per cent type III quality minced cuts can be stored at deep freezing condition for minimum 60 days without affecting the sensory qualities

- The use of cold-set binders (microbial transglutaminase) and adding tough meat in a minced form helped in the flavour enhancement
- Development and evaluation of fibre enhanced fermented carabeef sausage
- Inherently perishable nature of meat necessitates various preservation methods such as addition of spices, salt and drying, leading to the creation of fermented sausages, and our study focused on the development of shelf stable ready to eat snacks which are nutritious as well as palatable also.
- This study emphasised the presence of various bioactive compounds in buffalo meat that may confer health benefits beyond the essential nutrients required for human health.
- Treatment sausages with added fiber showed higher cooking yields compared to the control. Thus this study highlights incorporation of dietary fibers into meat products serves as an effective strategy for extension, binding or filling, thereby enhancing cooking yield and reducing production costs through lesser lean meat requirements and acting as a substitute for fats to lower the content of detrimental fats in meat products.
- Dietary fiber analyses, conducted by Interfield Laboratories, Kochi, showed the lowest fiber content in the control sausage, with T7(8% red banana peel paste) registering the highest dietary fiber content among the treatments). Hence our research proves that we can transform agricultural by-products into functional food ingredients.
- Based on the statistical analysis of storage study outcomes, it was concluded that the product remained acceptable up to 60 days.
- Standardisation and quality evaluation of cold pasteurised liquid whole egg using gamma irradiation
- The results of the study demonstrated that gamma irradiation at 3kGy can be used as an effective pasteurisation technique for providing safe and acceptable liquid whole egg to consumers.
- We were able to observe that the gamma irradiation of liquid whole eggs at 3kGy was found superior to thermally pasteurised eggs in terms of storage stability, with a minimum shelf-life of 75 days at 4±1°C.
- The physico-chemical, functional properties of the gamma irradiated liquid whole egg was almost similar to the non pasteurised liquid whole eggs
- Mayonnaise prepared from irradiated liquid whole egg was not significantly different from control and thermally pasteurised samples in overall acceptability, thereby giving a greater potential in industrial level bakery and confectionery sector.

- The study also envisages the scope of irradiation technologies as to enlighten to common people and in day to day life.
- Development and evaluation of fish feed by replacing fish meal with poultry by-product meal
- Analysis of poultry byproduct meal identified a high protein content of approximately 58 per cent. The formulation of floating pelleted feed for Genetically Improved Farmed Tilapia (GIFT) was successfully achieved through the substitution of fish meal with PBM. Substituting fish meal with PBM did not adversely affect the palatability to fish or their weight gain.
- The physicochemical properties of the feed, including floatability, swelling percentage and pellet integrity were notably diminished upon the introduction of PBM. Nevertheless, given the brief period of fish feeding practices, these adverse effects were considered tolerable and not significantly detrimental.

- The growth performance of GIFT improved significantly with a 75 per cent replacement of fish meal by PBM. Incorporating PBM into the fish feed formulation led to a reduction in feed costs by up to 15.82 Rs. /Kg of feed, highlighting economic benefits.
- The study observed a significant increase in TBARS and Tyrosine values, along with microbial quantities during aerobic storage, aligning with previous research findings yet maintaining safety standards up to 45 days with no fungal growth or coliform detection.
- The investigation concludes that up to 75 per cent of fish meal can be effectively replaced with PBM without negative impacts on fish growth and health, with the potential for complete substitution, affirming PBM's suitability and sustainability as an aquafeed ingredient

Effect of feed restriction on egg production and ovarian follicle development in white pekin ducks

In this study it was found that feed restriction at 40 per cent in White Pekin ducks effectively controlled body weight, reduced abdominal fat deposition and improved egg weight and production during the later laying phase, while also providing an economic advantage by reducing feed cost per egg produced without compromising overall reproductive performance.

Production, reproduction and progeny performance of japanese quail supplemented with guanidinoacetic acid in feed

The results of this study suggest that dietary supplementation with 0.10 and 0.15 per cent GAA enhances egg production, reproductive performance and creatine concentration in muscle and serum without adversely affecting the growth performance of breeder Japanese quails. Furthermore, 0.20 per cent GAA supplementation was found to improve progeny performance, highlighting its potential benefits for the overall productivity and economic viability of Japanese quail farming.

Standardisation of dietary protein and energy requirements for white leghorn male chicks for meat production

The cumulative body weight gain from 1 to 7 weeks was significantly higher in chicks fed with 22 per cent CP compared to those fed 20 per CP. However, ME levels did not significantly affect body weight gain. FCR, Meat quality indicatorsand Livability was unaffected by the dietary treatments. The shear force of breast muscle was significantly lower with 22 per cent CP and 3100 kcal/kg ME. The chicks fed with diet containing 22 per cent CP with 3100 kcal/kg ME (T1) had the highest collagen solubility. The proximate analysis of leg muscle revealed higher fat content in birds fed with 20 per cent CP as well as 3100 kcal/kg ME,while protein content was significantly higher in those fed with lower energy (2800 kcal/kg). The interaction between CP and ME significantly affected the protein content in the leg muscle. Carcass yield was higher in birds fed with 22 per cent CP and abdominal fat was higher for 3100 kcal/kg ME diet. Sensory evaluation showed no significant differences among treatments.

Evaluation of in ovo inoculation and dietary supplementation of probiotic, prebiotic and synbiotic on production performance of broiler chicken

Based on the results of the study, the in ovo synbiotic supplementation could improve final body weight and weight gain in commercial broiler chicken comparable to the dietary synbiotic supplementation. So in ovo inoculation of synbiotic is a promising practice, to attain a market weight similar to dietary synbiotic supplemented group. Growth performance of in ovo prebiotic group is also promising as it was similar to in ovo synbiotic and dietary prebiotic groups and was better than the control group.A single dose in ovo inoculation of prebiotic and synbiotic to amniotic sac on 18th day resulted in improved hatch weight and final body weight. This points out the scope of in ovo administration of prebiotics and synbiotics in commercial hatcheries along with in ovo vaccination. Improved growth performance, villus height to crypt depth ratio and caecal Lactobacillus count in the dietary synbiotic supplemented group and improved growth performance in the in ovo synbiotic group was observed in the present study

Effect of probiotic, prebiotic and its combination on growth performance, immune response and occurrence of campylobacter jejuni in broiler chicken

Results of the study indicated that dietary supplementation with B. subtilis combined with MOS offers the most significant benefits for broiler production, including enhanced growth performance, gut health and economic viability. The use of MOS alone also demonstrated positive effects, but the combination with B. subtilis provided the best outcomes. These results suggest that B. subtilis and MOS, particularly in combination, should be considered for improving broiler production efficiency and profitability. Further research could explore the mechanisms behind the benefits of B. subtilis and MOS, as well as potential long-term effects on broiler health and performance

Phenotypic characterisation, population diversity studies and genome wide scan in tellicherry chicken of kerala

Mitochondrial d loop sequencing of 150 Tellicherry chicken done for population diversity studies. Whole genome sequencing of pooled sample (20no) of Tellichery chicken was done to identify the pathways related to egg production, disease resistance and heat tolerance.

Effect of dietary nucleotide supplementation on performance of white leghorn layers and their progenies

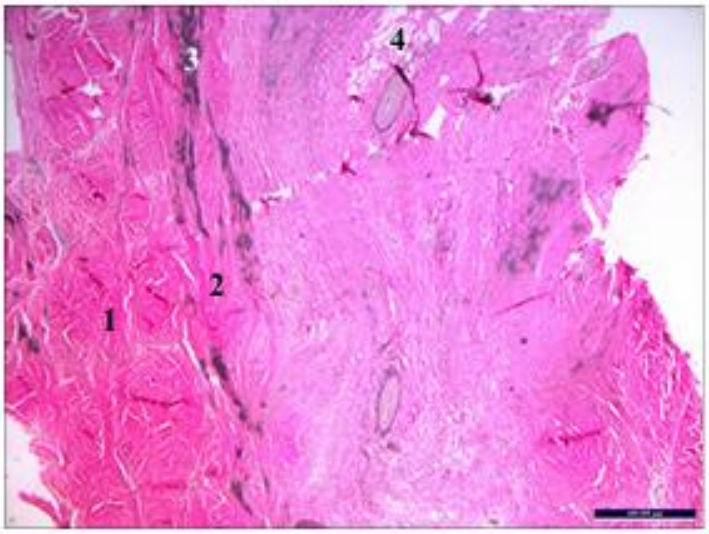
The results of this study suggest that nucleotide supplementation at 1 g/kg of diet is optimal for maximising growth and reproductive performance, egg production, intestinal histomorphometry, immune response and intestinal health. 0.5 g/kg is recommended for achieving the highest economic efficiency with no adverse impact on feed efficiency, livability and egg weight. While no significant improvements were noted in chick quality or growth performance, nucleotide supplementation proved beneficial for the health and productivity of laying hens, suggesting its potential value in commercial layer feed production.

Structural integrity of digital cushion and its relevance as a predictor of claw horn disruption lesions in crossbred cattle of Kerala

This study “Structural integrity of digital cushion and its relevance as a predictor of claw horn disruption lesions in crossbred cattle of Kerala” investigated the gross anatomy, histology, ultrastructure and chemical composition of the digital cushion in crossbred cattle of Kerala to explore its role in claw horn disruption lesions (CHDL). A total of 124 animals were examined, with hooves and blood samples collected for morphometric and genetic analysis. Results showed that heifers had thin digital cushions, which thickened with age, but in CHDL-affected

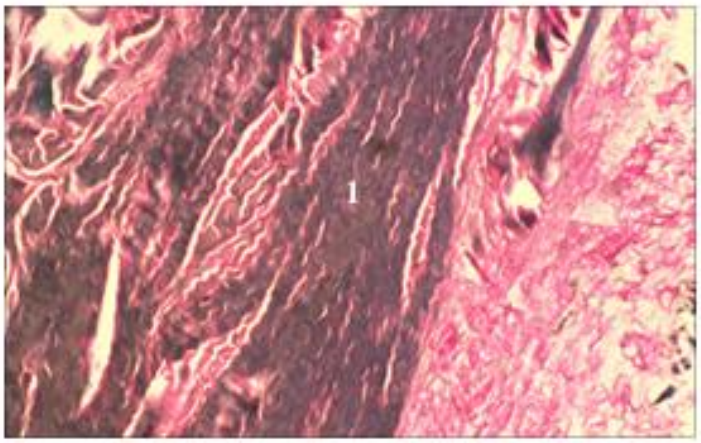
cows, the soft fat content was significantly reduced. Histological analysis revealed a shift from elastic to collagen fibers in older and CHDL-affected animals, making the digital cushion more brittle. A critical threshold for digital cushion thickness (DCT) was established, aiding early CHDL diagnosis.

A single nucleotide polymorphism (SNP) in exon 1 of the MC4R gene (C → G transversion at position 856) was detected, but no significant association with CHDL was found. The study highlighted the importance of maintaining optimal body condition, claw dimensions and well-developed digital cushions with adequate soft fat content to prevent CHDL. These findings will provide crucial baseline data for early diagnosis and management of CHDL in crossbred cattle.



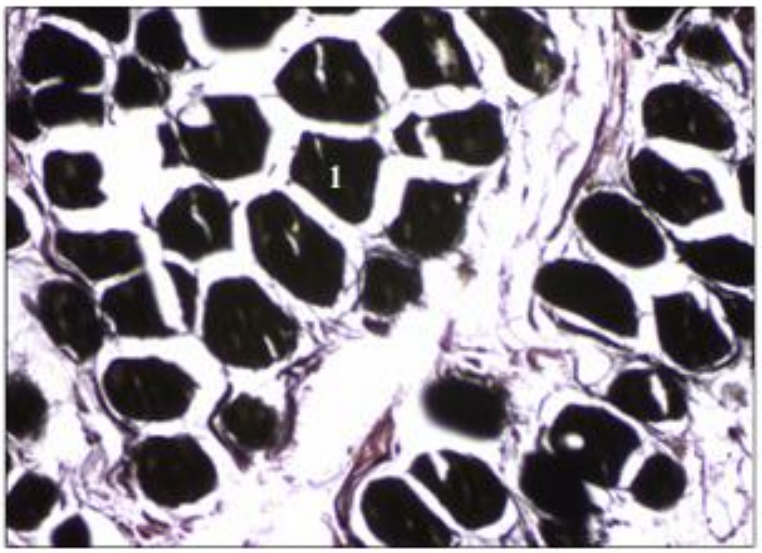
1. Reticular layer of corium
2. Collagen fibre bundles
3. Elastic fibres
4. Digital cushion

Fig. 62. Section of reticular layer and digital cushion of axial fat pad of left lateral forelimb claw in cows affected with CHDL. Verhoff's elastic stain x 40



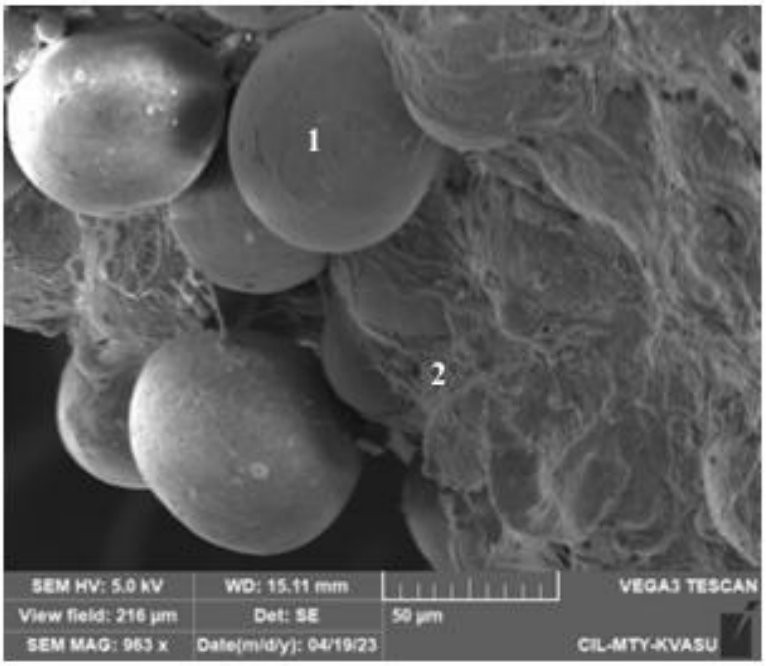
1. Elastic fibres

Fig. 40. Section of reticular layer of solar corium of left medial forelimb claw in heifers. Verhoff's elastic stain x 100



1. Adipocytes

Fig. 33. Section of middle fat pad of right lateral hind limb in cow of first to third parity group. Osmium tetroxide x 400



1. Adipocytes
2. Collagen fibres

Fig. 81. SEM image of bovine digital cushion detailing the structure of adipocytes. SEM with osmium tetroxide x 963

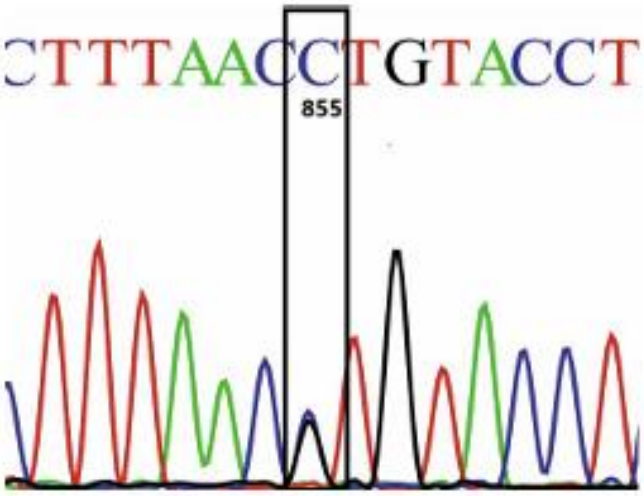


Fig. 121. Sequence map of exon 1 in *MC4R*

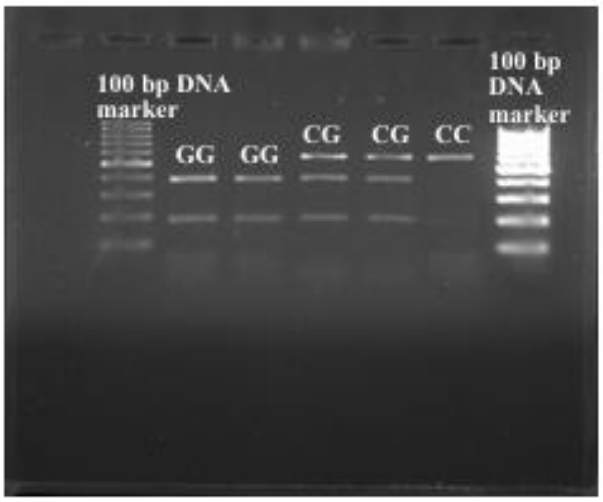


Fig. 122. RFLP pattern of exon 1 in *MC4R* resolved in 2 per cent agarose gel

Descriptive analysis of the production systems of Vilwadri and Ananganmala cattle of Kerala

The study was carried out to assess cattle keepers' indigenous know-how related to the production systems of Vilwadri and Ananganmala cattle. The attitude of respondents towards conservation of indigenous cattle and strengths, weaknesses, opportunities, and threats (SWOT) about the production systems of Vilwadri and Ananganmala cattle as perceived by the cattle keepers were studied. The cattle keepers were identified by key informant and snowball sampling method. The data were collected by personal interview method using a structured questionnaire. The majority of both Ananganmala and Vilwadri cattle keepers were predominantly males and fell within the age range of 30 to 50 years. Among the cattle keepers studied, those involved with Vilwadri cattle generally possessed higher educational qualifications, often graduation or higher. In contrast, most Ananganmala cattle keepers had completed primary or secondary education. Additionally, the cattle keepers were largely affiliated with the Hindu faith and belonged to forward communities, with a significant number living in nuclear family structures. Statistical analysis using the chi-square test revealed a significant association between the age of respondents and their attitude towards the conservation of Vilwadri cattle. The study documented a total of 76 indigenous know-hows from these farming communities, categorized into various domains.

SWOT analysis was also done and the cattle keepers identified several strengths in Vilwadri cattle farming, including lower fodder requirement, rearable under zero input system, lower occurrence of repeat breeding, and suitability for organic farming, while the ability of native breeds to provide essential milk and dairy products being highly valued among

Ananganmala cattle keepers. Conversely, the lower milk production compared to crossbred animals was cited as a significant weakness for both cattle types. Opportunities for enhancing and popularising indigenous cattle farming were noted, particularly through local initiatives and social groups promoting Vilwadri and Ananganmala cattle. These efforts were seen as crucial for the conservation of these indigenous breeds, which were recognized for their resilience and adaptability in various farming conditions.

Antimicrobial use and prescribing behaviour of veterinarians in large animal practice in kerala

A mixed method research design was used to investigate the perception of veterinarians engaged in large animal practice about antimicrobial use and resistance as well as their knowledge, attitudes and practices regarding antimicrobial resistance and stewardship. Four focus group discussions were conducted in four districts of Kerala, each with five veterinarians engaged in large animal practice, as part of the qualitative part of the study. Themes emerging from these discussions were used for questionnaire development for the quantitative part of the study. The structured, pre tested questionnaire was sent by Google form links to 1580 veterinarians working in Animal Husbandry Department, Kerala. A total of 336 responses were obtained and these formed the sample for the study. Majority of the respondents were middle aged (55.1%), male (55.1%), married (94.6%), undergraduate (45.2%), veterinary surgeons (78.6%), working in veterinary dispensaries (63.4%) situated in panchayat localities (74.7%). Most of the respondents had between 11 and 22 years of total work experience (39.28%), had not attended any training on antimicrobial use and resistance (66.7%) and had not participated in any antimicrobial stewardship programmes (93.2%). It was also evident that 47.02 per cent of the veterinarians had a medium level of confidence with regard to appropriate antimicrobial prescribing and 71.4 per cent had a low level of general awareness about antimicrobial resistance and stewardship.

Clinical signs and prior experience were the major clinical and non-clinical factors that influenced the prescribing decision of veterinarians on whether to prescribe an antimicrobial or not. Spectrum of activity of the drug and clinical signs were the major pharmacological and non-pharmacological factors that influenced the prescribing decision of veterinarians to choose a particular antimicrobial. Entrofloxacin, oxytetracycline and ceftriaxone were the antibiotics frequently used by the veterinarians in large animal practice. The results of the study also indicated that 47.61 per cent of the veterinarians had a medium level of perception about antimicrobial use and resistance; 47.32 per cent had a medium level of knowledge and 34.82

per cent had a moderately favourable attitude towards antimicrobial resistance and stewardship. It was also observed that 40.18 per cent of the veterinarians had a high level of adherence to optimum antimicrobial stewardship practices. Pressure or demand from clients, lack of access to antibiotic sensitivity testing laboratory facilities and insufficient fund allotment for drug purchase were the major barriers to optimum prescribing perceived by veterinarians. Establishing more antibiotic sensitivity testing laboratory facilities and providing sufficient veterinary manpower in the field were the major interventions suggested by the respondents to optimise prescribing practices.

Consumer preferences and awareness about safety and quality of meat and meat products

The study was conducted to understand the preference of consumers towards meat and meat products and extent of awareness of consumers about safety and quality of meat and meat products in Thrissur corporation area. The interview schedules were developed and data were collected by personal interview method from 150 consumers selected using multistage random sampling procedure.

Majority of the respondents were above 30 years of age and had education of higher secondary and above, more than half of the respondents were female and most of them had a nuclear family of up to four members. Majority of the consumers worked in private and business sectors and their reported annual income was between one to ten lakhs. More than half of the respondents consumed meat once or twice a week and they assessed the quality of meat by colour, tenderness, flavour, juiciness and smell. All the respondents preferred to purchase meat from the local meat stall because of the quality and freshness of meat available. It was noticed that respondents consumed chicken, beef, chevon, pork and rabbit in the descending order of preference. Most of the consumers preferred meat puffs and cutlets among the ready to eat meat products. There was a significant association between ($p<0.05$) between annual income and the frequency of meat consumption also consumers education level and awareness of consumers about the hygiene of meat handlers ($p<0.01$)

Among the eight domains studied for assessing the extent of awareness, majority of the consumers had high level of awareness about hygiene of the meat handler and hygiene cooking practice, medium level of awareness regarding hygiene at the meat shop, packed meat and meat products, and post buying hygienic meat handling practices and low level of awareness for meat quality, optimum storage conditions, consumption period and meat storage practices. The

present study identified that majority of the consumers had medium level of awareness regarding safety and quality of meat and meat products.

Collected serum and milk samples from crossbred and zebu cattle. Isolated DNA and done rolling circling amplification. Isolated Bovine meat and milk factors from the RCA product.Anti-Mullerian Hormone gene was isolated from crossbred and Vechur cattle and

Evaluation of serum biochemical status, endorine profile and oxidative stress in Attapady Black Does during peripartutient period

Evaluation of serum biochemical status, endocrine profile and oxidative stress in Malabari does during periparturient period were done. Role of reactive oxygen species and Epigallocatechin-3-gallate in stemness of breast cancer cells was studied in vitro. Haptoglobulin gene was isolated from Malabari goats. Molecular characterisation and expression analysis of the gen was then done. Gene encoding plasminogen binding surface associated enolase was isolated from Schistosoma spindale and molecular characterisation was done. Effect of soya bean meal incorporated diet on expression of oestrogen receptor alpha in non gonadal tissues of layer chicken was studied. Molecular characterisation and detection of haemoprotozoans/ rikettsiae in the tick vector was done. Taurine and L-carnitine was estimated in plasma of dogs with dilated cardiomyopathy using high performance liquid chromatography. Evaluation of serum biochemical status, endocrine profile and oxidative stress in Attapady Black does during periparturient period were done.

Isolation and characterisation of Avibacterium paragallinarum from poultry in Kerala

The important research highlights were studies on the isolation and characterization of **Avibacterium paragallinarum** from poultry in Kerala, isolation and identification of bacteria from vagina of sub-fertile and fertile bitches and their antibiotic resistance pattern by phenotypic and genotypic methods, detection and isolation of fowl adenovirus among broiler flocks in the state followed by its genotypic characterization

Molecular characterisation of antibiotic resistance of bacteria isolated from the reproductive tract of subfertile dogs during oestrus

The important research highlights were isolation and characterization of fowl adenovirus from poultry in Kerala. Among the 56 samples screened, five were found to be positive for the presence of the virus by PCR and egg inoculation. The representative PCR amplicons of hexon gene were sequenced, analysed and compared with sequences of other isolates from India and other countries, available in GeneBank. Phylogenetic analysis revealed that the isolates clustered with each other and also with isolates from India and different parts of the world, and they belonged to FAdV 11 serotype.

Isolation and molecular characterisation of fowl adenovirus from broiler chicken

The important research highlights were isolation and characterization of fowl adenovirus from poultry in Kerala. Among the 56 samples screened, five were found to be positive for the presence of the virus by PCR and egg inoculation. The representative PCR amplicons of hexon gene were sequenced, analysed and compared with sequences of other isolates from India and other countries, available in GeneBank. Phylogenetic analysis revealed that the isolates clustered with each other and also with isolates from India and different parts of the world, and they belonged to FAdV 11 serotype

Prevalence of multiple anthelmintic resistance in Haemonchuscontortus of caprine

The mean faecal egg count in goats was found to be the highest in July correlating woth monsoon which might be due to climatic factors that favour the multiplication of bacteria providing optimum nutrition for the free living stages of strongyles . Detection of benzimidazole (BZ), ivermectin (IVM) and levamisole (LRV) resistance was done in four farms by in vivo faecal egg count reduction test (FECRT), in vitro egg hatch assay (EHA), larval development assay (LDA) and molecular genotyping by polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP). Based on FECRT resistance to BZ

was detected in all the four farms with FECR less than 95 per cent. The results of EHA and LDA were interpreted with respect to the discriminating dose (DD) criterion indicating resistance in all four farms. Benzimidazole resistance associated SNPs were found in codons 198 and 200 and susceptible genotype at codon 167 of isotype 1 β-tubulin gene using PCR-RFLP. Resistance to IVM was detected using FECRT in three farms and susceptibility in one farm. The results of LDA indicated resistance in all the farms. Levamisole resistance detected using FECRT and LDA indicated resistance in one farm while all other three farms were susceptible. Regarding the DNA assay for LEV resistance in the study a 63 bp indel in acr-8 was observed in the study. However, not much difference in the allelic frequency susceptible and resistant isolates were observed in the study, suggesting that the 63 bp indel in acr-8 gene is undergoing selection and hence other genes like unc-74, unc-63, unc-50, unc-38, unc-29 and ric-3.1 and 3.2, should be further investigated

Evaluation of synthetic analogue of assembly pheromone for tick control in ruminants

Established the efficacy of assembly pheromone microparticles on Hemaphysalis and Rhipicephalus species of ticks by invitro petri dish bio assay. Tick traps baited with assembly pheromone-Deltamethrin beads were designed and field evaluation of the traps was done in cattle and goat farms. The traps were found effective in controlling the environmental stages of ticks

Molecular characterisation of Haemaphysalis spp. In goats and detection of Haemoprotozoans/ rickettsia in tick vector

Seroprevalence of intestinal schistosomosis in cattle evaluated by dialyzed purified recombinant tegument protein (rSs22.6) of S.spindale (rSs22.6) based dot ELISA was found to be 29.17 per cent. A seroprevalence of 31.25 per cent of intestinal schistosomosis in cattle was reported by the rSs22.6 based IgG ELISA. The sensitivity of rSs22.6 based IgG ELISA was more than that of rSs22.6 based dot ELISA. A Lateral flow assay was development using the rSs22.6 after dialysis and lyophilization the protein. Out of the 25 mesentery positive samples, 23 (92%) were detected as positive by rSs22.6 based IgG ELISA whereas only four mesentery positive samples (16%) were detected as positive by rSs22.6 based LFA. The results indicated that the sensitivity of rSs22.6 based LFA was much lower compared to that of rSs22.6 based IgG ELISA.

Immunohistochemical localisation of phosphatase and tensin homolog deleted on chromosome 10 and p53 in relation to hormone receptors in canine mammary tumours:

The current study entitled "Immunohistochemical localisation of phosphatase and tensin homolog deleted on chromosome 10 and p53 in relation to hormone receptors in canine mammary tumours" was conducted to evaluate the expression of ER, PR, HER 2 receptors and tumour suppressor proteins p53 and PTEN in CMT. A total of 25 CMT suspected cases presented to the University Veterinary hospitals at Mannuthy and Kokkalai from July 2022 to June 2023 were included in the present study. Dogs between the ages of seven and nine were found to have the highest incidence of mammary tumours and among the population under study, the mean age at which CMTs appeared was 8.72 years. Data on breed-specific occurrence indicated that Labrador retriever breeds were mostly affected. Among the 25 cases, 96 per cent of CMTs occurred in female dogs. The gland wise incidence showed higher frequency of affection in left side glands particularly, caudal abdominal. Solid carcinoma, tubulopapillary carcinoma and carcino sarcoma were the most common types of tumours observed in the present study. Dogs with home cooked diets reported more probability of acquiring CMTs. None of the dogs in the study were neutered.

Grossly, excisional biopsy samples varied in shape from spherical to oval, greyish pink to yellowish white colour, with soft to hard consistency. On grading of the tumours using cytology, 52 per cent tumours were grade 2 and 48 percent were grade 3. Histopathology of CMTs revealed different histological subtypes and 64 per cent cases showed grade 3 characters. There was strong relation between cytological and histological grading of CMTS. Immunocytochemistry was done in 13 samples for p53, PTEN, ER, PR and HER2 and the results showed 100 per cent specificity but with lower sensitivity. Immunohistochemical analysis was done in 25 CMTs for p53, PTEN, ER, PR and HER2. In the present study, classification based on receptor status revealed more of ER positive tumours, especially the luminal A type (60 percent), followed by Luminal B, HER 2 enriched and TNBC. The expression of the receptors in the tumours were compared between themselves, with the tumour suppressor proteins and also with grade of the tumour. The IHC results revealed strong association between the IHC score for PTEN and PR with tumour grade ie., as grade increased, expression of both the proteins decreased. Analysis also reported that the IHC staining for the PTEN increased with PR positivity. Presence of lymphatic invasion was negatively correlated with expression of protein PTEN. There was also inverse relation in the expression of PTEN and HER 2. Though this association was statistically not significant, as HER 2 enriched

tumours are associated with tumour aggressiveness, the relevance of this should be checked with higher sample size. In the case of **PTEN**, mostly loss of function mutation and thus loss of PTEN activity is associated with disease progression in many human cancers including HBC. It was also interesting to note that both p53 and PTEN were absent in the single case of TNBC we got in the present study. Among the six animals in which both the tumour suppressor proteins were absent, four animals succumbed to the disease and these tumours were of TNBC, HER 2 enriched and luminal B subtypes. Combined deficiency of p53 and PTEN was reported to be associated mostly with TNBC and thus with faster disease progression, poor prognosis and resistance to therapy in HBC. The absence of statistical significance for the protein p53 in the present study, could be due to mutations in the gene, which may result in loss of function and absence of protein synthesis or activating mutations which may lead to increased production of nonfunctional protein. Thus, more than the level of p53, the functional significance of p53 protein has to be looked into, in future studies. Further investigation of these proteins in ICC and IHC with large populations and in greater duration of time period may help in confirming their diagnostic, therapeutic and prognostic significance in canine mammary tumours.

Pathological, Immunohistochemical and molecular studies of Parvo, Rota and Corona viral gastroenteritis in dogs and cats:

The study intended to screen the carcasses of dogs and cats with lesions suggestive of gastroenteritis for parvo, rota and corona viruses by PCR targeting **VP-2** gene (160 bp), **VP-6** gene (379 bp) and **M** gene (CCoV; 279 bp and FCoV; 295 bp), respectively. The total of 70 dog and 30 cat carcasses with gastrointestinal lesions brought to the Department of Veterinary Pathology for necropsy during the study period from May 2022 to July 2023 formed the study material. Out of 100 cases, 46 dogs and 23 cats tested positive for parvovirus, four dogs and a cat turned out to be positive for the coronavirus, five dogs found to be positive for the rotavirus and ten dogs tested positive for the canine distemper virus. Among these, 38 dogs and 16 cats turned were positive for **E.coli** infection also. Dogs affected with parvo and corona viruses exhibited moderate to severe gross and histopathological (HP) lesions with strong nuclear immunostaining of viral antigen in various organs. However, cats with mild to moderate gross and HP alterations also displayed strong IHC signals for parvo viral antigen. In rota viral infection, even though the gross changes were mild to moderate, severe HP alterations could be observed with strong IHC signals in intestinal villi. A substantial association between the gross, HP and the IHC scores was established by statistical analysis. Secondary bacterial and

helminthic gastrointestinal infections were common findings in addition to viral aetiology. The severity of gross and HP lesion scores were markedly higher in combined infections than in single infections. The sequencing and phylogenetic analysis of canine parvo virus (CPV) and Feline parvo virus (FPV) revealed close evolutionary relation with other Indian and Chinese isolates. The CPV-2 isolates were of genotypes CPV 2a and CPV 2c, with an increased prevalence of CPV 2c. Also, significant variation was observed between the sequences of field and vaccine isolates. The finding warrants the requisite for a comprehensive investigation to determine the circulating field strains so as to ensure the efficacy of vaccines in current use and to endorse vaccine revisions, if required. Consequently, the current study established the prevalence of various canine and feline enteric viruses in Kerala accentuating the mandate for routine screening for mixed infections and modified therapeutic and preventive strategies.

Screening of synergistic viral infections in porcine circovirus-2 infected piglets and comparative evaluation ofIL-6 and TNF- α:

Porcine circovirus 2 (PCV2) infection is an economically important emerging viral infection having a significant impact on global swine industry. Immunosuppression caused by PCV2 infection is the major factor which facilitate synergistic infections. There are multiple reasons for immunosuppression to occur, but the role of cytokines seems to be a less explored area. Hence, this current research study has focused on the screening of synergistic viral agents like the classical swine fever virus (CSFV), porcine reproductive and respiratory syndrome virus (PRRSV), porcine parvo virus (PPV), transmissible gastroenteritis virus (TGEV), and porcine respiratory coronavirus (PRCV) in PCV2-infected piglets and the comparative evaluation of cytokines namely, TNF-α and IL-6 in lymphoid organs by immunohistochemistry (IHC). Initial screening was done by polymerase chain reaction (PCR) and reverse transcriptase polymerase chain reaction (RT-PCR). Gross and histopathological studies and immunohistochemical evaluation of cytokines were done in positive cases. Among the 80 cases taken for study, 18 were found to be positive for PCV2. Among these positive cases, three were having co-infection with CSFV, two with PRRSV, and one with PPV. The main gross lesions observed in PCV2 infection were icteric carcasses, non-collapsed emphysematous lungs with varying degrees of consolidation, vascular lesions like haemorrhages and oedema, degenerative and necrotic changes in the heart, liver, and kidney, gastric ulcers, catarrhal to haemorrhagic enteritis, enlarged and congested lymph nodes, mild splenomegaly, and congested tonsils with purulent foci. Histopathologically, these cases revealed lympho-histiocytic to granulomatous interstitial pneumonia, vascular lesions like congestion, haemorrhages, vascular and fibrin

thrombi formation, inflammatory, degenerative and necrotic changes in the liver, lungs, heart, and kidneys and GI tract, intracytoplasmic eosinophilic botryoid inclusion bodies in different tissues; severe lymphoid depletion; and granulomatous infiltration in all lymphoid organs. Combined infections revealed a significant increase in the severity of lesions when compared with single infections. Immunohistochemical analysis revealed appreciable localisation of proinflammatory cytokines like TNF-α and IL6 in lymphoid organs and the IHC scores of these cytokines were significantly higher in combined infections. Statistical analysis explained a significant correlation between the HP scores and IHC scores of cytokines in both single and combined infections with a significantly increased expression of TNF-α when compared to IL6. In addition, phylogenetic analysis of PCV2 was done, and it revealed two major cluster formations and three minor clusters among cluster I. Three sequences clustered with earlier sequences from Kerala, and the other seven sequences clustered together and showed similarity with Thailand strains. Thus, the current study establishes the prevalence of PCV2 and other viral agents in Kerala, emphasising the need and necessity of routine screening and vaccination for prevention and management.

Immunopathological studies on infectious bronchitis with or without infectious bursal disease and New Castle disease in chicken:

This research was conducted to study the immunopathology of IB with or without co-infection with IBD and ND by immunophenotyping CD4+ and CD8+ lymphocytes in bursa of Fabricius, spleen and Harderian gland in infected birds. Immunological response to infections is mounted by the innate and cell-mediated responses in which the CD4+ and CD8+ lymphocytes play a pivotal role. One hundred samples were collected from dead birds brought to the department of Veterinary Pathology, College of Veterinary and Animal Sciences, Mannuthy as well as various farms located in the Thrissur district. Detailed history was collected and the gross lesions were recorded. Tissue samples such as trachea, lungs, kidney, spleen, bursa of Fabricius, Harderian gland, oviduct and other organs were collected for histopathological studies in 10 per cent neutral buffered formalin. Tissue samples were also collected for conducting RT-PCR to confirm the presence of IB, IBD and ND infection in the dead birds. Tissue samples collected from healthy birds were employed as control to evaluate the immunopathological response. Out of the total 100 samples, 33 samples were positive for infectious bronchitis virus (IBV) in which 25 samples were co-infected with infectious bursal disease virus (IBDV) and two samples were co-infected with Newcastle disease virus (NDV). The infection with IBV alone was observed only in six cases. Gross lesions such as catarrhal

or caseous exudate in the trachea /nasal passages, pulmonary congestion, swollen pale kidney were common lesions in IB alone cases. Lesions such as enlarged bursa and spleen were common findings of cases that were co-infected with infectious IBD while hemorrhages in trachea and lungs were noticed in cases that were co-infected with ND. Histopathologically, pulmonary lesions such as loss of cilia, thickening of mucosa, desquamation of epithelium in trachea were recorded. Infiltration of inflammatory cells in lung interstitium was observed. The other microscopic findings recorded were interstitial nephritis and diffuse haemorrhages in spleen and Harderian gland. The histopathological lesions were scored for IB, IBD and ND and the scores for IB alone and co-infection with IBD were statistically analysed. Trachea, bursa and Harderian gland histopathological scores were significant between IB alone and co-infection with IBD. The exacerbated damage due to a combined attack was significant in bursa while the single infection inflicted significant injury to the trachea and Harderian gland. As there were only two cases of co-infection with ND, though statistical comparison was not done, the co-infected cases showed higher histopathological scores in the trachea, oviduct and Harderian gland. CD4+ and CD8+ lymphocytes were demonstrated in bursa of Fabricius, spleen and Harderian gland of affected birds by IHC. The CD4+ and CD8+ immunostaining was high in all the lymphoid organs, when IB alone or co-infection with IBD/ ND were compared against the control which indicated an increased response to the antigenic stimulus, though statistical significance could not be observed in all the conditions. The Harderian gland being situated in close proximity to the conjunctival mucus membrane, which is one of the major portals of entry to infections, showed an accentuated response of the helper (CD4+) and cytotoxic (CD8+) T cells to the IB infection alone, while statistical significance could not be obtained in the co-infection. Thus, the study provides cues about the immunopathological response of the lymphoid organs to the antigenic stimulus by IB alone or co-infection with IBD/ ND and suggested potential areas for future investigation into proactive strategies for addressing these illnesses.

Evaluation of protective effect of Murraya koenigii extract in experimentally induced acute pancreatitis in rat:

The present study entitled “Evaluation of protective effect of Murraya koenigii extract in experimentally induced acute pancreatitis in rat” was conducted and the study was focused on to assess the pathology of L- Arginine induced acute pancreatitis in rat and to evaluate the protective effect of alcoholic leaf extract of M. koenigii (curry leaf) against experimentally induced acute pancreatitis in rats. As per the CCSEA guidelines total of thirty Wistar albino

rats, with body weights ranging from 150 to 200 grams, were randomly allocated into five groups, each consisting of six rats. These groups were designated as follows: vehicle control, disease control, standard drug control, and two treatment groups receiving alcoholic extract of M. koenigii leaves (AML) at doses of 100 mg/kg and 300 mg/kg, respectively. Specified dose of AML was administered to the treatment groups via oral gavage, while the vehicle control group received a two per cent tween 80 solution for a duration of 14 days. On the 14th day of the experiment, acute pancreatitis was induced in the disease control, standard drug control, and treatment groups through the intraperitoneal injection of 20 percent L-arginine at a dose rate of 2.5 g/kg, administered in two doses at a one-hour interval to the animals. Blood samples were collected on day 0, 7 and 15 for haematobiochemical analysis. On the 15th day, all the animals were euthanised, and tissue samples were collected for subsequent investigations. Serum biochemical parameters revealed significant increase in the level of serum amylase and lipase in disease control group. The treatment group that received AML at a dosage of 300 mg/kg displayed a notable reduction in the levels of serum amylase and lipase. There were no significant differences noticed in the level of serum glucose and haematological parameters between groups. A reduction in reduced glutathione levels, along with an increase in tissue malondialdehyde and myeloperoxidase levels, was noted in the pancreatic tissue of disease controlstandard drug control, and treatment groups except for the vehicle control group and there were no significant difference noticed in these parameters of treatment groups compared to disease control group. When comparing the levels of pancreatic nitrite in the disease control group, a substantial reduction was observed in the treatment group that received AML at a dosage of 300 mg/kg. This finding suggests that oxidative stress, instigated by L-arginine at the pancreatic tissue level, may be the fundamental mechanism responsible for the necrosis of pancreatic acinar cells. Gross and histopathological assessments confirmed the development of extensive pancreatic acinar cell necrosis in the disease group, while the treatment group and standard drug control group exhibited comparatively less cellular degenerative changes. These results underscore the potential of curry leaves, with their inherent antioxidant properties, as a promising avenue for further investigation as a protective agent against acute pancreatitis.

Immunohistochemical evaluation of cancer stem cells in canine mammary tumours using biomarkers:

This study examined 44 confirmed cases of “CMTs” presented at the “University veterinary hospitals” , Mannuthy and Kokkali, Kerala Veterinary and Animal Sciences University (KVASU). The research aimed to investigate various aspects of these tumours, including their

occurrence, age distribution, anatomical localization, gross characteristics, histological subtypes, and haematological parameters. The mean age for the occurrence of “CMTs” was 8.510.040 years, with the age range spanning from 4 to 13 years. Labrador Retrievers and Crossbred dogs had the highest occurrence. Regarding anatomical localization, the inguinal “mammary gland” had the highest incidence at 34.1 per cent. Haematoxylin and Eosin staining identified ductal carcinoma as the frequently observed mammary tumour in dogs. Among the 44 cases of malignant “CMTs” studied, six cases were categorized as grade 1, 22 as grade II, and 16 as grade III. Haematological studies revealed anaemia with erythropenia, thrombocytopenia, and leucocytosis, along with variations in “differential white blood cell count” However, statistical analysis revealed no significant differences in haematological parameters between different tumour grades and healthy animals. Cytological investigation of “fine needle aspiration” samples collected from tumour masses and accessible sentinel lymph node was done. The results demonstrated a high degree of consistency between cytological and histopathological diagnoses, with malignancy accurately identified in 40 cases studied. Additionally, the behaviour of the tumour, such as grading, was concordant in 89.3% of the cases, which gave accurate diagnoses for five grade I, 18 grade II, and 11 grade III tumours. A total of six distinct samples representing various grades of malignant “CMTs” were analysed with to Quantitative real-time PCR for the purpose of evaluating “gene expression” profiles specifically on the expression of two cancer stem cell marker genes namely, octamer-binding transcription factor 4 (OCT 4) and “NANOG”. The expression levels of “NANOG” were notably elevated across all grades of malignant “CMTs” while that of OCT 4 exhibited higher levels in grade II and grade III tumours. The immunohistochemistry findings revealed higher immunostaining intensity for “OCT4”, “NANOG”, and “CD44” in higher-grade tumours, suggesting a potential correlation with tumour aggressiveness. However, ““CD24” ” exhibited variable staining intensity across the samples, indicating a less consistent association with tumour grades. This study provides insights into the use of the above three potential biomarkers of “cancer stem cells” for assessing the malignancy in CMT and highlights the complexity of ““CD24” ” as a biomarker. The study determined an average survival rate of 10.150±0.772 months. It was found that transitioning from grade I to grade III, as opposed to moving from grade I to grade II, served as a better predictor of tumor-specific overall survival. The research also confirmed a clear connection between tumor grade, the survival of individuals with malignant neoplasms, and the occurrence of pulmonary metastasis. The epidemiological, pathological, and haematological findings and the differential expression patterns of the specific genes within the context of various tumour grades contribute to the better

understanding of the molecular mechanisms underlying CMT, a highly complex tumour condition in dogs.

Antineoplastic activity of apigenin through inhibition of histone deacetylase in Dalton's Lymphoma Ascites cell line

The present study was undertaken to investigate the antineoplastic activity of apigenin through inhibition of histone deacetylase (HDAC) in Dalton Lymphoma Ascites (DLA) cell line using in silico and in vitro assays. In silico analysis was done using Autodock software and discovery studio visualizer and in vitro analysis was done by MTT and florescent staining procedure. The in silico docking analysis revealed strong affinity (inhibition) of apigenin with different classes of HDAC. The binding energy of apigenin with HDACs were -8.9, -7.98, -6.28 and -7.96 kcal/mol, respectively. The in vitro cytotoxicity assay in DLA cell line was conducted using MTT assay, which revealed a dose-dependent inhibition of cell viability. Based on the per cent inhibition, the IC50 values of apigenin were calculated to be 24.06±0.28 µg/mL respectively. Cell viability assessed after incubation with IC50 of test compounds for three hours using trypan blue exclusion assay revealed that apigenin has an average of 82.67 per cent cytotoxicity. Acridine orange/Ethidium bromide (AO/EB) staining and Hoechst staining were done to assess the apoptotic changes in cells exposed to test compound for 24h. The untreated control cells were viable which was indicated by uniform green fluorescence whereas cells treated with apigenin and suberoylanilide hydroxamic acid revealed early apoptotic changes like nuclear condensation, fragmentation and marginalisation. The change in mitochondrial transmembrane potential of cells exposed to test compound was estimated by JC-1 stain which revealed green fluorescence indicating the depolarisation of mitochondrial membrane in treated cells. Red fluorescence was noticed in untreated control cells indicating polarised mitochondrial membrane.

The relative expression of p21 and Bax were assayed using real-time quantitative PCR in the cells keeping GAPDH as reference gene. There was an up regulation of p21 and Bax in treated groups compared to tumour control and vehicle group. The fold increase in Bax expression was 1.1, 1.97 and 1.53 times whereas for p21, it was found as 1.47, 1.60 and 2.65 fold respectively for IC50 of apigenin, double IC50 of apigenin and SAHA treated cells. The cells exposed to double IC50 of apigenin exhibited increased expression compared to SAHA. Protein was isolated from DLA cells of treated and control groups by using cell lysis buffer and the supernatant was used for estimating HDAC protein separated by SDS-PAGE vertical

electrophoresis method.The bands were visualised by Coomassie staining procedure. Western blotting was performed with HDAC specific primary and secondary antibodies to determine the presence of bands in control and treated groups. The HDAC 3 specific protein band was clearly visualised in control groups in the PVDF membrane. From the present study, it was concluded that apigenin possess antineoplastic activity against DLA cells through inhibition of HDAC when compared with standard HDAC inhibitor SAHA which makes apigenin an ideal drug candidate for anticancer therapy

Antibacterial activity of proline-rich antimicrobial peptides isolated from goat spleen

Antimicrobial peptides are innate immune effectors with remarkable potential for combatting bacterial infections. They mostly act by membranolytic action without any specific receptors. Proline rich antimicrobial peptides are a subclass of these peptides which has a non-membranolytic mechanism different from other groups. The present study was conducted to investigate the antibacterial activity of proline-rich antimicrobial peptide isolated from goat spleen against Escherichia coli and Staphylococcus aureus. The cDNA from spleen was identified, cloned and sequenced. Sequence analysis of cloned cDNA revealed an antimicrobial peptide which was rich in proline residues with 565 bp. The peptide exhibited 98.33 per cent homology with that of Capra hircus Bactenecin 5. The translation of cDNA led to a peptide which contained 43 amino acids of the cDNA which correspond to putative antimicrobial domain and was custom synthesised. In this research, we assessed the efficacy of the isolated peptide against both Gram-negative and Gram-positive bacteria. The minimum inhibitory concentration for peptide against E. coli was 250 µg/mL and for S. aureus was 125 µg/mL by using resazurin based microtiter plate assay, and were compared with the standard antibiotic ciprofloxacin. The peptide exhibited bactericidal activity against E. coli and bacteriostatic activity against S. aureus. The isolated peptide inhibited the biofilm formation by both E. coli and *S. aureus* on congo red agar plates. Antibiofilm activity was also shown by the peptide in combination with ciprofloxacin. The synergy of combinations of peptide and ciprofloxacin analysed by micro dilution checkerboard method revealed a twelve-fold reduction in MIC value of ciprofloxacin against E. coli and four-fold reduction against S. aureus. This indicated synergistic activity of the combination against Gram-negative organism and a partial synergistic effect against Gram-postive organisms. The investigations suggested that the proline rich peptide was more active against Gram- negative organism when compared to that of Gram-positive organism. This research emphasizes the promising role of proline-rich antimicrobial peptides as a valuable resource for the development of novel antibacterial agents.

The results presented here provide essential insights into the potential applications of this goat spleen-derived peptide in the field of antimicrobial therapy, ultimately contributing to the fight against bacterial infections and the ongoing battle against antibiotic-resistant strains.

Evaluation of wound healing activity of Cissus quadrangularis and Chromolaena odorata in methicillin resistant Staphylococcus aureus infected wound in Wistar rats

The present study was envisaged to assess the wound healing activity of stem of Cissus quadrangularis and leaves of Chromolaena odorata in methicillin-resistant Staphylococcus aureus (MRSA) infected wounds. The plants parts were collected, authenticated, cleaned, shade dried, soxhlet extracted using ethyl acetate in case of C. quadrangularis and ethanol in case of C. odorata and the solvents were evaporated. The phytochemical constituents of the ethyl acetate extract of C. quadrangularis (EACQ) and ethanol extract of C. odorata (EECO) were analysed qualitatively by screening methods and using gas chromatography-mass spectrometry. In silico screening of phytocompounds obtained in gas chromatography were done against proteins of wound healing (IL6 and VEGF) and penicillin resistance (PBP2a). The antibacterial activity of EACQ and EECO was assessed using Kirby-Bauer agar disc diffusion method and modified resazurin microtiter plate assay. The MTT and scratch assays were used to evaluate the cell viability and cell migration potential of plant extracts in L929 mouse skin fibroblast cells. Angiogenesis activity of EACQ and EECO was determined using CAM assay. In vivo MRSA infected excision wound healing study on Wistar rats was conducted to evaluate the wound healing potential of EACQ and EECO. Phytochemical analysis of EACQ revealed the presence of flavonoids, alkaloids, saponins, steroids and glycosides and EECO revealed the presence of alkaloids, tannins, steroids, flavonoids and glycosides. Gas chromatography mass spectroscopic analysis of EACQ showed the presence of 26 compounds in which 13-docosenamide, (Z)- had the highest area percentage while EECO showed the presence of 39 compounds in which gamma-sitosterol had the highest area percentage. In silico screening identified that squalene of EACQ and epilupeol of EECO had lower binding energy or maximum binding affinity towards proteins of wound healing and penicillin resistance. EACQ showed zone of inhibition with MRSA while EECO did not show any zone of inhibition using agar disc diffusion method. Minimum inhibitory concentration of both plant extracts against MRSA was found to be 5mg/mL using modified resazurin microtiter plate assay. MTT assay revealed a concentration dependent increase in the per cent mean cell viability from 10 to 160 µg/mL with EACQ while EECO exhibited cell inhibition towards higher concentration with highest cell viability at 20µg/mL. In scratch assay, significant

($P<0.001$) reduction in mean cellular gap was observed for EACQ while EECO showed no significant reduction in cellular gap, at EC50 concentrations. CAM assay revealed significant ($P<0.01$) difference between number of primary, secondary, tertiary and quaternary vessels for EACQ and EECO compared with control and standard drug, allantoin. The results of in vivo study revealed that wound area of groups treated with different concentrations of EACQ and EECO showed significant reduction in wound area on day nine. On day 15, reduction in wound area for 0.5 percent EACQ and 0.1 per cent EECO was comparable with that of standard. Histopathological examination using H&E and Masson's trichrome staining methods revealed that the wound healing was better in rats treated with 0.5 per cent of EACQ and 0.1 per cent of EECO. The study concluded with the findings that EACQ and EECO exhibited wound healing property in MRSA infected wounds and the identified phytochemicals might be responsible to this activity mainly by binding to various proteins involved in wound healing and antimicrobial resistance, which needs to be further investigated.

Evaluation of anticancer activity of Sida alnifolia and Eupatorium triplinervis in MDA-MB-231 cell line

The present study was undertaken to evaluate the anticancer properties of methanol extract of whole plants of Sida alnifolia (MSA) and Eupatorium triplinervis (MET) in triple negative breast cancer cell line, MDA-MB-231. Both the plants were collected, authenticated, cleaned, shade dried, extracted using methanol in Soxhlet apparatus and the solvent was evaporated using rotary vacuum evaporator. The phytochemical constituents of the plant extracts were analysed qualitatively by screening methods and using gas chromatography-mass spectrometry. The phytochemicals identified were screened for its anticancer activity using prediction of activity spectra for substances (PASS) software. Violation of Lipinski's rule was analysed using Swiss ADME online webtool. Those compounds with antineoplastic activity were docked with Bcl-2 using autodock4. Both MSA and MET were screened for their cytotoxic potential in MDA-MB-231 cells using MTT assay at various concentrations of 10, 20, 40, 80 and 160 µg/mL. Cisplatin was used as the positive control. With the IC50 concentrations of the plant extracts and cisplatin, the apoptotic changes were studied using AO/EB and Hoechst staining methods. The effect of MSA and MET on the expression of anti-apoptotic gene, Bcl-2 was studied using RT-qPCR with GAPDH as the house-keeping gene.

On nucleotide blasting, the whole plant of S. alnifolia had 99.82 and 99.83 per cent similarity with the forward and reverse sequence of rbcL respectively. Similarly, whole plant of E. triplinervis had 95 per cent similarity with the forward and reverse sequences of matK.

The methanol extract of MSA produced 4.03 per cent yield whereas MET yielded 7.18 per cent. The phytochemical analysis of MSA and MET revealed the presence of alkaloids, terpenoids, phenolics, saponins, tannins and flavonoids. Among the selected compounds with antineoplastic activity, propanoic acid 2- (benzoylamino)-3-phenyl- methyl ester from MSA had the least binding energy of -7.8 Kcal/mol whereas in MET, uvaol and caryophyllene had the lowest binding energy of -7.6 Kcal/mol. Comparatively better cytotoxicity was produced by MSA with an IC50 of 20.62 µg/mL. However, MET induced a concentration-dependent cytotoxicity and the IC50 was found to be 44.58 µg/mL. The positive control, cisplatin had an IC50 of 29.86 µg/mL. on AO/EB staining, MDA-MB-231 cells treated with IC50 concentrations of MSA, MET and cisplatin exhibited orange nucleus and few necrotic cells. With Hoechst staining, fragmented, marginalised nuclei and condensed chromatin were observed. It was found that MSA produced 0.8-fold downregulation of Bcl-2, whereas MET produced 0.75-fold downregulation of Bcl-2. Cisplatin produced 0.85-fold downregulation of Bcl-2.

Thus, in the present study, methanol extracts of S. alnifolia and E. triplinervis exhibited cytotoxicity in MDA-MB-231 cell line by inducing apoptotic cell death via intrinsic pathway. The anticancer activity of the plant extracts could be attributed to the presence of propanoic acid 2-(benzoylamino)-3-phenyl- methyl ester in MSA while uvaol and caryophyllene in MET along with other plant ingredients which exhibited good binding affinity for Bcl-2. Hence, these plant extracts might be considered as a source for isolating therapeutic molecules for the treatment of breast cancer with triple negative phenotype.

Modulation of oestrogenic activity by methanolic extracts of bark and flower of Saraca asoca in MCF-7 cell line

The present study was undertaken to determine the oestrogenic activity by methanolic extracts of bark and flower of Saraca asoca in MCF-7 cells. The bark and flower of Asoka were collected locally, dried under shade, pulverised and extracted using methanol and solvent evaporated using rotary vacuum evaporator. Qualitative phytochemical analysis, Fourier transform infrared spectroscopy and Gas chromatography-mass spectrometry were performed to identify the chemical constituents of the extracts. The extract was assessed for its cytotoxicity in MCF-7 cell line by 3-(4,5-dimethyl thazol-2-yl)-2, 5-diphenyl tetrazolium bromide (MTT) assay and the half maximal inhibitory concentration (IC50) was calculated using Graph Pad Prism 5.0. The cells were seeded in 6 well plates at a concentration of 3×105 cells/mL and treated for 24 hours with extract of S. asoca bark and flower at half IC50, IC50

and double IC50 concentration. The cells were harvested and subjected to Acridine orange - Ethidium bromide (AOEB) and JC-1 staining for morphological evaluation of apoptosis. Oestrogen secreted by the extract-treated cells at 48 and 96h was assayed by Enzyme-linked immunosorbent assay (ELISA). The relative expression of GPER and CYP19 genes was quantified using quantitative real-time polymerase chain reaction (qRT-PCR) keeping GAPDH as reference gene.

The methanolic extract of Saraca asoca bark (SAB) produced an 11.4 per cent yield whereas, the flower of Saraca asoca (SAF) yielded 24.7 per cent. The phytochemical analysis of SAB and SAF revealed the presence of phenolics, saponins, tannins, glycosides and flavonoids. FTIR analysis of SAB and SAF detected the presence of alcohol, cyclic alkenes, nito- and fluro-group compounds whereas various compounds were detected in the extract by GCMS analysis. Dose-dependent reduction in cell viability was noticed when the cells were subjected to different concentrations of SAB and the IC50 was found to be 75.13 µg/mL. However, S. asoca flower SAF induced a dose-dependent increase in cell viability and the IC50 was found to be 93.96 µg/mL. AO/EB staining detected a dose-dependent shift from orange to red fluorescence indicating apoptosis in SAB treated cells whereas, SAF showed a dose-dependent shift from red to green indicating proliferation of cells. JC-1 staining showed apoptotic-green fluorescence cells at higher concentrations of SAB and lower concentrations of SAF. SAF increased the concentration of oestrogen secretion from MCF-7 cells, whereas SAB increased oestrogen secretion at half IC50 and double IC50 concentrations, but reduced at IC50. Flower of S. asoca upregulated the expression of CYP19 by 16.5-fold at double IC50. Expression of GPER was decreased by SAB while SAF downregulated its expression at half IC50 and upregulated at double IC50. From the study, it could be concluded that flower of S. asoca produced a positive effect on oestrogen secretion whereas the bark of S. asoca showed antiestrogenic properties at IC50 and oestrogenic properties at half IC50 and double IC50 concentrations which proves its biphasic action.

Evaluation of beta-caryophyllene incorporated chitosan-based hydrogel formulation on healing of full thickness burn wound in rats

Burn injury is an excruciating form of wound, classified under the open wound category and hence wound dressings form an integral part of burn wound management. The present study was conducted to evaluate the wound healing potential of beta caryophyllene (BCP) incorporated chitosan-based hydrogel dressings on full thickness burn wound in rats for aperiod of 15 days. The inert hydrogel (IH) was fabricated by dual crosslinking of chitosan and

polyvinyl alcohol fibres initially by formaldehyde as the crosslinker followed by freezethaw method. The synthesised hydrogels were examined for their morphological, physical and chemical characteristics. The successful incorporation of BCP into the hydrogel was confirmed by elution of BCP from the hydrogel by ethanol and qualitative and quantitative analysis by GC-MS. The antimicrobial activity of the IH and BCP incorporated hydrogel (BCP-H) was evaluated by Kirby-Bauer agar disc diffusion method on S. aureus strains. Further, in vivo evaluation of BCP-H on healing of fullthickness burn wounds was donein Wistar rats. Burn wound of one-centimetre square area was made on thoracolumbar region of rats under general anesthesia, using a custom-mademetal block of same area with nichrome heating filament. Thewound healing was assessed by measuring wound surface area, rate of wound contraction, hematological and histopathological findings. The disc diffusion assay revealed the zone of inhibition of BCP-H as 20 mm indicating its promising antibacterial activity against S. aureus bacteria. The hematological parameters suchas total leukocyte count and differential leukocyte count did not exhibit a significantdifference among the control (Tween 20), reference standard (silver sulfadiazine, 1%), Inert hydrogel group, BCP-H at low and high concentrations (0.5% and 1% BCP) groups. The results of the in vivo wound healing study revealed significant reduction in wound area as well as wound contraction rate in both concentrations of BCP-H after 15 days of treatment and the effect was comparable to the silver sulfadiazine treated group. The histopathological examination showed improved epithelialisation and skin appendages in reference standard as well as BCP- H groups by day 15. The Masson's trichrome staining revealed an increasedcollagen deposition in BCP-H group with both low and high BCP concentrations, similar to the reference standard group. Thus, the present study established significant healing potential of beta caryophyllene incorporated chitosan-based hydrogel dressings on full thickness burn wound in rats indicating its plausible potential for the application as burn wound dressing material for the effective skin repair.

Impact of Heat Stress on Physio-Biochemical Parameters During Early Lactation of Crossbred Dairy Cattle

The study assessed the impact of thermal stress during early lactation in crossbred dairy cattle. It was revealed that the lactating animals were experiencing thermal stress even when the ambient temperature was 27oC. Below 54% relative humidity no correlation could be observed between humidity and respiratory rate. But above 54%, relative humidity was also found to be positively correlated with respiratory rate. A 18.5% reduction in milk production was recorded during the most heat stressed period compared to control period, indicating the animals

maintained their positive energy balance at the expense of milk production during the study period. Oxidative stress experienced by animals was more related to production stress rather than climate stress. Occurrence of Campylobacter spp. in cats, pet birds and rats and in vitro antibacterial effect of aqueous Couropita guianensis flower extract

Out of 130 samples from pet birds and 60 samples from rats, 17.69 and 10 per cent were positive for Campylobacter by direct PCR. Antibiotic resistance profiling of isolates showed all the isolates were resistant to Cefuroxime. In vitro antibacterial activity of aqueous **Couropita guianensis** Aubl.flower extract had MIC of 25 mg/ml and is suggestive of its potential to be used effectively to control Campylobacter.

Screening for Salmonella species and Shigella species in chicken shawarma

Overall occurrence of Salmonella spp., in chicken shawarma, mayonnaise, vegetable salad and water was 14 per cent, 4 per cent, 4 per cent and 14 per cent respectively.None of the samples were positive for Shigella by conventional culture technique. However, shigella was detected in water samples (six percent) by direct PCR. In the water samples, microbiological parameters such as aerobic plate count, total coliform and E.coli count and Faecal Streptococccal count exceeded the prescribed level

Occurrence of Leptospira spp. in peri-domestic rats and associated environment in Thrissur, Kerala

Microscopic agglutination test (MAT) of serum samples of 100 peridomestic rats collected during summer and monsoon season revealed a seroprevalence of 8 percent and 32 per cent during summer and monsoon respectively, with the predominant serovars being Australis and Javanica, and Bataviae and Gryppotyphosa respectively.

Feather degrading ability of keratinolytic Bacillus spp. isolated from chicken waste disposal sites in Thrissur district..

Feather degrading potential of Bacillus. sp isolated from chicken waste dumping sites in Thrissur district and two isolates had promising results

Development and evaluation of helix loop-mediated amplification assay for detection of Listeria monocytogenes in milk and meat

The **helix loop-mediated amplification assay** was successfully developed for **L. monocytogenes** detection, incorporating a cost effective three-step centrifugation-based DNA extraction method and using pre-added HNB dye. The developed HAMP assay for identifying

L. monocytogenes was hundred per cent specific, as it successfully detected the DNA of tested **L. monocytogenes** (n= 15) and failed to amplify the DNA of other standard bacterial standard strains.

Clinico-epidemiology and comparative evaluation of diagnostic assays for leptospirosis among livestock of Northern Kerala

LAMP was standardized with DNA from *Leptospira interrogans* serovar Australis as a positive control and DNA from non-pathogenic serovar Patoc as a negative control. LAMP could be considered a robust tool for diagnosing leptospirosis in livestock due to its simplicity in performance.

Effect of selected essential oils and monosaccharides on the genotypic and phenotypic expression of major virulence factors of Pseudomonas isolates from canine otitis externa

The findings of this study support the use of essential oils and monosaccharides as effective alternatives or complements to conventional antibiotics in the treatment of canine otitis externa caused by pseudomonas spp. The essential oils tested, particularly eugenol and cinnamon oil, demonstrated significant antimicrobial and anti-virulence properties by reducing virulence gene expression. Monosaccharides, on the other hand, effectively inhibited bacterial adhesion, further limiting biofilm development.

Identification of bacterial agents associated with haemagalactia among cattle from Wayanad district

The 30 affected animals were classified into haemagalactia associated with infectious and non-infectious risk factors based on clinical examination, cultural isolation and haemato-biochemical analysis. Infectious risk factors includes mastitis (n=15) and non-infectious risk factors includes post-partum hyperemia (n=7), phosphorus deficiency (n=6) and teat capillary injury (n=2)

Molecular identification and characterisation of selected infectious agents associated with thrombocytopaenia in dogs

Babesia spp. was the most prevalent cause of thrombocytopenia in dogs, with *B. gibsoni* and *B. vogeli* combined infections being common.Leptospirosis was detected in a significant number of cases, primarily through LAMP, which proved to be a simpler, more sensitive, and cost-effective method compared to PCR Other infectious agents, such as *Ehrlichia canis*,

Anaplasma platys, and *Hepatozoon canis*, were detected in fewer cases, with no detection of Rickettsia spp. or SFTSV.

Clinical and immunopathological profiling of oriental theileriosis in cattle

Prevalence of oriental theileriosis: clinically infected animals -63%, subclinically infected animals – 47% and overall prevalence – 51%. Epidemiological analysis revealed a higher occurrence of oriental theileriosis in female crossbred HF under 2 years of age. Major hematobiochemical findings: Anaemia, thrombocytopenia, hypoproteinemia and hypoalbuminemia. Elevated AST and GGT could be observed in clinically infected cattle. Depression in serum vitamin A and Zn in clinically and subclinically infected cattle

***In vitro* assessment of the antibacterial activity of lactic acid bacteria against *Staphylococcus* spp isolated from the skin and ear of dogs**

Pyoderma- only SIG isolated- no S. aureus. Otitis- 34.62% Pseudomonas spp.Clustering analysis- homogeneity of phenotypic traits in SIG and Pseudomonas spp.LAB- Gram positive bacilli- 26.67%. Antibacterial activity- 33.33% LAB- 80% Gram positive bacilli.Antibacterial and antibiofilm of CFS were weak to moderate. Postbiotics- majorly organic acid (70%)- 2 peptides (20%)

Effect of Dietary Incorporation of Sukumara Gritham Residue On Growth Performance of Malabari Kids

Sukumara gritham residue can be safely incorporated in kid starter up to 20 per cent without affecting the growth performance of kids and better results could be achieved at 10 per cent level of incorporation, as evinced by the higher final body weight, higher average daily gain, total average body weight, better FCE, significantly higher digestibility coefficients of all nutrients except EE and ADF and lower cost per kg gain at that level of inclusion. This will help in preparation of cost effective kid starters instead of those made from costly conventional ingredients, thereby reducing the feed cost and ensuring better returns to the farmers.

Effect of supplementation of essential oils from Glycyrrhiza glabra and *Zingiber officinale* on performance of broiler chicken

The birds supplemented with essential oil from G. glabra at 200 mg/kg consumed less feed, had higher body weight gain, showed better FCR, higher carcass yield and higher profit, than chicks in all other groups. Therefore, it can be concluded that supplementation of essential oil from G. glabra at 200 mg/kg can be recommended.

Early diagnosis of pseudopregnancy in goats by ultrasonography and therapeutic management using cloprostenol sodium:

Pseudopregnancy in goats can be differentially diagnosed using ultrasonography on day 60 post breeding and can be effectively treated and brought back to fertile status using three doses of cloprostenol sodium at 10 days interval.

Endometrial mRNA expression of receptors for estrogen, progesterone, oxytocin and prostaglandin in crossbred cows exhibiting normal and prolonged oestrus:

Elevated progesterone levels observed in cows exhibiting prolonged oestrus could be linked to an incomplete regression of corpus luteum which was also in accordance with the ultrasonographic examination of ovaries. The incomplete luteolysis resulted in the expression of oxytocin and prostaglandin- 2 receptors on day day 16 in animals exhibiting prolonged oestrus.

Survival prognosis of canine neonates delivered by medical assistance and caesarean section:

Apgar scoring at 5 min and 1 h of birth was found useful for the prognostic evaluation of the survivability of puppies at 24 h of birth and also it could be used to identify weak puppies so that adequate health support and special neonatal care could be provided to improve its survival rates. After assisted whelping, weaker pups can be subjected to resuscitation procedures to improve Apgar scores which could help to reduce puppy mortality.

Evaluation of foetal survivability by analysing foetal maturity and fetomaternal disproportion in dogs:

Radiographic and direct foeto- maternal biometric assessments are valuable tools that can be employed in routine obstetric practice for evaluating the outcome of partition in dogs, particularly when dealing with various obstetric challenges such as dystocia, animals with exceptionally high or low fecundity high risk pregnancies and brachycephalic breeds. By doing so veterinarians can gain important insights into the progress and potential complications of pregnancy and labour in canine patients. This information is crucial for managing the care and ensuring the well being of both dam and her foetus to optimise the outcome of the pregnancy

Prognostic evaluation of uterine torsion based non haematological -biochemical and ultrasonographic changes due to multiple organ dysfunction syndrome in goats:

Uterine torsion can cause severe damage to the uterus if it remains un-diagnosed and corrected within a short period of time. Evaluation of blood parameters along with the ultrasonographic

studies could detect the extent of uterine tissue damage and systemic involvement. For the prediction of survivability of the dam, analysis of these parameters at frequent intervals during the post treatment period and estimation of organ specific enzymes to detect multiple organ dysfunctions is needed. Evaluation of blood gas indices and acid based status found to be helpful to correct the metabolic status of the blood for saving the life of the dam

Antifungal susceptibility profiling of mycotic isolates from reproductive tract of postpartum cows:

The cervico vaginal discharge scoring, pH, endometrial cytology and leukocyte esterase activity of uterine fluid was found to be highly significant in the diagnosis of endometritis caused by bacteria whereas, it was not significant in the diagnosis of endometritis caused by fungal organisms in postpartum dairy cows.

Clinico-biochemical and ultrasonographic evaluations of hepatobiliary disorders in domestic cats

Blood beta-hydroxybutyric acid estimation could be used as a diagnostic and prognostic marker for feline hepatic lipidosis. Fine needle aspiration cytology of the liver was found to have a higher specificity in diagnosing various hepatobiliary disorders in cats. Both SAMe and silymarin were found equally efficient as hepatoprotectives

Nerve conduction studies for localisation of neurological lesions in paralytic dogs and its therapeutic management

All animals showed a positive response to at least one neurological test by 30th day of treatment. Therapeutic trials with pregabalin and gabapentin showed improvement in postural reactions and peripheral nerve conduction studies, gabapentin showed positive response in case of spinal reflexes and cranial nerve response improved with pregabalin and citicoline.

Standardisation and quality evaluation of *kozhi ada*, a Malabari shelf stable snack

Kozhi ada preparation was standardised and the physico-chemical, microbiological and sensory attributes were analysed for 60 days at room temperature storage under aerobic and vacuum packaging and it was observed that the product was shelf stable for 60 days under both packaging conditions. Dehydrated porridge mixes containing chicken meat powder, jack fruit powder, sorghum/pearl millet/sorghum-pearl millet were developed and the physico-chemical, microbiological and sensory attributes were analysed for 90 days under vacuum packaging at room temperature storage and it was observed that the product was shelf stable for 90 days

Comparative evaluation of the antimicrobial activity of K*aempferia galanga* and C*urcuma longa* against multi-drug resistant non-typhoidal salmonella spp. In broiler chicken

The study evaluated the antimicrobial activity of *Kaempferia galanga* and *Curcuma longa* against multi-drug resistant non-typhoidal *Salmonella* spp. (MDR-NTS) in broiler chickens. MDR strains (*S. Enteritidis* and *S. Typhimurium*) were re-validated using PCR and antimicrobial susceptibility testing. The in vitro minimum inhibitory concentration (MIC) of *K. galanga* and *C. longa* was found to be 25 mg/mL and 500 mg/mL, respectively. Fractional inhibitory concentrations (FIC) were assessed using a checkerboard assay, yielding values of 62.5 µg/mL for *K. galanga* and 0.38 µg/mL for *C. longa*. The infectious dose 50 (ID50) of MDR-*S. Typhimurium* was calculated as 1×10^{10} CFU/mL. Total of 240 chicks were divided into eight groups (T1–T8) with three replicates each. Diets included basal feed, basal feed with 2.5% shade-dried *K. galanga*, 0.19% shade-dried *C. longa*, or their FIC combination (62.5 mg/kg and 0.38 mg/kg of feed). On day 7, selected groups (T5–T8) were orally inoculated with MDR-*S. Typhimurium*.Body weight, feed conversion ratio (FCR), survival, and bacterial counts were monitored weekly. Non-infected T4 birds showed the highest body weight ($P < 0.001$) and superior FCR (1.64 ± 0.04 by week 6). Among infected groups, T8 exhibited better growth and FCR. Caecal *Salmonella* counts were negative by week 4 in T6, T7, and T8 groups. T4 and T8 achieved higher live weight, carcass weight, and dressing percentage ($P \leq 0.05$), with no adverse impact on meat sensory attributes. The combination of *K. galanga* and *C. longa* showed the best growth promotion and antimicrobial activity, outperforming individual herbs.

Histomorphological, ultrastructural and immunohistochemical studies on the skin of crossbred and vechur cattle with special reference to thermal adaptation

Histomorphological, ultrastructural and immunohistochemical studieswere conducted on the skin of crossbred and Vechur cattle and compared. Skin samples of 1 cm^2 size were collected from 15 different regions *viz*., dorsal, ventral and lateral regions of head, neck, abdomen and tail respectively and muzzle, interdigital region of fore and hind limbs. Standard procedures were adopted for histoarchitectural and histochemical studies. Skin was thicker on the dorsal surface of the body and maximum thickness was recorded in the muzzle region. The total skin thickness was more in crossbred cattle than Vechur cattle. Crossbred cattle were observed to have longer hair than Vechur cattle. Cuticular scale pattern was similar in both breeds. Histological and scanning electron microscopic studies confirmed that the epidermis, featured four discrete layers namely, the stratum basale, stratum spinosum, stratum granulosum and

stratum corneum. In the region of the snout, an additional layer, the stratum lucidum, was identified. The dermis comprised two layers, a thicker and deeper reticular layer, and a thin, superficial papillary layer. Generally, the epidermis and its four distinct layers, exhibited greater thickness in the dorsal regions of the head, neck and abdomen in both the groups, with crossbred cattle having thicker epidermis compared to Vechur cattle. Among the various regions studied, the epidermis was thickest in the muzzle region in both the groups. The dermis and its two distinct layers exhibited a decreasing trend in thickness from the dorsal regions toward the lateral and ventral regions of the head, neck, thorax, and abdomen. Two types of sweat glands were identified namely, apocrine and merocrine. The average number of sebaceous glands and sweat glands and diameter of the sweat glands was higher in Vechur cattle than in crossbred cattle in various regions of the head, neck, abdomen and tail. The number of hair follicles per field under low-power magnification of the microscope was higher in Vechur cattle compared to crossbred cattle. The immunohistochemical expression of heat shock proteins (HSP) 70 and HSP 90 was observed in the stratum basale of the epidermis, as well as in sweat glands, sebaceous glands and hair follicles in both cattle breeds. The intensity of staining was more pronounced in Vechur cattle compared to crossbred cattle in the epidermis, sebaceous glands and hair root sheaths. In conclusion, histomorphological, ultrastructural, and immunohistochemical examinations of the skin suggested that the skin of Vechur cattle has characteristics that indicate it plays a more significant role in thermoregulation, and, as a result, makes Vechur cattle more thermotolerant compared to crossbred cattle. However, since these results were based on a small sample size and a limited duration of study, to understand the underlying mechanisms that make Vechur cattle more thermotolerant and to arrive at a definitive conclusion, further comprehensive studies involving larger and more diverse populations of different ages and animals reared under various conditions and in different geographical regions are essential. The results of this study can serve as a foundational basis for further physiological, pathological and immunological studies on heat tolerance in the native Vechur cattle.

Histomorphology and ultrastructure of the Harderian gland of White Leghorn birds during pre-hatch period exposed to coloured light

Histomorphological and ultrastructural changes in the Harderian gland of white leghorn embryos under various coloured light were studied. harderian gland appeared on 10th day of prehatch period. the development of the gland was racemose type. HG of white light treatment was diagonally opposite to green light treatment as far as histological, histochemical, and

immunohistochemical results. it was observed that growth and function of HG was affected at multilevel by providing coloured light during the prehatch period.

The effect of silver nanoparticles and ethion on the pre-hatch development of the liver in White Leghorn birds

The effect of silver nanoparticles and ethion on the pre-hatch development of the liver in White Leghorn birds were studied. This research highlights the dose-dependent hepatotoxicity of ethion and the potential of AgNPs at lower doses to mitigate its adverse effects, offering insights into the interplay between organophosphate pesticides and nanomaterials during embryonic development.

Livestock rearing practices among the tribal farmers of Wayanad District, Kerala

An ex post facto research was conducted among the tribal livestock farmers in Wayanad district of Kerala state to assess the adoption behavior and constraints faced by the tribal livestock farmers. Official approval for conducting the study was obtained from the Directorate of Schedule Tribe Development Department as well as from The Integrated Tribal Development Project, Government of Kerala. Thirty tribal livestock farmers who were in Vythiri, Sulthan Bathery and Manathavadi taluks were selected using multistage random sampling method. A structured interview schedule was used as a tool to collect the information from the respondents, with the assistance of Tribal Extension Officers. The result of the study inferred that majority of the livestock farmers were in middle age group and also non-literate. More than one-half of the respondents had animal husbandry as primary occupation, followed by daily wage labourers. The Tribal Extension Officer was the most preferred extension contact point to the tribal farmers. Regarding the overall adoption of recommended scientific farming practices it was observed that just above half of the tribal livestock farmers were medium adopters while the rest fell in the high and low categories. The highest adoption was in the domain of selection of animals followed by housing, feeding and animal health care practices. Whereas, the lowest adoption was observed in marketing practices. High cost of concentrate feed, non-availability of artificial insemination service in time, lack of knowledge on animal disease control, requirement of initial high capital investment, non-renumerative price for livestock and its commodities, lack of adequate government support to livestock farming, lack of physical connectivity to the market and low availability of good quality animals were some of the important constraint encountered by the tribal livestock farmers.

Assessment of the status and job satisfaction of private veterinary practitioners in Kerala

An ex post facto research was conducted among the Private Veterinary. Practitioners (PVPs) in the state of Kerala to assess the socio-economic status, to evaluate the clinical task performed by them, to measure the job satisfaction of PVPs and to analyse the constraints encountered by PVPs. In the present study PVPs were defined as the veterinarians who were treating pets, domestic animals and wildlife and had not received any kind of salary from any type of government organizations. Four PVPs were randomly selected from each district of the state thus a total of 56 PVPs from all over the state comprised as respondents. The data was collected using a pre-tested semi-structured interview schedule developed for the study. The results of the study inferred that just above half of the respondents were young aged and had essential educational qualification required for the job. More than two-third of the respondents were having the experience of up to five years and more than one-third of the respondents had an annual income of 5-10 lakhs. Regarding the promotion of their services, advertisement signboards at clinics/chambers and social media were channels mostly used by the PVPs irrespective of the regions of Kerala. Pet animals were the most predominantly treated and was ranked first. With respect to the clinical and laboratory tasks perceived as most important by the PVPs of Kerala, clinical examination of animals, management of poisoning, treatment of fracture and dislocation, artificial insemination in cattle and management of dystocia, radiographic examinations and faecal examination were ranked high. About two-fifth of the respondents were having lower level of satisfaction towards their job rest fell in medium and high categories in equal numbers. Among the constraints, client related constraints and technological related constraints were the most severe constraint faced by the PVPs. Job related, economic related and social related constraint perceived as least in that order.

Assessment of traditional and molecular methods for estimation of post-mortem interval in dogs-

Accurate estimation of the post-mortem interval (PMI) is critical in forensic investigations. However, reliable tools for PMI determination in canines are limited. This study investigated the utility of RNA degradation as a molecular biomarker for PMI estimation in dogs, focusing on the temporal changes in the expression of beta-actin, GAPDH, and 5S-rRNA in brain tissue. Quantitative reverse transcription polymerase chain reaction (RT-qPCR) was employed to quantify the cycle threshold (Ct) values of these target genes across a PMI range of 24 to 96 hours. A significant correlation between beta-actin Ct values and PMI was observed, demonstrating its potential as a reliable biomarker. A linear regression model was developed

using beta-actin Ct values to predict PMI within the studied time frame. The results suggest that beta-actin mRNA degradation provides a quantifiable and potentially accurate method for PMI estimation in dogs within 24-96 hours post-mortem. To the authors' knowledge, this study represents the first investigation of RNA degradation for PMI estimation in canine brain tissue.

Gross and histopathological evaluation of respiratory system of cats with special reference to common respiratory viral pathogens

This study systematically investigated the gross and histopathological alterations within the respiratory system of domestic cats, concurrently screening for common viral pathogens. A comprehensive post-mortem examination of 48 feline carcasses was conducted, focusing on the trachea, bronchi, and lungs. Macroscopic pulmonary lesions, observed in 72.91% of cases, encompassed a spectrum of pathologies including pulmonary congestion, hemorrhage, edema, pneumonic changes, pyothorax, and parasitic nodules. Histopathological analysis revealed corresponding microscopic lesions, characterized by varying degrees of inflammatory cell infiltration, congestion, hemorrhage, edema, bronchitis, emphysema, atelectasis, and type II pneumocyte proliferation. Molecular screening, utilizing polymerase chain reaction (PCR), targeted feline herpesvirus (FHV-1), feline calicivirus (FCV), and feline parvovirus (FPV). Notably, FPV was detected in the intestines and mesenteric lymph nodes of 31.25% of the subjects, correlating with observed gross intestinal lesions such as bloody, mucous-laden contents, engorged mesenteric vessels, and thickened intestinal walls with hemorrhagic luminal content. However, FPV was not detected in any lung tissue samples examined. This study provides a detailed clinicopathological characterization of respiratory diseases in cats and highlights the importance of comprehensive diagnostic approaches, including molecular techniques, for accurate etiological determination.

Immunohistochemical evaluation of muts homolgue 2 protein in various cutaneous tumours in dogs

This study aimed to characterize the occurrence, gross, and histopathological features of canine cutaneous tumors, and to evaluate the immunohistochemical expression of MutS homolog 2 (MSH2) protein. Thirty-five proliferative skin lesions were examined, with 33 diagnosed as neoplasms. The highest incidence of these neoplasms was observed in dogs aged 4-6 years, with 57.6% occurring in male animals. Tumors were classified as epithelial/melanocytic or mesenchymal. Benign neoplasms included trichoblastoma, lipoma, hemangioma, angiofibroma, hemangiopericytoma, histiocytoma, and mast cell tumor. Malignant tumors

comprised squamous cell carcinoma, hepatoid gland adenocarcinoma, melanoma, and liposarcoma. Two cases of hamartoma (sebaceous and fibro-adnexal) were also recorded. Immunohistochemical analysis revealed MSH2 expression in trichoblastoma, angiofibroma, hemangiopericytoma, mast cell tumor, squamous cell carcinoma, hepatoid gland adenocarcinoma, and melanoma. Conversely, MSH2 immunoreactivity was absent in lipoma, hemangioma, histiocytoma, and liposarcoma. This study effectively identified canine cutaneous tumors exhibiting defective mismatch repair (dMMR) through the assessment of MSH2 protein expression.

Effect of Vitamin B12 and Folic Acid in Reversing the Tumorigenic effect of 2,3,7,8-Tetrachloridebenzo-P-Dioxin on the MCF-7 Cells

Highlights: The study was conducted to assess the impact of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) on Michigan Cancer Foundation-7 (MCF-7) cells. The research involved evaluating cell number, cell viability, the expression of Aryl hydrocarbon receptor (AhR) and Breast cancer gene 1 (BRCA1), as well as the production of homocysteine in TCDD-treated and untreated MCF-7 cells. Additionally, the study aimed to determine whether vitamin B12 and folic acid (B9) could counteract the effects of TCDD. To achieve this, MCF-7 cells were subjected to varying doses of TCDD (T1-5nM; T3-10nM and T5-100nM) and combinations of vitamin B12 and B9 with TCDD (T2, T4 and T6) over different time intervals: 24, 48 and 72h. The findings from cell proliferation and viability studies revealed significant differences ($P \leq 0.005$) in viable cell counts at different time points in response to TCDD treatment, with or without vitamin B12 and B9 supplementation. Cell counts in the presence of TCDD along with vitamin B12 & B9 closely resembled those of the control group. Exposure of MCF-7 cells to TCDD resulted in a reduction in BRCA1 expression and remarkably, this decrease in BRCA1 expression could partially be restored through the supplementation of vitamin B12 and B9. There was no notable pattern of difference in AhR expression. Homocysteine assays revealed a significant difference ($P \leq 0.05$) in homocysteine levels at different time points due to TCDD treatment, which could be reversed almost to control by the addition of vitamin B12 and folic acid. This study provides comprehensive insights into the complex effects of TCDD and the potential of vitamin B12 and B9 supplementation in mitigating some of these adverse effects, emphasizing their role as natural AhR antagonists.

The role of 2,3,7,8-Tetrachlorodibenzo-P-Dioxin as an Endocrine Disruptor in Granulosa Cells and the effect of Vitamin B12 and Folic acid on its reversal

Highlights: 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD), is a potent dioxin toxin that is released into the environment through various anthropogenic processes. Recent studies detecting TCDD in packaged milk necessitated the urgency of investigating its adverse effects, especially its potential to disrupt various facets of granulosa cell function, which in turn affects ovarian folliculogenesis, steroidogenesis and consequently reproductive function. In the current study treating caprine ovarian granulosa cells with increasing concentrations of TCDD resulted in a dose-dependent decline in cell number and cell viability. Gene expression analysis revealed that TCDD exposure induced a significant ($p \leq 0.05$), dose-dependent upregulation of Oct4, Nanog, AhR, CYP19A1, FSHR, and LHR at 5 nM and 10 nM doses in granulosa cells. However, at the highest TCDD dose of 100nM, Nanog and AhR expression decreased, while expression of all other genes increased, as observed with lower doses. Oestrogen levels were observed to be decreasing with increasing doses of TCDD, with a significant ($p \leq 0.01$) decline observed at the dose of 100 nM. There was a dose-dependent rise in homocysteine level accompanied by a decrease in global DNA methylation with TCDD treatment. Supplementation with vitamin B12 and folic acid proved successful in reversing the majority of TCDD-induced adverse effects at lower doses of 5nM and 10nM. To summarize, this study unveiled that TCDD elicits its deleterious impacts via the AhR-mediated pathway, causing accumulation of homocysteine, DNA hypomethylation, altered gene expression and disruption of steroidogenesis. Supplementation with folic acid and vitamin B12 successfully alleviated the adverse effects of TCDD especially at lower doses.

Clinical Efficacy of Procedural Sedation combined with Femoral and Sciatic Nerve Blocks for Stifle and Tibial Surgeries.

The Study concluded that the protocol of procedural sedation combined with femoral and sciatic nerve blocks is effective for stifle and tibial surgeries in dogs without compromising cardiopulmonary functions.

Polyvinyl Alcohol- Hydroxyapatite Composite Ceramic as a Bone Graft Substitute in Rat Calvarial Defect Model

The study concluded that polyvinyl alcohol - hydroxyapatite composite ceramic could successfully heal critical sized defects in rat calvaria.

Radiographic Evaluation of Stiffle Joints in Dogs Affected with Hip Dysplasia

Study concluded that there exists a strong correlation between hip dysplasia and affections of stifle joints in dogs. Dogs with chronic and severe hip dysplasia may develop abnormal angular ailments in the femur, tibia or in both increasing the risk of concurrent stifle joint issues.

Bovine Amniotic Membrane Derived Extrcellular Matrix Scaffold for Corneal Wound Healling in Rabbit Model

The study concluded that the bovine amniotic membrane derived extracellular matrix scaffold has epitheliotropic effects which helped in complete re-epithelialization of the corneal defect and also helped in differentiation of fibroblasts to fibrocytes and reorganisation of the corneal collagen matrix to its normal parallel architecture.

Biomometic Periosteal Membrane and Graft Filler for the Repair of Critical Size Femoral Defects in Rat Model

The study confirmed the successful use of HA- doped collagen sleeve filled with HASi as a bone graft substitute and its advantages like early healing, osteoconductivity, osteoinduction and osteogenesis over existing bone substitutes for treating critical sized defects in rat femur.

Reparative efficacy of Bovine Amniotic Membrane Derived Extracellular Matrix Scaffolds in Splinted Excisional Wound Model on Rats

The study concluded that BAM derived ECM scaffold effectively protected wounds during early healing, promotes healing under scabs and doesn't impede the natural healing process.

Detection of polymorphisms of the olfactory receptor family 51 sub-family h member 1 gene and the association of different genotypes with Theileria infection in crossbred and Vechur cattle of Kerala

The study aimed to identify five SNPs in the OR51H1 gene that were reported to have association with Theileria infection and to find out association of SNPs with Theileria infection in Vechur and Crossbred cattle. Study identified five novel SNPs T271C, C272T, T362C, G180A and T181G in the OR51H1 gene

Instant ‘ Kaalan’- Process optimization and metabolomic studies

An investigation was undertaken to profile the physico-chemical and sensory aspects of Kaalan and establish a standardized preparation process. To align with present-day market demands, an instant Kaalan variant was formulated, its shelf-life determined, and nutritional profiling

executed via INFOGEST in-vitro gastrointestinal simulation studies. In the formulation of instant Kaalan, both vegetables and the coconut-buttermilk-spice mixture underwent distinct dehydration processes under controlled conditions. The developed product was found to be statistically similar to control for most of the nutritional parameters, with a shelf-life of six months at room temperature. The reconstituted instant Kaalan (RIK) demonstrated statistically high levels of dietary fiber, polyphenols, flavonoids, curcumin content, and antioxidant activity, establishing the functional superiority of the product. In-vitro digestion studies of RIK demonstrated lower bioaccessibility of polyphenols and flavonoids and higher bioaccessibility of curcumin and antioxidant activity.

Process standardization of high protein functional cookies for women using composite flour pre- mix and casein hydrolysate

The present study aimed to optimise the preparation of high-protein functional cookies using a composite flour premix and casein hydrolysate. The casein hydrolysate, derived by hydrolysing food-grade casein with alcalase enzyme, demonstrated excellent calcium solubilising property and a high content of essential amino acids, including lysine, phenylalanine and threonine. The optimisation process, conducted using Response Surface Methodology (RSM), identified ideal conditions as 14.63% casein hydrolysate, 170.52°C baking temperature, and 25.96 minutes of baking time. The resulting cookies had improved nutritional value, including higher protein (16.18%) and calcium (1.31%) content, strong antioxidant activity (73.62%), and better sensory attributes than control wheat cookies. A consumer acceptance study showed high satisfaction, suggesting strong market potential, while further clinical studies are needed to confirm calcium absorption benefits.

Process standardization of dietetic functional *lassi* incorporating multifunctional ingredients

A study developed a functional *lassi* using buffalo skim milk by incorporating coconut water, inulin, pumpkin seed powder, lutein and vitamin D_3 and completely replacing sugar with sucralose. This dietetic *lassi* had higher antioxidant activity, a vitamin D_3 content of 349 IU/L with recovery rate of 87.25 per cent and is rich in minerals and amino acids. It had a shelf life of 12 days at 7±1 °C, and the cost of production was Rs 17 per 100 ml when compared to Rs 12 per 100 ml for the control *lassi.*

Rerouting of fermentative metabolism of Lactic acid bacteria to respiratory metabolism for improved performances as starter concentrates

This study explored the potential of rerouting lactic acid bacteria (LAB) metabolism from fermentation to aerobic respiration to improve growth and robustness. Five LAB isolates from curd samples in Kerala—Lacticaseibacillus rhamnosus AMB 120, Lactobacillus delbrueckii ssp bulgaricus TVM 1607, Limosilactobacillus fermentum ALP 120, Lactiplantibacillus plantarum IDK 120, and Lacticaseibacillus casei WYD 1501—were assessed for growth, pH, lactic acid, diacetyl, acetoin production, and stress responses.

Lacticaseibacillus rhamnosus AMB 120 showed the best performance under aerobic conditions, achieving 9.04 log active cells at 96 hours. Cells propagated in respiratory mode showed minimal viability loss (0.97 log) after three months of storage at 4°C, compared to a significant loss (6.11 log) in fermentative mode cells. Similar results were observed for lyophilized starters stored at various temperatures.

This study highlights the benefits of aerobic respiration for improving LAB viability, robustness, and stress tolerance, offering a potential pathway for developing more resilient starter cultures for dairy products

Metabolomic profiling of milk from Vechur, Murrah and Malabari breeds fermented with wild strains of lactic acid bacteria

This study explored the metabolomic profiles of fermented milk from Vechur cow, Murrah buffalo, and Malabari goat, using bacterial isolates identified as Lacticaseibacillus rhamnosus, Lactiplantibacillus plantarum, and Lacticaseibacillus paracasei. The isolates showed optimal growth at 37°C and high acid production, with varying antioxidant activity.

Fermentation led to the production of organic acids: Murrah buffalo milk had lactic, acetic, and citric acids, Vechur cow milk had lactic and acetic acids, and Malabari goat milk had only lactic acid. Flavor compounds like diacetyl and acetoin were detected in buffalo and goat milk, while goat milk had a unique peptide profile compared to cow and buffalo milk.

No significant fermentation effect on free fatty acids was observed. Statistical analysis showed significant differences in milk types, but not in bacterial cultures. This research lays the groundwork for further studies on fermented dairy products, highlighting species-specific differences in metabolites and the potential for developing functional dairy products.

An assessment of resistance and virulence of enterococcal isolates from dahi / thairu samples

This study assessed the resistance and virulent properties of enterococcal isolates from household and market dahi/thairu samples. Out of 52 samples, 14 enterococcal isolates (10 from households, 4 from markets) were identified. A high percentage (71.42%) were multi-drug resistant, with resistance to Kanamycin, Colistin, Streptomycin, and Ampicillin. 21.42% were resistant to Vancomycin. All isolates were sensitive to Rifampicin and Linezolid. Biofilm formation was observed in 90% of isolates, with 50% weak and 40% moderate formers.

Two haemolytic isolates, HH06 and HH07, tested positive for virulence genes (cyt A, esp, asa), while non-haemolytic isolate MM01 lacked these genes. The isolates HH06 and HH07 were identified as Enterococcus faecalis DMAI02 and Enterococcus faecium DMAI03, while MM01 was Enterococcus faecalis DMAI04. This study highlights the presence of drug-resistant enterococci in dahi/thairu as a potential health risk.

Enzymatic profiling of indigenous lactic acid bacteria for food fermentations

This study evaluated ten lactic acid bacteria (LAB) isolates, focusing on their enzymatic potential (phytase and proteolytic activities). The isolates were assessed for probiotic properties, including acid and bile tolerance, with CD, FL, BS, and LA showing the highest tolerance. Auto-aggregation and co-aggregation were significant in some isolates. GP and LA showed strong antimicrobial activity against E. coli and S. aureus. All isolates were γ-hemolytic and resistant to β-lactams and glycopeptides. Phytase activity ranged from 24.04 to 195.02 IU/ml, and soymilk fermentation increased iron and zinc bioavailability while reducing phytate content. The findings suggest LAB can combat micronutrient deficiencies and serve as effective probiotics.

Evaluation of autochthonous Lactobacillus sp. as adjunct cultures in improving the techno functional properties of feta type cheese from Malabari goat milk.

This study assessed native lactic acid bacteria (LAB) from dahi as adjuncts for Feta-type cheese made from Malabari goat milk. Twelve LAB strains were tested for various properties, and *Lactiplantibacillus plantarum* ADMH 97 was selected as the best adjunct. Over 60 days of ripening, the test cheese showed significant changes in moisture, pH, acidity, and protein content compared to the control. The test cheese also had higher levels of essential amino acids and esters as the primary volatile flavor compounds. Sensory evaluation favored the test cheese.

This study highlights the potential of native LAB as adjunct cultures to enhance Feta-type cheese production.

Associate action of lactic acid bacteria and yeast in the ecological niche of 'thayir" prepared by back slopping.

This study investigated the use of lactic acid bacteria (LAB) and yeast native to household thayir for producing fermented milk products. Seven LAB and seven yeast strains were tested for compatibility, with no antagonism found. The best growth synergy occurred between Limosilactobacillus fermentum DMLA1 and Kluyveromyces marxianus DMYR03, but organoleptically acceptable products were achieved only when Limosilactobacillus fermentum DM13 was combined with Kluyveromyces marxianus DMYR03 in a 5:3 ratio.

Key findings:

- LAB-only products had better texture and structure.
- Co-cultured thayir had the highest vitamin B2 content.
- LAB monoculture showed the highest levels of vitamin B9 and lactic acid.
- Yeast-only thayir had the highest amino acid content but became unacceptable after 5 days of storage.
- Co-cultured thayir had the highest shelf-life acceptability.
- Yeast didn't significantly enhance product attributes in the tested ratio, with LAB being the dominant microorganism.

In conclusion, while LAB alone produced the best product, the co-culture offered benefits like higher vitamin B2 content and better shelf life

Assessment of Malabari goat milk feta type cheese as a matrix for the delivery of probiotics

This study explores the potential of Malabari goat milk for making feta-type cheese as a probiotic delivery system. Lactiplantibacillus plantarum ADMG1, isolated from raw goat milk, was selected for its probiotic properties, including acid and bile tolerance. After 30 days of ripening, probiotics survived in the cheese, confirmed by RAPD-PCR. Bioactivity tests showed that digestion enhanced antioxidant potential and α-glucosidase inhibition, while ACE inhibitory activity and lipase inhibition remained stable. The study concludes that Malabari goat milk feta-type cheese is an effective matrix for delivering probiotics with therapeutic benefits.

Characterization of biofilm forming micro flora isolated from organized dairy plants.

This study isolated biofilm-forming microorganisms from dairy plants and assessed their biofilm formation and pathogenicity. Three strong biofilm formers—Pantoea dispersa TSR BFM DM 03, Streptococcus lutetinis TSR BFM DM 02, and Escherichia fergusonii TSR BFM DM 1A—were identified. Disinfectant efficacy was tested, with benzalkonium chloride proving most effective at 20 ppm. Four sanitization trials were conducted, and the best result was achieved with 20 ppm benzalkonium chloride at 3°C for 10 minutes, resulting in a 100% reduction in biofilm. The study highlights the effectiveness of benzalkonium chloride in eradicating biofilms in dairy plants.

Formulation of hypoallergenic whey protein supplement with enhanced iron bioavailability

Micronutrient deficiency, also known as "hidden hunger," is a global issue. To combat this, whey protein concentrate (WPC) was used as an iron binder. Enzymatic hydrolysis was used to reduce allergenicity, with trypsin and chymotrypsin enzymes used. Allergenicity tests showed a reduction of 60.63% for WPCH fortified with iron and ascorbic acid, followed by trypsin hydrolysate of WPC (T3) and WPCH-Fe(T) (T6). Masking agents were used to reduce bitterness. Iron bioavailability studies were validated using animal Hb repletion bioassay on male Wistar rats. The results suggest the successful preparation of fortified WPCH with reduced allergenicity, palatability, and enhanced iron bioavailability.

Technological characterization of functional paneer prepared from buffalo milk treated with β - cyclodextrin and thyme essential oil.

This study developed a functional paneer with low cholesterol content and improved stability. Beta cyclodextrin was used for cholesterol removal, and buffalo milk was treated with varying amounts. Thyme essential oil (TEO) was added to the paneer, with a total polyphenolic content of 98.19 mg/g GAE. The paneer had a shelf life of 17 days under refrigerated conditions, with satisfactory sensory scores and retained bioactive components of thyme essential oil.

Effect of Plectranthus amboinicus on oxidative stability of Vechur ghee

A study focused on enhancing the oxidative stability of ghee, which is susceptible to off-flavor development due to auto-oxidation. Indian borage, known as Plectranthus amboinicus, a medicinal herb with proven antioxidant properties, was chosen as the natural source of antioxidant to improve the shelf life of Vechur ghee. Vechur ghee was added with different

levels of P. amboinicus leaf powder (PALP) and P. amboinicus essential oil (PAEO) of Plectranthus amboinicus. PAEO at a concentration of 0.25%, was determined to be the optimal level after the initial optimization trials based on sensory characteristics and oxidative stability assessments conducted during accelerated storage at 80°C ± 1°C at an intervals of 0, 5, 10, for 15 days. The ghee samples, including control, reference, and essential oil added ghee, were stored in glass stoppered bottles at 37°C for storage studies. Sensory evaluation, peroxide value, thiobarbituric acid value, and antioxidant activity were assessed at 15-day intervals over 120 days, revealing the successful enhancement of oxidative stability with the PAEO. From the results it can be confirmed that Plectranthus amboinicus extract can be used as an effective alternative to synthetic antioxidants in ghee to enhance its shelf life.

Process optimization for flavor enhancement of ghee

Flavoured Ghee was prepared by idealising the suitable time-temperature and inoculum combinations of ghee that would be appealing to the South Indian population. Lactococcus lactis subsp. lactis, L. lactis subsp. diacetylactis, and Leuconostoc mesenteroides subsp. dextranicum were used in five different combinations. Each sample treatment was divided into two lots and incubated at 25°C for 24h and 48h respectively.The ripened cream samples were analysed for titratable acidity, flavour score, diacetyl production, and fatty acid profile (GCMS/MS). Based on the sensory score and total fatty acid content, a sample with a culture combination of Lactococcus. lactis subsp. lactis and Leuconostoc mesenteroides subsp. dextranicum (sample D) obtained the highest sensory score at 110°C/30min, irrespective of the ripening period. Studies conclude that ghee samples clarified at 125ºC for 15min always scored higher than those at 110ºC for 30min and the incubation period and presence of citrate had no significant effect on flavor score.

Development of GABA (Gamma- Aminobutyric Acid) pickering emulsion for application in Functional Dairy Beverages

Gamma-aminobutyric acid (GABA), an inhibitory neurotransmitter, plays a critical role in managing various mental health conditions and disorders. Its importance in promoting mental wellness has made it a valuable component in the functional food industry. Germinated rice has been identified as a potential source of GABA. This study aims to investigate the GABA content in traditional rice varieties from Kerala and to explore the effects of soaking and germination on its concentration. Five rice varieties were examined: three brown rice varieties—Uma, Jyothi, and Wayanadan Thondi—and two red rice varieties—Veliyachennellu

and Njavara (medicinal). These varieties were subjected to soaking for periods ranging from 3 to 96 hours and germination for periods ranging from 12 to 96 hours, all at 28ºC. The results revealed that Veliyachennellu and Njavara exhibited significant increases in GABA content, from 18.449 to 83.153 mg/100g and 16.815 to 74.071 mg/100g, respectively, with the highest levels observed at 48 hours of soaking and 72 hours of germination in conditions of 90-95% relative humidity at 28ºC. The study demonstrated a substantial increase in GABA content in red rice varieties, with optimal conditions identified as 48 hours of soaking and 72 hours of germination at 28ºC. These findings highlight the potential of traditional rice varieties, particularly red rice, as enhanced sources of GABA, contributing to their value in functional food applications.

Effect of Plectranthus amboinicus on oxidative stability of Vechur ghee

In this study the potential ability of Dried leaf powder and essential oil extract of Plectranthus amboinicus to enhance the oxidative stability of Vechur Ghee was verified. Vechur ghee was prepared using direct cream method. Plectranthus amboinicus essential oil was extracted using hydro-distillation method. The dried leaf powder was prepared by drying the leaves at 60 ℃ and then grinding the dried leaves to a fine powder. Essential oil and dried leaf powder was added to the ghee after ghee preparation during the cooling down stage when the temperature reached 40 ℃ at the 0.25, 0.5 and 0.75 per cent levels. Accelerated shelf life study was carried out by storing the milk at 80±1 ℃ for 15 days. Sensory analysis and DPPH assay was carried out at 5days intervals over the storage period of 15 days. The overall acceptability was highest for the control followed by dried leaf powder added ghee and finally essential oil added ghee. In the study it was observed that ghee samples added with essential oil had significant improvement in the oxidative stability while ghee samples added with dried leaf powder was seen to have lowered oxidative stability.

Rerouting of fermentative metabolism of Lactic acid bacteria to respiratory metabolism for improved performances as starter concentrates

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AMB 120 showed the best performance under aerobic conditions, achieving 9.04 log active cells at 96 hours. Cells propagated in respiratory mode showed minimal viability loss (0.97 log) after three months of storage at 4°C, compared to a significant loss (6.11 log) in fermentative mode cells. Similar results were observed for lyophilized starters stored at various temperatures. This study highlights the benefits of aerobic respiration for improving LAB viability, robustness, and stress tolerance, offering a potential pathway for developing more resilient starter cultures for dairy products.

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Effect of elevated Carbondioxide environment on the Microflora of raw milk

This study evaluated the effectiveness of carbon dioxide (CO_2) in controlling microbial growth in raw milk under different time and temperature conditions. Raw milk stored at 29°C for 6 hours showed high microbial loads, but carbonation at 20 psi significantly reduced bacterial counts. Suppression rates were 91.16% for total viable count (TVC), 94.84% for coliforms, 99.37% for Gram-negative bacteria, and 97.11% for psychrotrophs. At 4°C, a three to four log reduction in microbial counts was observed. Compared to uncarbonated milk, CO_2-treated milk showed 94.8% suppression in TVC and 85.54% in GNC. Longer storage (12 hours) enhanced the inhibitory effect, especially against psychrotrophs. Carbonated milk stored at 20°C had better microbial quality than uncarbonated samples stored at 10°C. After pasteurization, microbial quality differences disappeared. CO_2 also increased milk's Methylene Blue Reduction Time and buffering capacity without affecting coagulation, suggesting its potential as a natural preservative.

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This study assessed the resistance and virulent properties of enterococcal isolates from household and market dahi/thairu samples. Out of 52 samples, 14 enterococcal isolates (10 from households, 4 from markets) were identified. A high percentage (71.42%) were multi-drug resistant, with resistance to Kanamycin, Colistin, Streptomycin, and Ampicillin. 21.42% were resistant to Vancomycin. All isolates were sensitive to Rifampicin and Linezolid. Biofilm formation was observed in 90% of isolates, with 50% weak and 40% moderate formers.Two haemolytic isolates, HH06 and HH07, tested positive for virulence genes (cyt A, esp,asa), while non-haemolytic isolate MM01 lacked these genes. The isolates HH06 and HH07were identified as *Enterococcus faecalis* DMAI02 and *Enterococcus faecium* DMAI03, whileMM01 was *Enterococcus faecalis* DMAI04. This study highlights the presence of drug-resistant enterococci in dahi/thairu as a potential health risk.

Effect of Plectranthus amboinicus on oxidative stability of Vechur ghee

A study focused on enhancing the oxidative stability of ghee, which is susceptible to off-flavor development due to auto-oxidation. Indian borage, known as *Plectranthus amboinicus*, a medicinal herb with proven antioxidant properties, was chosen as the natural source of antioxidant to improve the shelf life of Vechur ghee. Vechur ghee was added with different levels of P. amboinicus leaf powder (PALP) and P. amboinicus essential oil (PAEO) of

Plectranthus amboinicus. PAEO at a concentration of 0.25%, was determined to be the optimal level after the initial optimization trials based on sensory characteristics and oxidative stability assessments conducted during accelerated storage at 80°C ± 1°C at an intervals of 0, 5, 10, for 15 days. The ghee samples, including control, reference, and essential oil added ghee, were stored in glass stoppered bottles at 37°C for storage studies. Sensory evaluation, peroxide value, thiobarbituric acid value, and antioxidant activity were assessed at 15-day intervals over 120 days, revealing the successful enhancement of oxidative stability with the PAEO. From the results it can be confirmed that *Plectranthus amboinicus* extract can be used as an effective alternative to synthetic antioxidants in ghee to enhance its shelf life.

Process optimization for flavor enhancement of ghee

Flavoured Ghee was prepared by idealising the suitable time-temperature and inoculum combinations of ghee that would be appealing to the South Indian population. *Lactococcus lactis* subsp. *lactis,* L. *lactis subsp. diacetylactis*, and *Leuconostoc mesenteroides* subsp. *dextranicum* were used in five different combinations. Each sample treatment was divided into two lots and incubated at 25°C for 24h and 48h respectively.The ripened cream samples were analysed for titratable acidity, flavour score, diacetyl production, and fatty acid profile (GCMS/MS). Based on the sensory score and total fatty acid content, a sample with a culture combination of *Lactococcus. lactis* subsp. *lactis and Leuconostoc mesenteroides* subsp. *dextranicum* (sample D) obtained the highest sensory score at 110°C/30min, irrespective of the ripening period. Studies conclude that ghee samples clarified at 125ºC for 15min always scored higher than those at 110ºC for 30min and the incubation period and presence of citrate had no significant effect on flavor score.

Evaluation of autochthonous Lactobacillus sp. As adjunct cultures in improving the techno functional properties of feta type cheese from Malabari goat milk.

This study assessed native lactic acid bacteria (LAB) from dahi as adjuncts for Feta- type cheese made from Malabari goat milk. Twelve LAB strains were tested for various properties, and *Lactiplanti bacillus plantarum* ADMH 97 was selected as the best adjunct. Over 60 days of ripening, the test cheese showed significant changes in moisture, pH, acidity, and protein content compared to the control. The test cheese also had higher levels of essential amino acids and esters as the primary volatile flavor compounds. Sensory evaluation favored the test cheese. This study highlights the potential of native LAB as adjunct cultures to enhance Feta-type cheese production.

Enzymatic profiling of indigenous lactic acid bacteria for food fermentations

This study evaluated ten lactic acid bacteria (LAB) isolates, focusing on their enzymatic potential (phytase and proteolytic activities). The isolates were assessed for probiotic properties, including acid and bile tolerance, with CD, FL, BS, and LA showing the highest tolerance. Auto-aggregation and co-aggregation were significant in some isolates. GP and LA showed strong antimicrobial activity against E. coli and S. aureus. All isolates were γ-hemolytic and resistant to β-lactams and glycopeptides. Phytase activity ranged from 24.04 to 195.02 IU/ml, and soymilk fermentation increased iron and zinc bioavailability while reducing phytate content. The findings suggest LAB can combat micronutrient deficiencies and serve as effective probiotics.

Technological characterization of functional paneer prepared from buffalo milk treated with β - cyclodextrin and thyme essential oil

This study developed a functional paneer with low cholesterol content and improved stability. Beta cyclodextrin was used for cholesterol removal, and buffalo milk was treated with varying amounts. Thyme essential oil (TEO) was added to the paneer, with a total polyphenolic content of 98.19 mg/g GAE. The paneer had a shelf life of 17 days under refrigerated conditions, with satisfactory sensory scores and retained bioactive components of thyme essential oil.

Trainings conducted

- As a part of final year course work of 2019 admission B. Tech Dairy Technology students, Three Days hands on Training programme - “Palmaduram- Preparation of value-added dairy products for small scale Entrepreneurs” was conducted from 08/01/2024 to 10/01/2024. 23 farmers from different parts of Kerala participated in the programme. Classes and demonstration on preparation of various products such as Paneer, paneer pickle, Khoa, Gulabjamun, Ice cream, set curd and ghee was carried out as part of the training.
- As part of the final year course work of 2019 batch B. Tech Food technology students, a Hands-on training program ‘SUBHIKSHAM- 23’ was conducted on value added food products at VKIDFT Mannuthy from 19/07/2023 to 21/07/2023.
- The Department of Dairy Microbiology, VKIDFT, Mannuthy conducted a hands-on training program on ‘Preparation of Fermented Milk Products and Starter Culture Technology’ for small-scale entrepreneurs and farmers from 25.07.2023 to 26.07.2023. A total of 18 participants from various parts of Kerala participated in the training

- A demonstration class on the ‘Preparation of Fermented Milk Products’ was conducted by the Department of Dairy Microbiology for farmers and small-scale entrepreneurs from Vypin Block ernakulum district. The program was organized by the Dairy Development Department on 20/12/2023. The total number of participants was 25.

PUBLICATIONS

1. Books/ Book chapters

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2. Ajith, Y., Panicker, V.P., Athira, K.S., Adithya, S., Davis, J.K. and Preena, K.P. 2024. *Laboratory and Molecular Techniques for Diagnosis of Disease*. 68p.
3. Saeeendran, P.C., Anil, K.S. and Jagadish Kumar, T.N. Fodder Production and Conservation.
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5. Saseendran, P.C. and Anil, K.S. 2023. *General Livestock Management*. Brillion Publishing, 1st Edition,
6. Irshad, A. and Justin, D. 2023. *One Health and Zoonotic Diseases*. Indian Veterinary Association, Kerala, 448p.
7. Irshad, A., Justin, D. and Tresamol, P.V. 2023. *Livestock Production: Recent Trends and Economic Importance* (1st Ed.). Indian Veterinary Association, Kerala, 221p.
8. Simi, G. 2025. Green energy production from poultry waste: Sustainable perspectives. In: Sah, D. and Yadav, S. (eds.), *Natural Resource Management and Environmental Security*, Volume 6. Integrated Publications, Karnataka.
9. Sunilkumar, N.S., Sreeranjini, A.R., Ashok, N., Maya, S., Aravindakshan, T.V. and Narayanan, M.K. 2024. Structural integrity of bovine digital cushion as a predictor of incidence of claw horn disruption lesions. In: Irshad, A. and Narayanan, S.B. (eds.), *Advances in Veterinary and Animal Sciences (Volume I: Animal Science): Compendium of Critical Insights: A Collection of Review Articles*. Indian Veterinary Association, Kerala, pp. 12-30. ISBN 978-93-340-4428-7.
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13. Beena, V. 2023. Excretory physiology. In: Das, P.K., Sejian, V., Mukherjee, J. and Banerjee, D. (eds.), *Text Book of Veterinary Physiology*, p. 213.

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16. Nayar, R. and Rajagopal, K. 2023. Shelf stable poultry meat products. In: Aswathi, P.B. and Vergis, J. (eds.), *Advanced Training in Poultry Production with Special Emphasis on Recent Techniques in Antimicrobial Resistance and Food Safety* (1st Ed.). Directorate of Entrepreneurship, Kerala Veterinary and Animal Sciences University, Pookode, Wayanad, Kerala, pp. 64-71.

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2. Conference Proceedings

38. A.K. Beena., Ligimol James & Aparana sudhakaran V. Probiotic Dairy foods as functional foods. Compendium of ‘Dairy products in human health and nutrition innovations opportunities’

39. Dr. A K Beena, Professer and Head and Dr. Aparna Sudhakaran V, Assistant Professer, Department of Dairy Microbiology, Article – “The Evolving Role of Lactic Acid Bacteria as Dairy Starters”, Souvenir, 50th Dairy Industry Conference from 4th- 6th March ,2024, page 73

40. Dr. A K Beena, Dr. Rejeesh R, Department of Dairy Microbiology, article- “advancements in functional dairy products”, Souvenir, 50th Dairy Industry Conference from 4th- 6th March ,2024, page 111.

3. Papers presented

1. Deepa, C.K. 2023. Participated and presented paper on "Phylogenetic analysis of Babesia gibsoni isolates of South India using apical membrane antigen, 50kDa surface antigen, and 70kDa heat shock protein genes" in 30th Swadeshi Science Congress held at NIT, Calicut from 25-05-2023 to 27-05-2023.
2. Anju Varghese. 2023. Participated and presented paper on "Molecular detection and phylogenetic characterization of Hepatozoon felis in tiger, leopard and a wild cat" in 30th Swadeshi Science Congress held at NIT, Calicut from 25-05-2023 to 27-05-2023.
3. Deepa, C.K. 2023. Participated and presented paper on "Evaluation of recombinant Babesia gibsoni thrombospondin-related adhesive protein (BgTRAP) for the sero-diagnosis of canine babesiosis" in 32nd National Conference of Veterinary Parasitology (NCVP) held at Bihar Veterinary College, BAU during 29-11-2023 to 01-12-2023.
4. Anju Varghese. 2023. Participated and presented paper on "Study of genetic diversity among Babesia gibsoni isolates in dogs from South India" in 32nd National Conference of Veterinary Parasitology (NCVP) held at Bihar Veterinary College, BAU during 29-11-2023 to 01-12-2023.

4. Popular Articles

1. Popular article published in The Hindu- on Kerala's 'Eat Right App' to help people eat at hygienic places- Dr. Indu B, Assistant Professor, Department of Dairy Chemistry– 11/07/2023
2. Vandhana, P.S., Lukose, S.J. and Divya, M.P. 2024. Arogya geevithathibbu aattinpal Popular article published in Karshakasree, February 2024.
3. Akshay, R. and Rashmi, K.G. 2023. Membrane fouling and Mitigation strategies in Dairy industry. The Science World. Nov 2023 3(11): 2912-2916.
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5. Mariya Divanshi A S, Sneha K and Aprna S.V Popular article on Emerging Concepts in the Probiotic field, Agritech Today Magazine, September,2023.
6. Subith. C, Aysha C. H., 2023, Recent Advancements in Biosensing Strategies for Enhanced Food Safety Applications, Food infotech.

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8. Shehnas S, Meghana Sajeev, Subith C, 2023, Nutritional qualities of millet protein, https://www.foodinfotech.com/nutritional-and-functional-properties-of-millets-an-overview/
9. Wafa Navas, Sana Wilson, Subith C, 2023, Exploring Consumer Acceptability of lab grown meat: Bridging the gap between innovation and palatability, https://www.foodinfotech.com/exploring-consumer-acceptability-of-lab-grown-meat/
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5. Peer reviewed journal publications

1. Aisha, T.S., Irshad, A., Vasudevan,V.N., Sathu,T., Ambily, R. and Rejeesh, R. 2024. Effect of incorporating wheat bran as a dietary fibre source in fermented carabeef sausage. *J. Vet. Anim. Sci*. 55 :571-579.
2. Aiswarya, K. Vijayan, Rachana, C.R., Divya, M.P., Ligimol James, and Indu, B. 2023. A comparative study on the effectiveness of Plectranthus amboinicus dried leaf powder and essential oil extract on controlling oxidation in Vechur ghee. *Pharma Innov. J.* 12: 1460-1463.
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4. Aiswarya, S.R., Beena, A.K., Aparna, S,V., Archana, C. and Aysha, C.H. Antibiogram of Enterococcus sp. Isolated from house hold thayir sample. *Journal of Veterinary and animal sciences.*

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AWARDS AND HONOURS- FACULTY

1. Dr. C. N. Dinesh, Professor, Deprtment of Animal Genetics and Breeding, CVAs, Mannuthy was adjudged the Best Oral Presentation Award for the paper titled "*Microarray Analysis of Genes Expressed in the Skin of Vechur and Bos taurus Crossbred Cattle Following Rhipicephalus annulatus Infestation*", authored by Kurian, E., Dinesh, C. N., Raji, K., Ravindran, R., Shynu, M., Nisha, T. S., Rojan, P. M., Bindu, K. A., and Aravindakshan, T. V. (2023), at the National Conference on Advances in Genetics and Genomics for Sustainable Livestock Transformation & XVII Annual Convention of the Indian Society of Animal Genetics and Breeding (ISAGB), held from November 16–17, 2023, at ICAR-National Bureau of Animal Genetic Resources, Karnal.

2. Dr. Hiron M. Harshan, Professor, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy received the Best Research Paper Award (Poster) and Best Research Paper Award (Oral) in Companion Animal Reproduction at the 38th Annual Convention of ISSAR and International Symposium on "Frontiers in Theriogenology: Research and Practice" (December 6th – 8th, 2023).

3. Dr. Manju K. Mathew, Assistant Professor, Department of Clinical Medicine, Ethics and Jurisprudence, secured third prize for oral presentation in faculty catergory in the alternative medicine session of 40th Annual Convention of Indian Society for Veterinary Medicine held at CVAS, Mannuthy 22-24th February 2024

4. Dr. Anil K.S, Professor, Departmant of Livestock Production and Management, CVAS, Mannuthy bagged National fellow of Animal Production and management (FNAPM) award during the 30 th ISAPM Annual Convention

5. Dr. Manju Sasidharan, Associate Professor, Departmant of Livestock Production and Management, CVAS, Mannuthy bagged third Prize for oral presentation in 15th Kerala Veterinary Science Congress and International Seminar 2023 by Indian Veterinary Association, Kerala

6. Dr. N.Geetha, Associate Professor, Departmant of Livestock Production and Management, CVAS, Mannuthy, bagged Dr.M.S Patel award for the best research paper published in the journal on participatory research in LPM

7. Dr. Suraj, P.T., Professor, Departmant of Livestock Production and Management, CVAS, Mannuthy, bagged third prize for oral presentation in the National Conference on "Optimization of Livestock Farming for Sustainable Development in the Era of Climate Change & 30th Annual Convention of ISAPM 2024 held at Madras Veterinary College, Chennai from 22 – 24th February 2024

8. Dr. Deepak Mathew D. K. Associate Professor, Departmant of Livestock Production and Management, CVAS, Mannuthy, bagged first prize in the 15th Kerala Veterinary Science Congress & International Seminar on "Exploring the Boundless Horizons of Veterinary Profession- Unleashing a New Era Worldwide" Oral Presentation- Session V-Livestock and Poultry Production

9. Dr. V. N. Vasudevan, Professor, Department of Livestock Products Technology, CVAS Mannuthy bagged 1st Prize in Oral Presentation (Food Industry and the Environment) – VIth Association of Meat Scientists and Technologists National Conference, Chennai, organized by Students' Union 23-24, CVAS Mannuthy.

10. Dr. Shamna T.P. , Assistant Professir, Department of Poultry Science, CVAS Mannuthy secured Second prize for best poster presentation, WVPAINDIA conference

11. Dr K M Lucy, Professor, Department of Veterinary Anatomy and Histology, CVAS Mannuthy bagged Dr V R Bamburkar IAVA Silver Jubilee Award for the Veterinary Anatomist of the year in the XXXVII Annual Convention & National Symposium On "Recent Advances in Veterinary Anatomy and their Applications for Improvement of Animal Health and Production" from 5th to 7th December, 2023 at Department of Veterinary Anatomy College of Veterinary Science Sri Venkateswara Veterinary University, Tirupati

12. Dr. N.S. Sunilkumar , Assistant Professor, Department of Veterinary Anatomy and Histology, CVAS Mannuthy bagged best second oral presentation award in the Session 1: Basic Veterinary and Allied Sciences of the 15th Kerala Veterinary Science Congress- 2023 organized by Indian Veterinary Association, Kerala at College of Veterinary and Animal Sciences, Pookode on 17th to 19th November, 2023.

13. Dr K M Lucy, Professor, Department of Veterinary Anatomy and Histology, CVAS Mannuthy bagged Dr V R Bamburkar IAVA Silver Jubilee Award for the Veterinary Anatomist of the year in the XXXVII Annual Convention & National Symposium On "Recent Advances in Veterinary Anatomy and their Applications for Improvement of

Animal Health and Production" from 5th to 7th December, 2023 at Department of Veterinary Anatomy College of Veterinary Science Sri Venkateswara Veterinary University, Tirupati

14. Dr. N.S. Sunilkumar, Assistant Professor, Department of Veterinary Anatomy and Histology, CVAS Mannuthy bagged Best second oral presentation award in the Session 1: Basic Veterinary and Allied Sciences of the 15th Kerala Veterinary Science Congress- 2023 organized by Indian Veterinary Association, Kerala at College of Veterinary and Animal Sciences, Pookode on 17th to 19th November, 2023.
15. Dr. A. R. Sreeranjini, Professor, Department of Veterinary Anatomy and Histology, CVAS Mannuthy bagged Professor, Department of Veterinary Anatomy and Histology, CVAS Mannuthy bagged
16. Dr. N.S. Sunilkumar, Assistant Professor, Department of Veterinary Anatomy and Histology, CVAS Mannuthy bagged Best Article Award in the review article writing competition conducted by Indian Veterinary Association, Kerala during2023.
17. Dr. Varuna P. Panicker, Assistant Professor, Department of Veterinary Biochemistry, won Scientist of the Year 2022 by instituted by SVBBI
18. DR. PRIYA P.M., Professor and Head Department of Veterinary Microbiology, CVAS Mannuthy secured IVRI Mukteswar Albert Linghard memorial award 2023 (Inactivated oil adjuvant vaccine against riemerellosis)-
19. Dr. M .N Priya, Associate Preofesor, Department of Veterinary parasitology, CVAS, Mannuthy secured first Prize-Poster presentation – "In silico analysis of 22.6kDa tegument protein of Schistosoma spindale-a promising candidate antigen for diagnosis of intestinal schistosomosis". 15thKerala Veterinary Science Congress and International Seminar on "Exploring the boundless horizons of veterinary profession- unleashing a new era worldwide" held on 18th -19th November,2023 at CVAS Pookode, KVASU.
20. Dr K Syamala Associate Preofesor, Department of Veterinary parasitology, CVAS, Mannuthy secured Third prize poster-Poster presentation. Comprehensive evaluation of parasitic management practices and constraints in goat husbandry of tribal goat farmers in Attapady hills of Kerala. 32nd NCVP "Sustainable control of parasitic diseases for improved productivity of livestock in current scenario: organized by Bihar Veterinary College, Patna, 29.11.23-01.12.23
21. Dr. Radhika, Associate Preofesor, Department of Veterinary parasitology, CVAS, Mannuthy secured Second prize poster- Poster presentation 2023. Development of Multiplex copro-

polymerase chain reaction for detection of economically important gastrointestinal strongyles in goats" 32th NCVP and National Symposium on "Sustainable Control of Parasitic Diseases for Improved Productivity of Livestock in Current Scenario" held at Bihar Veterinary college, BASU, from 29th Nov to 1st December

22. Dr. Devi S. S, assistant professor, Department of Veterinary Pathology, CVAS, Mannuthy bagged Second prize in oral presentation in the Kerala Veterinary Science congress - Organised by IVA - International seminar on exploring the boundless horizons of Veterinary profession-unleashing a new era worldwide
23. Bibu John Kariyil., Assistant Professor, Department of Veterinary Pharmacology and Toxicology, CVAS, Mannuthy bagged First prize in Oral presentation in the conference on Global Perspectives in Ethno Veterinary Herbal Research for Production of Residue Free Animal Products conducted by Veterinary College and Research Institute, Orathanadu
24. Dr Nisha A R., AssociateProfessor, Department of Veterinary Pharmacology and Toxicology, CVAS, Mannuthy bagged First prize in Oral presentation in the conference on Global Perspectives in Ethno Veterinary Herbal Research for Production of Residue Free Animal Products conducted by Veterinary College and Research Institute, Orathanadu
25. Dr. Pratheesh, Assistant Professor, Department of Veterinary Physiology, CVAS, Mannuthy was selected for INSA Visiting Scientist Program at DBT-NIAB, Hyderabad for one month
26. Dr. Binsy Mathew, Assistant Professor, Department of Veterinary Public Health, CVAS, Mannuthy secured Best Doctoral Thesis in The University in 2023 by Association of Indian Universities (AIU)
27. Mr. Vyshak V L, Teaching Assistant, Department of Dairy Chemistry- cleared UGC NET- April 2023
28. Dr. Divya M.P., Assistant Professor, Department of Dairy Chemistry - evaluator for the Innovation Challenge - 2023 conducted by the Kerala Development and Innovation Strategic Council (K-DISC) as part of the One Local Government One Idea (OLOI) project held on 09/05/2023
29. Dr. Antony Pallan, Teaching Assistant, Department of Dairy Engineering acted as Special invitee as technical expert for interview of Feed mill Supervisor and feed mill technician SANFT, Mannuthy held on 16/05/2023 & 17/05/2023
30. Ms. Divya K B, Assistant Professor, Dairy Technology secured first prize in Paper presentation on the topic "Physico chemical and sensory characterization of Kaalan

from Central parts of Kerala at Swadeshi Sciene Congress –" Indian Knowledge Systems" conducted at NIT Kozhikode from 25/05/2023 to 27/05/2023

31. Dr. S N Rajakumar, Dean, VKIDFT Mannuthy as expert for selection of externship for Food and Dairy Technology students, Koduvally, TANUVAS, under NAHEP on 26/09/2023
32. Er. Devikrishna P, Teaching Assistant, Department of Dairy Engineering- Secured 2nd rank for ICAR PhD Entrance Examination 2023- 30/09/2023
33. Dr. Jose Mathew, Assistant Professor, Physical Education, Participated in the Meri Matti Mera Desh Programme
34. Dr. Jose Mathew, Assistant Professor, Physical Education, Participated in the Federal Bank Kochi Marathon 2023
35. Dr. Jose Mathew, Assistant Professor, Physical Education, Participated in the Foodathon 237 km Run conducted on 3rd June 2023 at Mannuthy
36. Dr. Jose Mathew, Assistant Professor, Physical Education, Published article titled " Promoting Health Enhancing Physical Activity" on International Jounrnal of Physiology, Exercise and Physical Education
37. Dr. Jose Mathew, Assistant Professor, Physical Education, Participated in the Khelo Masters State Athletic Championship held at Thope Stadium, Thrissur on 27th & 28th May 2023 and secured Second Position in Discuss throw, Third Position in 100 m race & First Position in 200m Race
38. Dr. Jose Mathew, Assistant Professor, Physical Education, Participated in the Kerala State Masters Athletic Championship 2023 held at Calicut University Stadium on 5th August 2023 and secured Third Position in 400 m race
39. Dr. Jose Mathew, Assistant Professor, Physical Education, Participated in the Ageas Federal Kochi Spice Coast Marathon held at Kochi on 29th October 2023 with time of 2.02.3
40. Dr. Jose Mathew, Assistant Professor, Physical Education, Participated in the Niveus Mangalore Marathon held at Mangalore on 5th November 2023 with time of 1.55.11
41. Dr. Jose Mathew, Assistant Professor, Physical Education, Participated in the State Masters Athletic Meet 2023 held at EMS Stadium, Nilehwar on 2nd & 3rd December

2023 and secured First Position in 400m race, Second Position in 200 mtr race & Second Position in 800 mtr race.

42. Dr. Jose Mathew, Assistant Professor, Physical Education, Participated in the 5th National Masters Athletic Championship 2024 held at Gochibowli Stadium, Hyderabad on 8th to 11th February 2024 and secured First Position in 400 mtr race, Second Position in 200 mtr race & Third Position in 800 mtr race

43. Dr. Jose Mathew, Assistant Professor, Physical Education, Lead Author of an edited chapter entitled Comparative Analysis of Group Cohesion among Female Interuniversity Level Sports Persons from District Games. Edited book chapter published by Lulu Publication 3101 Hillsborough St. Raleigh NC27607, United States ISBN 978-1-304-95817-4

44. Mr. Subith C, Teaching Assistant, Food Process Technology- Cleared GATE 2024 with Rank 37

45. Dr. Aparna Sudhakaran V, Assistant Professer, Department of Dairy Microbiology, has presented a paper and won the 1st prize in one day KSCSTE co-sponsored National Seminar on “Emerging Trends in Biotechnology for Sustainable Development” held at St. Mary’s College, Thrissur on 1st March 2024, which was organized by Department of Biotechnology

46. Dr. Antony Pallan, Teaching Assistant, Department of Dairy Engineering acted as Special invitee as technical expert for interview of Feed mill Supervisor and feed mill technician SANFT, Mannuthy held on 16/05/2023 & 17/05/2023

AWARDS AND HONOURS - STUDENTS

1. Dr. Vinay, MVSc Scholar, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy received the ISACP-2023 National Award for Best Thesis Presentation in Clinical Subjects.
2. Dr. Ananthapadmanabhan T.P., MVSc Scholar, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy secured second place at the 6th National Online Clinical Case Conference-2023.
3. Dr. Ayana C.I., MVSc Scholar, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy achieved third place at the 6th National Online Clinical Case Conference-2023.
4. Dr. Rahul Ram S., MVSc Scholar, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy secured third place at the 6th National Online Clinical Case Conference-2023.
5. Hitha K. Thilak, ., MVSc Scholar, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy received the Young Scientist Award for Companion Animal Reproduction (Poster) in 38th Annual Convention of the Indian Society for Study of Animal Reproduction and International Symposium on “Frontiers in Theriogenology: Research and Practice” (Dec 6-8, 2023)
6. Aiswarya D., ., MVSc Scholar, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy won third place in the Clinical Case Presentation (Oral) category in 38th Annual Convention of the Indian Society for Study of Animal Reproduction and International Symposium on “Frontiers in Theriogenology: Research and Practice” (Dec 6-8, 2023)
7. Aravind Suresh M., ., MVSc Scholar, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy secured second place in the Clinical Case Presentation (Oral) category in 38th Annual Convention of the Indian Society for Study of Animal Reproduction and International Symposium on “Frontiers in Theriogenology: Research and Practice” (Dec 6-8, 2023)
8. Sophia Xavier, ., MVSc Scholar, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy was awarded the Young Scientist Award for Reproductive Biotechnology (Poster) in 38th Annual Convention of the Indian

Society for Study of Animal Reproduction and International Symposium on "Frontiers in Theriogenology: Research and Practice" (Dec 6-8, 2023)

9. Revathy Murali, ., MVSc Scholar, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy won first place in the Reproductive Biotechnology (Poster) category and third place in the Reproductive Biotechnology (Oral) category in 38th Annual Convention of the Indian Society for Study of Animal Reproduction and International Symposium on "Frontiers in Theriogenology: Research and Practice" (Dec 6-8, 2023)

10. Shalini G., ., MVSc Scholar, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy received the Young Scientist Award for Clinical Case Presentation (Poster) in 38th Annual Convention of the Indian Society for Study of Animal Reproduction and International Symposium on "Frontiers in Theriogenology: Research and Practice" (Dec 6-8, 2023)

11. Nivethitha K.K., ., MVSc Scholar, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy was recognized as a Young Scientist in Andrology and Artificial Insemination (Oral) in 38th Annual Convention of the Indian Society for Study of Animal Reproduction and International Symposium on "Frontiers in Theriogenology: Research and Practice" (Dec 6-8, 2023)

12. Rahul Ram, ., MVSc Scholar, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy won the Young Scientist Award for Companion Animal Reproduction (Oral) in 38th Annual Convention of the Indian Society for Study of Animal Reproduction and International Symposium on "Frontiers in Theriogenology: Research and Practice" (Dec 6-8, 2023)

13. Ananthapadmanabhan T.P., ., MVSc Scholar, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy received the Young Scientist Award for Companion Animal Reproduction (Oral) in 38th Annual Convention of the Indian Society for Study of Animal Reproduction and International Symposium on "Frontiers in Theriogenology: Research and Practice" (Dec 6-8, 2023)

14. Dr. Haleema H, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy bagged First prize for oral presentation in the 15th Kerala Veterinary Science Congress conducted by Indian Veterinary Association, Kerala

15. Dr. Josline Naviya G., Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy bagged third Prize for oral presentation in the 30th Annual Convention and National Conference on "Optimization of Livestock Farming for sustainable development in the era of climate change" instituted by TANUVAS and ISAPM

16. Dr. Praveen Kumar I., Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy bagged second Prize for oral presentation in the 30th Annual Convention and National Conference on "Optimization of Livestock Farming for sustainable development in the era of climate change" instituted by TANUVAS and ISAPM

17. Dr. A. Singaravaduvelan, Department of Animal Reproduction, Gynaecology and Obstetrics, CVAS, Mannuthy bagged third Prize for oral presentation in the 30th Annual Convention and National Conference on "Optimization of Livestock Farming for sustainable development in the era of climate change" instituted by TANUVAS and ISAPM

18. Dr. Jophil Thomas, Department of Livestock Products Technology, CVAS Mannuthy bagged 2nd Prize in Oral Presentation (Impact on Food Processing and Preservation on Human Health) – VIth Association of Meat Scientists and Technologists National Conference, Chennai, organized by Students' Union 23-24, CVAS Mannuthy.

19. Dr. Ameena Asharaf, Department of Livestock Products Technology, CVAS Mannuthy bagged 2nd Prize in Oral Presentation (Food Industry and the Environment) – VIth Association of Meat Scientists and Technologists National Conference, Chennai, organized by Students' Union 23-24, CVAS Mannuthy.

20. Dr, Anjana P. PhD Scholar, Department of Poultry Science, CVAS Mannuthy secured First prize for best poster presentation, WVPAINDIA

21. Dr Vaka Harideep, MVSc scholar, Department of Veterinary Anatomy and Histology, CVAS Mannuthy bagged Best paper award in Gross Anatomy session in XXXVII Annual Convention & National Symposium On "Recent Advances in Veterinary Anatomy and their Applications for Improvement of Animal Health and Production" from 5th to 7th December, 2023 at Department of Veterinary Anatomy College of Veterinary Science Sri Venkateswara Veterinary University, Tirupati

22. Dr Vaka Harideep, MVSc scholar, Department of Veterinary Anatomy and Histology, CVAS Mannuthy bagged Best paper award in Forensic anatomy including archeological studies session in XXXVII Annual Convention & National Symposium On "Recent Advances in Veterinary Anatomy and their Applications for Improvement of Animal Health and Production" from 5th to 7th December, 2023 at Department of Veterinary Anatomy College of Veterinary Science Sri Venkateswara Veterinary University, Tirupati

23. Dr J Jayalakshmi, MVSc scholar, Department of Veterinary Anatomy and Histology, CVAS Mannuthy bagged Best paper award in Clinical anatomy and multidisciplinary approach session in XXXVII Annual Convention & National Symposium On "Recent Advances in Veterinary Anatomy and their Applications for Improvement of Animal Health and Production" from 5th to 7th December, 2023 at Department of Veterinary Anatomy College of Veterinary Science Sri Venkateswara Veterinary University, Tirupati

24. Dr Vaka Harideep, MVSc scholar, Department of Veterinary Anatomy and Histology, CVAS Mannuthy bagged First prize in poster presentation in the Session 1: Basic Veterinary and Allied Sciences of the 15th Kerala Veterinary Science Congress- 2023 organized by Indian Veterinary Association, Kerala at College of Veterinary and Animal Sciences, Pookode on 17th to 19th November, 2023

25. Dr Pavizham G Krishna, MVSc scholar, Department of Veterinary Anatomy and Histology, CVAS Mannuthy bagged Third prize in oral presentation in the Session 4: Climate Change, Environment Health and Wildlife of the 15th Kerala Veterinary Science Congress- 2023 organized by Indian Veterinary Association, Kerala at College of Veterinary and Animal Sciences, Pookode on 17th to 19th November, 2023.

26. T.Vijaya Nirmala, PhD scholar, Department of Veterinary and Animal Husbandry Extension, CVAS Mannuthy has been awarded the Third prize in the poster presentation category in 15th Kerala Veterinary Science Congress 2023 and international seminar on "Exploring the boundless horizons of veterinary profession - Unleashing a new era worldwide" organised by Indian Veterinary Association, Kerala on 18th and 19th November 2023 at College of Veterinary and Animal Sciences, Pookode, Wayanad, Kerala

27. Dr Athira C.P, MVSc Scholar, Deoartment of Veterinary Parasitology, CVAS, Mannuthy secured first prize in poster-Oral Presentation. Detection of benzimidazole resistance in gastrointestinal nematodes of goats of Thrissur, Kerala using different tests. (Authored by Athira C.P. K syamala and Bindu L). 32nd NCVP "Sustainable control of parasitic diseases for improved productivity of livestock in current scenario: organized by Bihar Veterinary College, Patna, 29.11.23-01.12.23

28. Dr. Aravind K Unni, MVSc Scholar, Department of Veterinary Pathology, CVAS, Mannuthy bagged First prize in poster presentation in the Kerala Veterinary Science congress - Organised by IVA - International seminar on exploring the boundless horizons of Veterinary profession- unleashing a new era worldwide

29. Dr. Nisna Niyas, MVSc Scholar, Department of Veterinary Pathology, CVAS, Mannuthy bagged Second in oral presentation in the Kerala Veterinary Science congress - Organised by IVA - International seminar on exploring the boundless horizons of Veterinary profession- unleashing a new era worldwide -

30. Dr. Sruthi S, PhD scholar, Department of Veterinary Pathology, CVAS, Mannuthy bagged Molecular oncology award in the Veterinary Pathology conference - Indian association of Veterinary Pathology

31. Dr Asif. M. Hebbal, Dr MSVB Ananya and Dr Sonali, MVSc scholars, Department of Veterinary Public Health, CVAS, Mannuthy Secured second prize for the group presentation on the occasion of World Zoonoses Day- 2023 in Division of Veterinary Public Health, ICAR- IVRI, Izatnagar on 6 th July, 2023

32. Kurian, E., Dinesh, C. N., Raji, K., Ravindran, R., Shynu, M., Nisha, T. S., Rojan, P. M., Bindu, K. A., and Aravindakshan, T. V. (2023). *Microarray analysis of genes expressed in the skin of Vechur and Bos taurus crossbred cattle following Rhipicephalus annulatus infestation.* Presented at the National Conference on Advances in Genetics and Genomics for Sustainable Livestock Transformation & XVII Annual Convention of ISAGB, ICAR-NBAGR, Karnal, 16–17 November 2023.

33. Krupa, R.J., Manju, K.M., Vijayakumar, K and Tresamol, P. V. (2023). *Therapeutic management of generalised demodicosis secondary to hypothyroidism in a dachshund puppy*. Veterinary Medicine Case Presentation Competition, ISVM Kerala Chapter, 26–27 March 2023, p. 9.

34. Athira, S., Manju, K.M., and Usha, N.P. (2023). *Xenotransfusion: A silver line for the successful management of anaemia in a kitten.* Veterinary Medicine Case Presentation Competition, ISVM Kerala Chapter, 26–27 March 2023, p. 13.

35. Reshma, R., Majida, F.P., Umesh, C. G., Manju, K.M., Arun, G., and Usha, N. P. (2023). *Chronic haematuria associated with benign fibromatous nodule of urinary bladder in a Rottweiler dog: Diagnosis and management.* Veterinary Medicine Case Presentation Competition, ISVM Kerala Chapter, 26–27 March 2023, p. 14.

36. Hana, V. P., Athira, S., Manju, K. M., and Usha, N. P. (2023). *Clinical pathology and management of snake envenomation in a Doberman Pinscher dog.* Veterinary Medicine Case Presentation Competition, ISVM Kerala Chapter, 26–27 March 2023, p. 17.

37. Manju, K. M. and Usha, N. P. (2023). *Successful management of gastro-oesophageal reflux disease (GERD) in a German Shepherd*. Veterinary Medicine Case Presentation Competition, ISVM Kerala Chapter, 26–27 March 2023, p. 19.

38. Usha, N.P., Manju, K., and Vijeesh, V. (2023). *Therapeutic management of topical fungal infection in a dog using methanolic extract of Artemisia japonica*. Proceedings of the 2nd Indian Congress for Veterinary Dermatology, 19–21 May 2023, p. 182.

39. Krupa, R. J., Manju, K.M., Vijayakumar, K., and Tresamol P. V.(2023). *Diagnosis and therapeutic management of juvenile cellulitis in a dachshund puppy.* Proceedings of the 2nd Indian Congress for Veterinary Dermatology, 19–21 May 2023, p. 192.

40. Athira, S., Manju, K., Umesh C. G., and Usha, N.P. (2023). *Successful management of pemphigus foliaceus in a dog – a case report.* Proceedings of the 2nd Indian Congress for Veterinary Dermatology, 19–21 May 2023, p. 192.

41. Manju, K. M., Usha, N. P, Krupa, R.J., and Umesh C. G. (2023). *A rare case of cutaneous leukocytoclastic vasculitis in a dog and its successful management.* Proceedings of the 2nd Indian Congress for Veterinary Dermatology, 19–21 May 2023, p. 193.

42. Aiswarya, A., Manju, K., and Usha, N.P. (2023). *Successful management of yeast infection in a Wistar rat.* Proceedings of the 2nd Indian Congress for Veterinary Dermatology, 19–21 May 2023, p. 210.

43. Hana, V. P., Vinod, K. K., Laiju M. P., Bibin, B.B., Manju K., and Arun, G. (2023). *Assessment of antineoplastic effect of Piroxicam in the management of rectal polyp in a Dachshund dog.* Proceedings of the Kerala Veterinary Science Congress, 18–19 November 2023, p. 311.

44. Aiswarya, A., Manju K., Devi S. S., Arun, G., and Sindhu K. (2023). *Fungal mycetoma in a cat.* Proceedings of the Kerala Veterinary Science Congress, 18–19 November 2023, p. 314.

45. Gowri, V., Manju K., and Tresamol P. V. (2023). *Management of onychomycosis caused by Trichophyton species in a non-descript dog.* Proceedings of the Kerala Veterinary Science Congress, 18–19 November 2023, p. 325.

46. Vasudevan, V. N. (2023). *Development of animal-derived biomaterials.* Compendium of the 6th Convention of AMST and National Seminar on One Health – A New Paradigm to Augment Livestock Production and Food Security, 16–18 October 2023, p. 153.

47. Vasudevan, V. N., Shibin, T. J., and Sabin, G. (2023). *Consumer preference for pork chops differing in fat thickness, lean thickness and lean color* [abstract]. Compendium of 6th Convention of the AMST and National Seminar on One Health – A New Paradigm to Augment Livestock Production and Food Security; 16–18 October 2023. Chennai: Tamil Nadu Veterinary and Animal Sciences University, p. 261.

48. Vasudevan, V. N. and Vidya, S. (2023). *Development of acellular bovine pericardium using bile as a novel decellularizing agent* [abstract]. Compendium of 6th Convention of the AMST and National Seminar on One Health – A New Paradigm to Augment Livestock Production and Food Security; 16–18 October 2023. Chennai: Tamil Nadu Veterinary and Animal Sciences University, p. 262.

49. Abrar, B. M. H. S., Sathu T., Vasudevan V. N., Irshad A., Harikrishnan R. G., and Gleeja V. L. (2023). *Optimizing the incorporation of type II and type III quality meat in cold setted restructured beef: A sensory evaluation* [abstract]. Compendium of 6th Convention of the AMST and National Seminar on One Health – A New Paradigm to Augment Livestock Production and Food Security; 16–18 October 2023. Chennai: Tamil Nadu Veterinary and Animal Sciences University, p. 267. Abstract No. S-III-FPP-1.

50. Bhattu, N.K., Irshad, A., Silpa, S., Sathu, T., and Vasudevan, V. N. (2023). *Development and quality evaluation of beef incorporated snack (beef murukku)* [abstract]. Compendium of 6th Convention of the AMST and National Seminar on One Health – A New Paradigm to Augment Livestock Production and Food Security; 16–18 October 2023. Chennai: Tamil Nadu Veterinary and Animal Sciences University, p. 269. Abstract No. S-III-FPP-4.

51. Jophil, T., Irshad, A., Adithya, A. A., Silpa, S., Sathu, T., and Vasudevan, V. N. (2023). *Development and quality evaluation of pork skin pickle incorporated with mango (Mangifera indica) and elephant foot yam (Amorphophallus paeoniifolius)* [abstract]. Compendium of 6th Convention of the AMST and National Seminar on One Health – A New Paradigm to Augment Livestock Production and Food Security; 16–18 October 2023. Chennai: Tamil Nadu Veterinary and Animal Sciences University, p. 273. Abstract No. S-III-FPP-10.

52. Midhun, M., Irshad, A., Gritty, S, Silpa, S., Sathu, T., and Vasudevan, V. N. (2023). *Assessment of quality and shelf life of meat-incorporated halwa under refrigerated storage condition* [abstract]. Compendium of 6th Convention of the AMST and National Seminar on One Health – A New Paradigm to Augment Livestock Production and Food Security; 16–18 October 2023. Chennai: Tamil Nadu Veterinary and Animal Sciences University, p. 275. Abstract No. S-III-FPP-13.

53. Prajwal, S., Vasudevan, V. N., Sathu, T., Irshad, A., and Nagashree, V. (2023). *Ranking of female buffalo muscles for its tenderness* [abstract]. Compendium of 6th Convention of the AMST and National Seminar on One Health – A New Paradigm to Augment Livestock Production and Food Security; 16–18 October 2023. Chennai: Tamil Nadu Veterinary and Animal Sciences University, p. 279. Abstract No. S-III-FPP-19.

54. Prajwal, S., Vasudevan, V. N., Sathu, T., Irshad, A., Arun, S. K. J., and Nagashree V. (2023). *Prevention of cold shortening of pre-rigor buffalo meat by its chunk size under chiller conditions* [abstract]. Compendium of 6th Convention of the AMST and National Seminar on One Health – A New Paradigm to Augment Livestock Production and Food Security; 16–18 October 2023. Chennai: Tamil Nadu Veterinary and Animal Sciences University, p. 280. Abstract No. S-III-FPP-20.

55. Vandana, S., Vasudevan, V. N., Sathu, T., Irshad, A., Arun, S. K. J., Yazhini, D. R., and Sunil, V. B. (2023). *FTIR spectroscopy for the identification of cold slaughtered meat* [abstract]. Compendium of 6th Convention of the AMST and National Seminar on One Health – A New Paradigm to Augment Livestock Production and Food Security; 16–18 October 2023. Chennai: Tamil Nadu Veterinary and Animal Sciences University, p. 302. Abstract No. S-IV-FSFS-14.

56. Ameena, A., Vasudevan, V.N, and Sudha, S.V. (2023). *Effects of ageing, tumbling, marination and irradiation on the collagen characteristics of buffalo meat* [abstract]. Compendium of 6th Convention of the AMST and National Seminar on One Health – A New Paradigm to Augment Livestock Production and Food Security; 16–18 October 2023, Chennai. Tamil Nadu Veterinary and Animal Sciences University, p. 309. Abstract No. S-V-BSFV-1.

57. Pressy, M. B., Vasudevan, V. N., and Salil, K. (2023). *Composition of meat and bone meal produced from different proportions of bone and offal by ecofriendly dry rendering* [abstract]. Compendium of 6th Convention of the AMST and National Seminar on One Health – A New Paradigm to Augment Livestock Production and Food Security; 16–18 October 2023, Chennai. Tamil Nadu Veterinary and Animal Sciences University, p. 318. Abstract No. S-V-BSFV-15.

58. Sunilkumar, N. S., Sreeranjini, A. R., Ashok, S., Maya, T. V., Aravindakshan, and Narayanan, M. K. (2023). *Histological studies on the digital cushion in crossbred cattle of Kerala.* Proceedings of the 15th Kerala Veterinary Science Congress; 17–19 November 2023, Pookode, Wayanad. College of Veterinary and Animal Sciences (CVAS).

59. Nirmala, T. V., Reddy, A. D. V., Karunasree, E., George, A., and Jiji, R. S. (2023). *Backyard poultry farming: An income generating source to tribal and rural youth under Arya Project.* Compendium of the 15th Kerala Veterinary Science Congress.

60. Rahim, A., George, A., Jiji, R. S., Vidya, P., Gleeja, V. L.and Radha, K. (2023). *Awareness of consumers regarding the health benefits of consumption of goat milk.* In: Proceedings of the 15th Kerala Veterinary Science Congress and International Seminar; 18–19 November 2023, Pookode. Kerala Veterinary and Animal Sciences University and Indian Veterinary Association, Kerala, pp. 62–64.

61. Rahim, A., George, A., Jiji, R. S., Vidya, P., Gleeja, V. L., and Radha, K. (2024). *Livestock farmers' perception of climate change and adaptation measures practiced in Velinalloor village, Kollam district, Kerala.* In: Proceedings of the International Conference on Innovative Education, Research and Extension Approaches for Transmitting Scientific Know-How to Augment Livestock Production in the Contemporary Scenario; 10–12 July 2024, Thanjavur. Society for Veterinary and Animal Husbandry Extension Education, Veterinary College and Research Institute, Orathanadu, Tamil Nadu Veterinary and Animal Sciences University, pp. 293–296.

62. Rashmi, R., Rajeev, T. S., Justin, D. and Karthik, V. K. (2024). *Optimising canine and community health through the assessment of dog breeders' knowledge.* Compendium, Kerala Science Congress; 7–10 February 2025, Vellanikkara. Kerala Agricultural University, p. 306. Abstract No. 5.7.

63. Vidya, P. and Narayanan, M. K. (2023). *Examining the impact of developed educational video content on knowledge gain in dairy feeding management practices* [abstract]. Compendium, Kerala Veterinary Science Congress; 18–19 November 2023, Wayanad, p. 60. Abstract No. P1 F10.

64. Bindu, L. (2024). *Haemoparasitic diseases in domestic animals – Diagnostic challenges.* Pre-conference workshop on "Laboratory and Molecular Techniques for Diagnosis of Disease" in association with the 40th Annual Convention of ISVM, held at CVAS, Mannuthy, 21 February 2024.

65. Bindu, L. (2023). *Integrating technology for effective learning outcomes in veterinary parasitology.* Lead paper presented at the 32nd National Congress of Veterinary Parasitology (NCVP) on "Sustainable Control of Parasitic Diseases for Improved Productivity of Livestock in the Current Scenario," organized by Bihar Veterinary College, Patna, 29 November – 1 December 2023, pp. 104–108.

66. Athira, C. P., Syamala, K. and Bindu L. (2023). *Detection of benzimidazole resistance in gastrointestinal nematodes of goats of Thrissur, Kerala using different tests.* 32nd NCVP and National Symposium on "Sustainable Control of Parasitic Diseases for Improved Productivity of Livestock in the Current Scenario," Bihar Veterinary College, Patna, 29 November – 1 December 2023, p. 134.

67. Asha, R., Lucy S., Sankar M., Radhika, R., and Devada, K. (2023). *Development of PCR-RFLP for the detection of benzimidazole resistance in Oesophagostomum spp.*

Compendium of the 32nd National Congress of Veterinary Parasitology and National Symposium on "Sustainable Control of Parasitic Diseases for Improved Productivity of Livestock in the Current Scenario," Bihar Animal Sciences University, Patna, 29 November – 1 December 2023.

68. Syamala, K., Devada, K., Bindu, L., Raji, K, and Thirupathy, V.R. (2023). *Comprehensive evaluation of parasitic management practices and constraints in goat husbandry of tribal goat farmers in Attapady hills of Kerala.* 32nd NCVP, Bihar Veterinary College, Patna, 29 November – 1 December 2023, p. 123.

69. Thamilbharathi, L. M., Radhika, R., Priya, M. N., and Devada, K. (2023). *Development of multiplex copro-polymerase chain reaction for detection of economically important gastrointestinal strongyles in goats.* 32nd NCVP and National Symposium on "Sustainable Control of Parasitic Diseases for Improved Productivity of Livestock in the Current Scenario," Bihar Veterinary College, BASU, 29 November – 1 December 2023.

70. Bindu, L., Priya, M. N., Amrutha, A., Nikitha,S., and Ambily, R. (2023). *Recombinant protein-based DOT ELISA for detection of bovine intestinal schistosomosis.* 32nd NCVP on "Sustainable Control of Parasitic Diseases for Improved Productivity of Livestock in the Current Scenario," organized by Bihar Veterinary College, Patna, 29 November – 1 December 2023, p. 33.

71. Priya, M. N., Bindu, L., Nikitha, S., Amrutha, A and Modi, S. (2023*). In silico analysis of 22.6 kDa tegument protein of Schistosoma spindale – A promising candidate antigen for diagnosis of intestinal schistosomosis.* Compendium of the 15th Kerala Veterinary Science Congress and International Seminar on "Exploring the Boundless Horizons of Veterinary Profession – Unleashing a New Era Worldwide," 18–19 November 2023, CVAS Pookode, KVASU, p. 58.

72. Bindu, L, Modi, S., Amrutha, A., Priya, M. N., and Uma, R. (2023). *Phylogenetic analysis of the 14-3-3 tegumental protein encoding gene of Schistosoma spindale.* Compendium of the 15th Kerala Veterinary Science Congress and International Seminar on "Exploring the Boundless Horizons of Veterinary Profession – Unleashing a New Era Worldwide," 18–19 November 2023, CVAS Pookode, KVASU, p. 41.

73. Reshmi, R. Aswathy, S, Bindu, L., Thasni, S., and Sathya, S. (2023). *Clinical case report of protozoa, Nyctotherus sp., in green iguanas (Iguana iguana).* Compendium of the 15th Kerala Veterinary Science Congress and International Seminar on "Exploring the Boundless Horizons of Veterinary Profession – Unleashing a New Era Worldwide," 18–19 November 2023, CVAS Pookode, KVASU, p. 158.

74. Nikitha, S., Devada, K., Priya, M.N., Bindu, L, Prathyusha, S., Praseeda, V and Sharun, P.S. (2023). *Fasciola hepatica infection in a buffalo – A case report.* Compendium of the 15th Kerala Veterinary Science Congress and International Seminar on "Exploring the Boundless Horizons of Veterinary Profession – Unleashing a New Era Worldwide," 18–19 November 2023, CVAS Pookode, KVASU, p. 109.

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147. Post graduate students in Dairy Chemistry, Ms. Sana Jose K (2019 Admission DT) and Ms. Aiswarya V G (2020 Admission DT) received Gold Medal for securing First Rank in M Tech at the 4th Convocation of KVASU on 20/05/2023. Undergraduate students of Dairy Technology (DT) and Food Technology (FT), Ms. Aiswarya Velekat Santhosh (2018 Admission DT), Ms. Anit Rose Antony (2017 Admission FT) and Ms. Nithya P N (2018 Admission FT) also excelled in the function by bagging Gold Medal in their respective streams.- May 2023

148. A project named 'Prototype of an equipment using hurdle technology to reduce microbial load in clarified juices' developed by the final year students of B. Tech Food Technology course got selected for incubation in Technology Business Incubator for 2023-24 by TBI Government Engineering College, Thrissur – May 2023

149. Ms. Nazrin Nazer (2021 Batch B. Tech Food Technology)- Radio talk on publicization of food safety day programmes and Foodathon at VKIDFT- Club FM- 02/06/2023

150. Ms. Sneha. K, M. Tech Scholar, Department of Dairy Microbiology presented a paper on "Comparative evaluation of probiotic characteristics of potent indigenous *Lactobacillus* strains for food fermentations" in the National seminar on '*Microbiome-The Unseen*' jointly organized by Department of Microbiology, Sreesankara College Kalady and Department of Marine Biology, Microbiology & Biochemistry, CUSAT on 22/08/2023 & 23/08/2023

151. Mr. Akshay Aravind, M. Tech Scholar, Department of Dairy Microbiology presented a paper on "Identification, Isolation, Enumeration & pathogenic characterization of pink colony producing biofilm forming organism isolated from a market sample of pasteurized sample" in the National seminar on '*Microbiome-The Unseen*' jointly organized by Department of Microbiology, Sreesankara College Kalady and Department of Marine Biology, Microbiology & Biochemistry, CUSAT on 22/08/2023 & 23/08/2023

152. Ms. Ansa Shaji (2019 Batch B. Tech Food Technology)- –Talk in program with RJ Jeena about Project topic "ULTRA OZEINODE" – 13/09/2023

153. Mr. Akshay Aravind, M. Tech Scholar, Department of Dairy Microbiology presented a poster on "Isolation and characterization of E. coli isolated from commercial pickled brine used for pickling vegetables and assessing its multiple drug resistance" in the International Conference on 'Antimicrobial resistance' jointly organized by Department of Biosciences, MES College Marampally and Department of Marine Biology, Microbiology & Biochemistry, CUSAT on 28/09/2023 & 29/09/2023.

154. Reji A.J (M.Tech 2020 admission residency) cleared UGC NET- December 2023

155. Dharani M (PhD 2022 admission) cleared UGC NET- December 2023

156. Reji A.J (M.Tech 2020 admission residency) secured First Rank in the Kerala PSC examination to the post Dairy Extension Officer

157. Ms.Nithya P N (2018 Admission) -secured 1st rank in ICAR AIEEA (PG)

158. Ms.V V Anu Jeslet, Mr. Abhinav Sasi, Ms. Ansa Shaji, Mr Ahammed Zainy N K and Mr Alan John (2019 Admision) The best project award for the Hurdle Technology prototype equipment in 10th National level Technical Project Exhibition and

Competition – SRISHTI 2024 This project was selected for incubating in Technology Business Incubator for 2023-24 by TBI GEC Thrissur for a grant of upto 1lakh rupees only. (Several newspaper recognitions for the same project.)

159. Ms.V V Anu Jeslet , Mr Mohammed Ameen and Ms. Jubairiya K (2019 Admn) - GATE EXAM 2023 qualified
160. Mr Mohammed Ameen, Ms. Parvathy P S GATE EXAM 2024 qualified.
161. Ms.Susan Eldhose (2020 Admn)- GATE EXAM 2024 (Rank 410) qualified
162. Ms.Ansa Shaji (2019 Admn)--Secured first prize in speech competition during internship at Cargill India Pvt Ltd- November 2023
163. Ms. Karthika Raj- (2019 Admn)-Participated and Presented Poster in the National level Seminar organized by Association Of Food Scientists And Technologists (INDIA), Thrissur Chapter. -28/2/2024
164. Ms. Meghna Sajeev and Ms.Shehanaz S (2020 Admission)Published a review article in NUTRI- CEREALS magazine about nutritional and functional properties of millets : an overview
165. Ms.Sana Wilson , Ms.Wafa Navas (2020 Admission) –popular article on "Exploring consumer acceptability of lab grown meat" in food infotech magazine"
166. Ms.Sana Wilson and Ms.Wafa Navas (2020 Admission)- Review article on " Probiotics and its therapeutic effects: a review" in International Journal For Multidisciplinary Research (IJFMR)
167. Ms.Sana Wilson and Ms.Wafa Navas (2020 Admission) -Participated and presented a paper at 9th International food Convention-7/12/23 - 10/12/23
168. Ms.Wafa Navas(2020 Admission) -Volunteered and presented a paper at 50th IDA Dairy Industry Conference. 3/3/24- 6/3/24
169. Ms. Wafa Navas ,Ms.Jessica Jose Motha , Ms.Gopika M G, Ms.Hamna P , Ms. Amrin Fathima and Ms.Aleena Kadar (2020 Admission) -Participated in Eat Right Seminar conducted by Food Safety Department, Thrissur-17/8/23
170. Ms. Wafa Navas (2020 Admission) -Case study competition conducted by Amul - First prize-28/11/2023

171. Mr Irfan K E (2020 Admission B.Tech Dairy Technology)- GATE EXAM 2024 qualified
172. Ms Gowry A.L (2020 Admission B.Tech Dairy Technology)- GATE EXAM 2024 qualified
173. Ms Farheen A (2019 Admission B.Tech Dairy Technology)- GATE EXAM 2024 qualified
174. Mr Harshit Raj (2019 Admission B.Tech Dairy Technology)- GATE EXAM 2024 qualified
175. Ms. Aiswarya Velekat Santosh (2018 Admission B.Tech Dairy Technology)- selected for Chief Ministers Student Excellence Award 2023 for meritorious aggregate achievement in under graduate examination- January 2024
176. Ms. Adrija R (2018 Admission B.Tech Dairy Technology)- selected for Chief Ministers Student Excellence Award 2023 for meritorious aggregate achievement in under graduate examination- January 2024
177. Amrita T A: Participated and presented on the topic –Assessment of antibiotic resistance of thermoduric psychrotrophic bacteria isolated from market samples of pasteurized milk collected from Mannuthy, Kerala State, India- Pai, 25th March, 2023
178. Aiswarya S.R Participated and presented poster in 29th Indian Convention of Food Scientists and Technologists, 5-7 January, UHT Milk: a potential reservoir of MDR Bacteria.
179. Aiswarya S.R Participated and presented in PAi, 25th March, An assessment of multiple drug resistant enterococci from household curd sample
180. Akshay Aravind Secured 2nd prize in product innovation contest, Pai (25th March), idea: Lactose free low fat whey icecream
181. Akshay Aravind Participated and presented on the topic: Isolation, enumeration and assessment of pathogenicity of pink colony producing, organisms from pasteurized milk

SCHOOLS AND CENTRES

SCHOOL OF ANIMAL NUTRITION AND FEED TECHNOLOGY

About the centre : The School of Animal Nutrition and Feed Technology (SANFT) has been established under the Kerala Veterinary and Animal Sciences University to provide specialized training programs in animal nutrition and allied sectors. Revolving fund Feed mill for the production of compounded feeds for livestock is under SANFT from 2013 onwards. Diploma programme on Feed Technology is also offered under SANFT.

Major activities/Achievements: Sixteen types of feed products is being marketed through feed mill, caters to all animals of KVASU farms including experimental animals. Local sales is also being done . Twelve diploma students in feed technology completed the course in 2023-24

SCHOOL OF ANIMAL PRODUCTION AND BIOTECHNOLOGY

About the Centre: Modern biotechnology holds immense potential for improving animal health and productivity. A key objective is to introduce advanced biotechnological methods to replace outdated practices. However, due to limitations in resources, research infrastructure, and trained personnel, the latest scientific advancements in this field have not been fully utilised for enhancing livestock health and productivity in our country. The School of Animal Production and Biotechnology (SAAPBT) is being established at KVASU to bridge this gap by offering specialised, need-based research and training for students and faculty across various disciplines.

The School launched two new postgraduate programmes in the academic year 2013–14: M.V.Sc. in Animal Biotechnology (4 seats) and M.Sc. in Animal Biotechnology (10 seats). These courses are designed to develop a technically skilled manpower base, equipping students with the expertise necessary to utilise biotechnology as a tool for improving human and animal health, livestock production, and related areas. The curriculum covers molecular diagnostics, advanced vaccine development, wildlife conservation, and forensic biotechnology, as well as epidemiological and climate change studies.

Trainings conducted.

(i) Hands-on training on *Molecular Biology Techniques and Bioinformatics Tools for Advanced Life Science Research* from May 2nd to 12th, 2023.

(ii) Skill Development Training on *Molecular Biology and Bioinformatics Tools for Advanced Life Science Research* from October 03rd to 16th, 2023.

(iii) Hands-on training on *Molecular Biology Techniques and Bioinformatics Tools for Advanced Life Science Research* from October 4th to November 10th, 2023.

(iv) Hands-on training on *Molecular Biology Techniques and Bioinformatics Tools for Advanced Life Science Research* from January 30th to February 9th, 2024.

Research Activities

KVASU Research Projects:-

State Plan Project 2023-24 - Evaluation of genomic and proteomic markers associated with adaptation, disease resistance, and production performance of livestock species of Kerala.

Master's/Doctoral Research projects

(i) Molecular characterization of Octapamine/tyramine receptor gene in *Rhipicephalus microplus* to assess amitraz resistance.

(ii) Molecular detection of Leptospira from environmental samples

(iii) Genomic imprinting and allele-specific expression of *insulin-like growth factor 2* gene in goats

(iv) Evaluation of apoptotic activity and infiltration of CD8+ lymphocyte subsets in the microenvironment of murine model of triple negative breast cancer.

Major activities/Achievements

(i) Molecular characterisation of exon 3 of the octopamine receptor (*OCT/Tyr*) gene, a known target site for amitraz, an acaricide, was done in *Rhipicephalus (Boophilus) microplus*, a major ectoparasite of livestock.

(ii) Phenotypic and genotypic assessment revealed the susceptibility of *R. microplus* ticks to amitraz in the surveyed region of Kerala, contrasting with reports of amitraz resistance in cattle ticks in other parts of the country.

(iii) Among the 54 environmental samples collected from different parts of Kerala, three samples showed pathogenicity, as they yielded amplicons of *lipl32, loa22,* and *16S rRNA* genes of leptospires. The quantification method of biofilm detection was also done and found that all isolates were moderate biofilm producers.

SCHOOL OF BIO ENERGY STUDIES AND FARM WASTE MANAGEMENT

About the centre : The School started functioning in 2013 as a collaborative project of Dept. of Livestock Production Management, Livestock Products Technology, Animal Nutrition and Veterinary Public Health, with a Technical coordination committee with Scientists from these departments, focusing mainly on bio- energy research, bio- diesel production, consolidated and integrated waste management in farms, production and evaluation of organic manure along with its value addition and enrichment and training programs in Livestock Waste Management.

Trainings conducted

(i) Waste Management, environmental mitigation and resource optimization in Animal Husbandry in collaboration with MANAGE from July 17-19, 2024.

Major activities/Achievements: The School has established a Bio-diesel plant and environmental lab with facility for multigas analysis, IR thermometer and thermal camera and BOD analyser, an integrated waste management model and has developed technologies for enhanced aerobic composting through mechanical shredding and forced oxygenation, two stage digestor bio-gas plant, bio-diesel production from animlal fat, waste utilisation by black soldier flies *(Hermetia illucens*), holistic low cost scrubbing mechanism for harvesting purified biogas, integrated farming model for waste management, model bio waste management by combined mechanical and biological process,values addition of slurry and organic manure and compressed storage of biogas.

The School has associated with Nirmal Nagaram Project at Alappuzha in integrated waste management using Thumburmuzhy composting technique, conducted a series of trainings to farmers and stake holders in waste management, camps for school students, consultancy to farmers, supported – UG,PG and Ph.D Research Projects from inside and outside University, published and presented around 15 papers. As part of the efforts of the School two Gobardhan projects have been implemented in the University Farms. The School has been involved in technical support and structured training in the World Bank funded Kerala Solid Waste Management Project (KSWMP) and development of a curriculum on Waste Management for College students.

SCHOOL OF ZOONOSES PUBLIC HEALTH AND PATHOBIOLOGY

About the centre: The School of Zoonoses Public Health and Pathobiology (SZPHPB) was established under Kerala Veterinary and Animal Sciences University at its College of Veterinary and Animal Sciences, Mannuthy Campus to foster interdisciplinary research in the fields of zoonoses, public health and pathobiology. The departments of Veterinary Public Health, Veterinary Microbiology, Vetrinary Parasitiology, Veterinary Epidemiology and preventive Medicine and Veterinary pathology collaborate and conduct research and awareness programmes on zoonoses.

Course conducted under the School: PG Diploma course on Food safety and Quality Assurance (Distance Education mode)

Trainings conducted: Culture of Responsibility -a biosafety training for Post graduate students

Research Activities

KVASU Research projects.

State Plan Project- Prevalence of zoonotic diseases among pet birds and companion animals of Kerala

Research Highlights

Campylobacter spp. isolated and molecular confirmation done from samples collected from pet birds and cats. 17.69% and 10% samples from pet birds and cats were positive. *Campylobacter jejuni* and *Campylobacter coli* was detected. 11.76 % samples and 44.26% samples of cats and dogs suspected for rabies were positive for the disease. Virulent Marecks disease virus was detected from turkey from Kollam district by PCR. MDR E coli and Salmonella detected from pet birds from Thrissur district. Chlamydia was not detected from pet birds. Faecal samples from pet birds from Palakkad district- 43% samples positive for GI parasites . Blood samples : 10% Microfilaria, *Babesia gabsoni* -9%

PG Diploma Course: Students admitted : 15

Major activities/Achievements:

1. Conducted an exhibition on “Know Zoonoses to no Zoonoses”, awareness class for students of Bethlehem school , Mukkatukara, Thrissur

2. Exhibition conducted on Know zoonoses to no zoonoses at Adat panchayat in association with NSS Unit, CVAS, Mannuthy.

3. Collaborated with ReAct Asia Pacific and Dept of VPH for conduct of Multisectoral Workshop on Preventing Antimicrobial Resistance Together

CENTRE FOR ANIMAL ADAPTATION TO ENVIRONMENT AND CLIMATE CHANGE STUDIES (CAADECCS)

About the centre: Climate change is an undeniable reality. As stated by the Intergovernmental Panel on Climate Change (IPCC), if global warming continues unabated, temperatures are projected to rise by 1.5°C between 2030 and 2052. Over the past few decades, the frequency of marine heatwaves has doubled, while the shrinking cryosphere and ocean warming have led to accelerated sea level rise. These changes in weather patterns and intensified climate extremes are pushing both natural and human systems beyond their capacity to adapt, resulting in irreversible impacts on livelihoods, agricultural productivity, human health and food security (IPCC AR6, 2022).

The outcomes of climate change are felt globally, prompting attention from various scientific disciplines. Agriculture, as the cornerstone of economic development, is particularly vulnerable to fluctuations in climatic conditions. The livestock sector, a vital component of agricultural growth, serves as a primary source of income for many poor and marginal farmers worldwide. Paradoxically, while contributing to climate change, this sector also faces significant impacts from it. The escalating levels of greenhouse gas emissions exacerbate global warming, posing a threat to livestock production. Evidence indicates a notable increase in greenhouse gas concentrations over the past century, posing serious concerns for the dairy sector, a crucial livelihood for disadvantaged farmers. The current trajectory of global warming is expected to alter breed composition, compromise nutritional security and facilitate the emergence and re-emergence of pests and diseases.

In anticipation of the challenges confronting the livestock sector in a changing climate, the Kerala Veterinary and Animal Sciences University (KVASU) has established the 'Centre for Animal Adaptation to Environment and Climate Change Studies (CAADECCS)'under the Directorate of Academics and Research with ICAR special grant during XI Plan. This Centre aims to advance climate change education, research and extension activities in the field of animal agriculture.

CAADECCS stands as a pioneering institution among the State Veterinary Universities nationwide, functioning as the focal point for research and capacity building across all facets of climate change risk management concerning animal agriculture. The overarching goal is to devise and implement strategies aimed at mitigating the adverse impacts of climate change and variability, thereby sustaining and bolstering rural livelihoods through effective livestock production and management.

Central to its mission, the centre endeavours to establish Livestock Advisory Field Units (LAFUs) across all livestock farms. These units will address location-specific challenges related to climate change adaptation and mitigation, providing tailored Livestock Advisory services based on medium-range weather forecasting. By doing so, the centre aims to empower livestock farmers with the knowledge and tools necessary to navigate climatic uncertainties effectively.

The outcomes generated by the centre will not only have local and regional significance but will also contribute to national and global efforts in climate change adaptation and mitigation within the domain of Animal Agriculture, particularly in the Humid Tropics. Through its comprehensive approach, CAADECCS seeks to foster resilience and sustainability across livestock systems, thereby safeguarding livelihoods and promoting agricultural resilience in the face of a changing climate.

Faculty Position:

(i) Implementing Officer: Dr. V. Beena (Professor, Department of Veterinary Physiology)

(ii) Associate Professor: Dr. S. Harikumar (Associate Professor and Head, ILFC, Pookode)

Education

P.G. Diploma in Climate Services: Offers two P.G. Diploma Programs in 'Climate Services' and 'Climate Services in Animal Agriculture'. No student has been enrolled in the academic year 2023-24.

Ph.D. in Climate Change and Animal Agriculture: No student has been enrolled in the academic year 2023-24.

Continuing Education

Provided training to Officers of the Animal Husbandry Department on climate change and animal husbandry as a part of their three-month training programme. Dr. V. Beena took a class on the topic "An introduction to the activities of CAADECCS" and Dr. S. Harikumar on "Thermal stress management in dairy cattle".

Research Activities

KVASU Research projects.

State Plan Projects: These are being implemented every year. The preliminary research projects are focused on the assessment of thermal stress in animals. The students and faculties of CAADECCS have published articles in various national and international journals. Two projects entitled "Livestock Advisory Based on Weather Forewarning (RSP/23-24/IX/4)' and 'Strengthening of CAADECCS for Climate Change Preparedness in Livestock Sector (RSP/23-24/XII-13)' with a financial outlay of Rs. 20,00,000/- (Rupees twenty lakhs only) and Rs. 10,00,000/- (Rupees ten lakhs only) respectively have been sanctioned to CAADECCS under the State Plan Schemes for the year 2023-24. The released amount has been utilized for the good conduct of activities of CAADECCS.

Externally Aided Projects: In the year 2019-20, RKVY-RAFTAAR project with a total financial outlay of 170 lakhs was sanctioned to CAADECCS and the Centre has established a Climate Controlled Research Complex (CCRC), a high-tech research facility for assessing thermal stress in animals in a fully controlled environment. The facility comprises two major chambers, a climate chamber in which the temperature and relative humidity can be adjusted from 5oC to 50oC±1oC and 20% to 95% ±3% respectively and a comfort chamber in which the temperature is always kept in the comfort zone (i.e., from 20- 27oC) of the animal. Each chamber can accommodate six large animals like cattle and buffaloes. Besides, there is an animal holding facility to keep 12 animals in ambient conditions outside the chamber. In all three conditions, the physiological and behavioural alterations can be observed and monitored continuously. In the climate chamber, an artificial climate can be created with different combinations of temperature and relative humidity with the help of air conditioners and dehumidifiers supported by appropriate software. There is also a provision for controlling the diurnal lighting, optional elevated humidity, air exchange control, and tight performance tolerances. There are facilities to monitor methane, carbon dioxide and ammonia gases

discharged from animals in the chamber. It is an ultimate research facility of international standards for assessing the impact of thermal stress in animals and also for finding out the alleviation strategies to be adopted for sustainable livestock production. The uniqueness of this facility is that it can be used for large and small animal research. On 17th April 2023, CCRC was inaugurated by the Honourable Minister for Animal Husbandry and Dairy Development, Smt. J. Chinchurani and that was included as Chief Minister's 100 days action programme.

Climate Controlled Research Complex (CCRC)

Masters /Doctoral Research projects

(i) Assessing the Correlation of Thermal Stress and Oxidative Status during the Late Gestation Period in Cross-bred Dairy Cattle (MSc-Anupama, 2024)

(ii) Assessment of the Correlation between Thermal Stress and Mineral status during Late Gestation in Cross-bred Dairy Cattle (MSc-Devamalini B. S., 2024)

Major activities/Achievements

1. On 17th April 2023, Climate Controlled Research Complex (CCRC) was inaugurated by the Honourable Minister for Animal Husbandry and Dairy Development, Smt. J. Chinchurani and that was included as Chief Minister's 100 days action programme. In the year 2019-20, RKVY-RAFTAAR project with a total financial outlay of 170 lakhs was sanctioned to CAADECCS and the Centre has established a Climate Controlled Research Complex (CCRC), a high-tech research facility for assessing thermal stress in animals in a fully controlled environment.

Climate-controlled chamber

Comfort chamber

വെറ്റിനറി സർവകലാശാലയുടെ മണ്ണുത്തി ക്യാംപസിൽ സ്ഥാപിച്ച കാലാവസ്ഥാ ഗവേഷണ സമുച്ചയം മന്ത്രി ജെ. ചിഞ്ചുറാണി ഉദ്ഘാടനം ചെയ്യുന്നു.

കാലാവസ്ഥാ ഗവേഷണങ്ങൾക്ക് സാർവദേശീയ പ്രാധാന്യം: മന്ത്രി

മണ്ണുത്തി .● മൃഗസംരക്ഷണ മേഖലയിൽ കാലാവസ്ഥാ വ്യതിയാനം സംബന്ധിച്ചുള്ള ഗവേഷണങ്ങൾക്കു സാർവദേശീയ പ്രാധാന്യമുണ്ടെന്നു മന്ത്രി ജെ. ചിഞ്ചുറാണി വെറ്റിനറി സർവകലാശാലയുടെ മണ്ണുത്തി ക്യാംപസിലെ പരിസ്ഥിതി കാലാവസ്ഥാ വ്യതിയാന പഠനകേന്ദ്രത്തിനു കീഴിൽ സ്ഥാപിച്ച ലോകോത്തര നിലവാരത്തിലുള്ള നിയന്ത്രിത കാലാവസ്ഥാ ഗവേഷണ സമുച്ചയം ഉദ്ഘാടനം ചെയ്യുകയായിരുന്ന മന്ത്രി. സർവകലാശാല ഭരണ സമിതി അംഗം വാഴൂർ സോമൻ അധ്യക്ഷത വഹിച്ചു. കേന്ദ്രത്തിൽ കേന്ദ്രത്തിൽ പ്രവർത്തനമാരംഭിക്കുന്ന മലിനജല സംസ്കരണ പ്ലാന്റിന്റെ ഉദ്ഘാടനവും മന്ത്രി നിർവഹിച്ചു. സർവകലാശാലയുടെ മാംസസംസ്കരണ വിഭാഗത്തിന് (മീറ്റ് ടെക്നോളജി യൂണിറ്റ്) ഐഎസ്ഒ 22000 – 2018 അംഗീകാരം ലഭിച്ചതിന്റെ ഔദ്യോഗിക പ്രഖ്യാപനം നടത്തി. സർവകലാശാല അക്കാദമിക്സ് ആൻഡ് റിസർച്ച് ഡയറക്ടർ പ്രഫ. ഡോ. സി. ലത പദ്ധതി വിശദീകരണം നൽകി. കോർപറേഷൻ കൗൺസിലർ രേഷ്മ ഹെമേജ് ,വൈസ് ചാൻസലർ പ്രൊഫ. ഡോ.) എം. ആർ. ശശീന്ദ്രനാഥ്, സംസ്ഥാന വെറ്റിനറി കൗൺസിൽ പ്രസിഡന്റ് ഡോ. വി .എം. ഹാരിസ്, സർവകലാശാല സംരംഭകത്വ വിഭാഗം ഡയറക്ടർ പ്രഫ. ഡോ. ടി. എസ്. രാജീവ്, വെറ്റിനറി സയൻസ് ഫാക്കൽറ്റി ഡീൻ പ്രഫ. ഡോ. കെ. വിജയകുമാർ, ഡയറി സയൻസ് ഫാക്കൽറ്റി ഡീൻ പ്രഫ. ഡോ. എസ്.എൻ. രാജകുമാർ, പൂക്കോട് വെറ്റിനറി കോളജ് ഡീൻ പ്രൊഫ. ഡോ. എം കെ നാരായണൻ, രജിസ്ട്രാർ പ്രൊഫ. ഡോ. പി. സുധീർ ബാബു എന്നിവർ പ്രസംഗിച്ചു.

Animal Holding Facility

Control Room

2. Book entitled "Birds of the Campus - Illustrated List of Birds of College of Veterinary and Animal Sciences, Mannuthy, Kerala" edited by Dr. V. Beena and Dr. S. Harikumar with ISBN 978-93-91716-08-0 was released on 05.06.2023.

Publications

1.1.Articles Published in Research Journal

- Swaminathan, A., Beena, V., Babitha, V., Parvathy, V.S., Shynu, M., Greeshma, J., Gleeja, V.L., Megha, P.S., Kulamkuthiyil, M.J., Ragupathi, B. and Ramnath, V., 2024. Impact of heat stress on physio-biochemical parameters during early lactation of crossbred dairy cattle. *Theoretical and Applied Climatology*, pp.1-19.
- Ajith, Y., Adithya, S., Panicker, V.P., Athira, N., Beena, V., Safeer, M.S., Preena, P., Nisha, A.R., Divya, C., Sangeetha, S.G. and Umesh, C.G., 2023. Biometeorological analysis on the molecular incidence of babesiosis and ehrlichiosis in dogs. *Theoretical and Applied Climatology*, pp.1-10.
- Astuti, P.K., Ayoob, A., Strausz, P., Vakayil, B., Kumar, S.H. and Kusza, S., 2024. Climate change and dairy farming sustainability; a causal loop paradox and its mitigation scenario. *Heliyon*.

1.2.Book chapters

- Madhavan Unny, N., Zarina, A. and Beena, V., 2023. Fluid and Electrolyte Balance. In *Textbook of Veterinary Physiology* (pp. 193-211). Singapore: Springer Nature Singapore.
- Beena, V., 2023. Excretory Physiology. In *Textbook of Veterinary Physiology* (pp. 213-231). Singapore: Springer Nature Singapore.

1.3. Books Published

- Book entitled "Birds of the Campus - Illustrated List of Birds of College of Veterinary and Animal Sciences, Mannuthy, Kerala" edited by Dr. V. Beena and Dr. S. Harikumar with ISBN 978-93-91716-08-0 was released on 05.06.2023

CENTRE FOR WILDLIFE STUDIES, POOKODE

About the centre: KVASU Centre for Wildlife Studies (KVASU-CWS) was established by the University at its Pookode Campus in 2011 to function as its transdisciplinary platform for research, training and social outreach on matters of emerging importance at the wildlife-human interface. The Centre has been offering the Master of Science (Wildlife Studies) course open for all bioscience graduates since its inception The alumni strength of the course during 2023-24 is 89, most of whom are employed in leading wildlife research or management organizations. The students of KVASU-CWS engage in field-oriented as well as laboratory-based research projects on a variety of challenging problems associated with wildlife including biodiversity studies, ecosystem health, human-wildlife interactions, and animal diseases. Efforts of the University to make this mission sustainable and develop it further to address modern challenges at the human-wildlife interface more efficiently has resulted in a proposal for developing KVASU-CWS into a 'Centre of Excellence in One Health: Western Ghats Biodiversity, Wildlife-Human Interface, and Zoonotic Diseases (CoE-OH)' being selected under the Centres of Excellence Project of Government of Kerala in 2022.

Trainings conducted.

- Training on reptile and amphibian diversity and ecology for students involving Dr Vivek Philip Cyriac, Post Doctoral Fellow, Indian Institute of Science, Bangalore, on 11th June, 2023
- Heronry survey field training for students at Kasaragod & Kannur from 6th to 8th August, 2023
- Field training for students at Panamaram heronry on 21st September, 2023
- Field training for students at Chembra Peak on 14th October, 2023
- Training for students on "Biotechnology in Plant Conservation" by Dr. Satheeshkumar, Principal Scientist & Head (Retd.), Biotechnology, JNTBGRI, Palode, and Member, Kerala State Biodiversity Board on 4th December, 2023
- Training for students on the topic "How People's Biodiversity Register Contributes to the Conservation of Wildlife" on 5th December, 2023
- Field training for students at Eravikulam National Park, Chinnar Wildlife Sanctuary, Pampadum Shola National Park, and Mathikettan Shola National Park within the Munnar Wildlife Division from 19th to 22nd December, 2023

- Student field training at the ecosystems of Rajasthan from 22nd January to 1st February, 2024

Research Activities

Masters /Doctoral Research projects

- Abhishek S. (21-MSVP-01), Title: Status of Nilgiri Tahr (*Nilgiritragus hylocrius*) in Western Ghats: A Review
- Chaithra B. P. (21-MSVP-02), Title: People's perception on human- Bonnet Macaque (*Macaca radiata*) conflict with special reference to a selected sacred grove of Calicut, Kerala
- Jeffy Mathew (21-MSVP-03), Title: Understanding people's perception of monsoon fishing and fish consumption at Manimala river belt of Kadapra Panchayath of Pathanamthitta District, Kerala
- Karan S. (21-MSVP-04), Title: Modelling seasonal distribution and migration in cattle egrets (*Bubulcus ibis*) in India
- Shahrukh Nihal K. (21-MSVP-05), Title: People's perception of human elephant conflict in Vythiri Panchayat of Wayanad district

Major activities/Achievements

- PBL Workshop on human-wildlife conflict for students including Dr. Jacob Thundathil (Professor, University of Calgary, Canada), Dr. Anil Zachariah (Retd. Assistant Director, Kerala State Animal Husbandry Department) and Dr. E. K. Easwaran (Retd. Chief Forest Veterinary Officer) on 6th, 12th and 16th of May, 2023
- "Karshakar Bhoomiyude Bhishagwarar" workshop for farmers involving faculty of KVASU-CWS and Shri. M. I. Varghese IFS (Retd.) on 20th December, 2023, 24th January, 2024, and 23rd February, 2024
- Government Order issued providing Administrative Sanction for the development of KVASU-CWS into 'Centre of Excellence in One Health: Western Ghats Biodiversity, Wildlife-Human Interface, and Zoonotic Diseases' under the Centres of Excellence Project of Government of Kerala and submitted Detailed Project Report of the same to Kerala Infrastructure Investment Fund Board (KIIFB).

CENTRE FOR ONE HEALTH EDUCATION, ADVOCACY, RESEARCH AND TRAINING (COHEART)

About the centre: The Kerala Veterinary & Animal Sciences University (KVASU) has established "Center for One Health Education, Advocacy, Research and Training (COHEART)" in the year 2014 to serve as a base for the rapidly expanding concept of "One Health" in India as well as to act as a hub for encouraging One Health activities over the globe. The One Health Initiative is a global movement dedicated to improving the life of all species – human and animal - through the integration of human medicine, veterinary medicine and environmental science. COHEART is the first of its kind in the country and aims at capacity building of various professionals for a holistic, multifaceted solution of zoonoses threats and global health challenges through collaboration, cooperation and partnership between different disciplines.

The centre is located in scenic hilly terrain of Pookode in Wayanad district of Kerala, India. Wayanad district stands in the southern tip of the Deccan Plateau, north-eastern part of Kerala and its chief glory is the majestic Western Ghats with lofty ridges interspersed with dense forest, tangled jungles and deep valleys along the human habitations- a place ideal for co-existence of man and animal with nature, which will make the centre shine as a beacon of excellence.

Trainings conducted

1. Asian Elephant Support hands-on training program for wildlife veterinarians from 27.11.2023 to 30.11.2023.
2. Professionals from various disciplines were trained in the PG Diploma in One Health. This year 10 scholars have registered for the course and appeared for the course.

Research Activities

External Aided Projects

- *Improving Animal Health Practices of Veterinarians and Livestock farmers to contain Antimicrobial Resistance and Promote One Health (Bangladesh, India, Nepal* & Sri Lanka) (Principal Investigator: Officer-In-Charge, COHEART; Funding Agency: Asian Development Bank through Sathguru Management Consultants; Project Outlay: Rs. 5,50,000/-)

KVASU Research projects

- Addressing One Health priority areas through research, capacity building and development of knowledge products (RSP/23-24/VIII-2)

Major activities/Achievements

- World Zoonoses Day was commemorated on 06/07/2023 at CVAS, Pookode with awareness drive on zoonotic diseases and the ways to prevent the spread in association with the Students' Union, CVAS, Pookode.
- Experts from the COHEART were actively involved in one health activity within the state (State One Health Committee; Standing Committee on Zoonoses).
- Technical Expertise was provided for the Centre for One Health-Kerala institutionalised by the Ministry of Health and Family Welfare, Government of Kerala.

BIOSCIENCE RESEARCH AND TRAINING CENTRE, THIRUVANANTHAPURAM

About the centre: The Bioscience Research and Training Centre (BRTC) was established in 2018 by KVASU at the Bio360 Life Sciences Park at Thonnakkal, Thiruvananthapuram, for conducting high-quality research on infectious diseases and pathogen molecular biology affecting animals

Research Activities

External Aided Project

Title of the project	PI	Funding Agency	Total outlay (Rs)
Evaluation of maternal antibody transfer against infectious bronchitis and infectious bursal disease in chicken	Dr. Krithiga, K.	AHD, Government of Kerala	18,64,500/-

Research Highlight

The evaluation of the antibody titre was performed from blood samples collected from broiler (Vencob-400) breeder hens at 51 and 43 weeks of laying housed at KEPCO farm Kudapanakunnu, Thiruvananthapuram against infectious bronchitis and infectious bursal disease in chicken. The transfer of maternal antibodies (MAb) were assessed from chicks aged 1, 3, 7 and 12 days. The serum samples separated from the collected blood were subjected to ELISA against IB and IBD using IDEXX IBV Ab Test and IDEXX IBD XR Ab Test kits. The broiler breeders showed adequate antibody titre against IB and IBD. The chicks in the 1st, 3rd and 7th days of age showed the presence of MAb in the serum samples however, a drastic reduction was observed in the antibody titre of the chicks in the 12th day of age against both the diseases.The results of the study are being submitted for publication.

KVASU Research projects

Name of PI	Funding Agency	Title of Project	Total Outlay (Lakhs)
Dr. Sreeja R. Nair	State Plan	Enhancement of animal health and productivity through development of rapid accurate disease control measures for infectious disease of viral etiology	8
		Strengthening of Bioscience Research and training Centre, Thiruvananthapuram	8

Major activities/Achievements

As part of the research projects undertaken at the center,

1. Milk samples were collected from cattle suspected of mastitis across various organised farms in Thiruvananthapuram. Bacterial pathogens were isolated from the samples using standard microbial culture techniques. Antimicrobial resistance (AMR) profiling was performed on the bacterial isolates, and multidrug-resistant strains of *Escherichia coli* and *Staphylococcus aureus* were identified. Further investigations were conducted to analyse biofilm-forming genes, virulence genes and antibiotic resistance genes in the isolates.The results of the study are being submitted for publication.

2. A comprehensive transcriptomic analysis of IBDV was conducted using RNA sequencing (RNA-Seq) in unvaccinated 18-day-old chickens. The study revealed significant differential expression of genes on days two and five post-inoculation relative to the control group. Pathway enrichment analyses using Kyoto Encyclopedia of Genes and Genomes (KEGG) and Gene Ontology (GO) highlighted dysregulated genes and their associated processes. Validation of RNA-Seq findings was performed through real-time PCR analysis of randomly selected genes, confirming the transcriptomic alterations induced by IBDV infection.The results of the study are being submitted for publication.
3. Blood samples were collected from approximately 300 vaccinated pet dogs to conduct a cross-sectional evaluation of the anti-rabies neutralising antibody response. Serum separation was performed and an indirect ELISA was done to determine the humoral immune response. The results of the study are being submitted for publication.

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KERALA VETERINARY AND ANIMAL SCIENCES UNIVERSITY

Pookode, Wayanad, Kerala