

LIVESTOCK PRODUCTS TECHNOLOGY
Course Structure - at a Glance

CODE	COURSE TITLE	CREDITS
LPT 601	FRESH MEAT TECHNOLOGY	1+1
LPT 602	MEAT PROCESSING, PACKAGING, QUALITY CONTROL AND MARKETING	2+1
LPT 603	POULTRY AND FISH PRODUCTS TECHNOLOGY	2+1
LPT 604	EGG AND EGG PRODUCTS TECHNOLOGY	1+1
LPT 605	ABATTOIR AND POULTRY PROCESSING PLANT PRACTICES	1+1
LPT 606	SLAUGHTER HOUSE BYPRODUCTS TECHNOLOGY	2+1
LPT 607	PROCESSING AND MARKETING OF WOOL	2+1
LPT 608*	MARKET MILK PROCESSING AND DAIRY PLANT PRACTICES	2+1
LPT 609	QUALITY CONTROL OF MILK AND MILK PRODUCTS	1+1
LPT 610	TECHNOLOGY OF MILK PRODUCTS	2+1
LPT 611	BIOTECHNOLOGY OF FOODS OF ANIMAL ORIGIN	1+1
LPT 612*	IN-PLANT TRAINING (NON CREDIT)	0+2
LPT 691	MASTER'S SEMINAR	1+0
LPT 699	MASTER'S RESEARCH	20
LPT 701	ADVANCES IN ABATTOIR PRACTICES AND ANIMAL BYPRODUCTS UTILIZATION	2+1
LPT 702	ADVANCES IN FRESH AND PROCESSED MEAT PRODUCTS TECHNOLOGY	3+1
LPT 703	ADVANCES IN POULTRY PRODUCTS TECHNOLOGY	2+1
LPT 704	ADVANCES IN MILK AND MILK PRODUCTS TECHNOLOGY	3+1
LPT 705	ADVANCES IN QUALITY CONTROL OF LIVESTOCK PRODUCTS	2+0
LPT 706	BIOTECHNOLOGICAL TECHNIQUES AND PROCESSES IN ANIMAL PRODUCTS	1+1
LPT 791	DOCTORAL SEMINAR I	1+0
LPT 792	DOCTORAL SEMINAR II	1+0
LPT 799	DOCTORAL RESEARCH	45

* Non-Credit (Satisfactory/Unsatisfactory)

LIVESTOCK PRODUCTS TECHNOLOGY

Course Contents

LPT 601 **FRESH MEAT TECHNOLOGY** **1+1**

Objective

To impart knowledge about history, current status of meat industry, muscle composition, functions and sensory quality of meat. To educate on factors influencing quality of meat and nutritive value.

Theory

UNIT I

History and development of meat science and meat industry, current trends and prospects of meat industry-Structure and chemistry of animal tissues, muscle functions and postmortem changes- Rigor mortis – Effect of transport on meat quality – its veterinary and clinical importance – PSE and DFD in meat quality – Conversion of muscle to meat.

UNIT II

Composition, nutritional content and general quality characterization and evaluation of meat and its products- meat microbiology –Factors affecting quality of meat – Essential nutrients in meat and poultry meat – Tenderization. Chemical residues in meat and their effects on the health of the consumer.

Practical

Microbiological sampling and evaluation of meat. Evaluation of physico-chemical and sensory properties of meat and meat products. Estimation of pH – Colour - Water holding capacity – ERV – Tyrosine value – Thiobarbituric acid number – Estimation of texture profile of meat – Estimation of glycogen, R-value, myoglobin, proximate analysis of meat and meat products including poultry products – Estimation of drip loss - Determination of Sarcomere length, fibre diameter and myofibrillar fragmentation index. Retail and wholesale cuts.

Suggested Readings

- Gracey JF. 1999. *Thornton's Meat hygiene*. 10th Ed. WB Saunders.
Kerry J, Kerry J & Ledward D. 2005. *Meat Processing-Improving Quality*. Woodhead Publishing Ltd., UK.
Pearson AM & Dutson TR. 1999. *Advances in Meat Research*. Vol. IX. *Quality Attributes and their Measurement in Meat, Poultry and Fish Products*. Aspen Publishers, Inc, Maryland, USA.
Swatland H & Compbell T. 2004. *Meat Cuts and Muscle Foods*. Nottingham Univ. Press.

LPT 602 **MEAT PROCESSING, PACKAGING, QUALITY** **2+1**
CONTROL AND MARKETING

Objective

To impart knowledge on preservations, methods, product development, quality control and packaging practices in meat.

Theory

UNIT I

Factors affecting fresh meat quality, ageing, basic principles of preservation, chilling, freezing, thermal processing, dehydration, irradiation and use of chemicals and antibiotics; meat curing and smoking.

UNIT II

Comminuted meat; preparation of various kinds of fresh and cooked meat products-Canning – Heat processing – Sausages – Ham, Bacon, Tandoori-Barbecueing of Poultry.Senses of taste and olfaction-factors influencing sensory measurements, physical and chemical properties related to sensory evaluation, types of sensory panels, discriminate and descriptive testing.

UNIT III

Meat adulteration and substitution – Different techniques for meat speciation – Agar gel immuno diffusion techniques – Démonstration of CIE, IEF, ELISA, PCR

UNIT IV

Principles of packaging- Product characteristics affecting packaging requirements; packaging material and their characteristics - different methods of packaging meat – Vacuum packaging – MAP – Retort pouch processing.

UNIT V

Marketing of meat, setting up of a meat retailing unit and other meat merchandising practices. MFPO, BIS Standards for meat products.National and international specifications and standards.

Practical

Proximate composition of meat, tyrosine value, nitrite content, TBARS value, peroxide value, Formulation of different meat products, emulsion stability, shear force value, cooking determinants, subjective and objective method of sensory evaluations.

Suggested Readings

- Kerry J, Kerry J & Ledward D. 2005. *Meat Processing-Improving Quality*. Woodhead Publishing Ltd., UK.
- Pearson AM & Dutson TR. 1999. *Advances in Meat Research*. Vol. IX. *Quality Attributes and their Measurement in Meat, Poultry and Fish Products*. Aspen Publishers, Inc, Maryland, USA.
- Swatland H & Compbell T. 2004. *Meat Cuts and Muscle Foods*. Nottingham Univ. Press.

LPT 603

POULTRY AND FISH PRODUCTS TECHNOLOGY

2+1

Objective

To impart knowledge on structure, functional quality, microbiology, processing and preservation of poultry meat, eggs and fish.

Theory

UNIT I

History and development of poultry meat and egg processing industry. Different species of poultry and their production potentials- commonly occurring anti nutrients, and antibiotics in poultry feed ingredients and its

effect on egg and meat nutrition - Quality identification, quality maintenance, chemical, nutritional and microbiological quality of poultry meat. Preservation and packing techniques of shelled and liquid eggs. Quality identification of shell eggs and factors influencing the quality

UNIT II

Pre-slaughter care, transportation, resting, fasting, ante-mortem examination, methods of slaughter and slaughtering procedure-postmortem inspection-reasons for condemnation of carcass-yield and grading of dressed chicken,cut-up parts and de boned meat.UNIT III

Structure, nutritive value, compositional chemistry, microbiology and functional properties of eggs. Low cholesterol eggs, GMP, HACCP procedures for food safety – Codex regulation for food products safety – WTO/GOI regulations for import and export of poultry products. National and international regulations, standards, quality control and marketing of fish and fish products, utilization of fish processing waste.

UNIT IV

Fishery resources, marine and fresh water fishes, transportation, processing, preservation, grading, standards.Quality control, labeling and marketing of fish and fish products, utilization of fish processing waste.

UNIT V

Post processing value added meat for export- Integration,poultry and fish processing and marketing-Storage, packaging and chilling, freezing, dehydration, canning, irradiation, curing, smoking, barbecuing, cooking and preparation of further processed poultry and fish products.

Practical

Organization, sanitation and maintenance of poultry processing plants. Slaughtering, ante-mortem and postmortem inspection, meat cutting, grading, production of ready to eat, smoked and cured poultry meatComminuted and other poultry based convenient items.Visit to poultry processing plant/egg processing plant. Postmortem inspection, carcass yield and grading. Meat bone ratio,quality maintenance, tenderization water holding capacity. TBA values and preparation of further processed and freeze dried poultry products. Whole egg powder,shell meal processing plant waste meal-HACCP-egg powder processing plant. Grading of shelled eggs, liquid eggs,egg powder foaming property , posteurization of liquid egg, testing microbial load in different foams of egg, visit of egg powder plant/egg processing plant poultry and fish products and its Proximate analysis, microbiological and sensory evaluation and poultry meat and fish.

Suggested Readings

Mead GC.1989. *Processing of Poultry*. Elsevier.

Mountney GJ. *Poultry Products Technology*. 2nd Ed. AVI Publ.

Pearson AM & Gillett TA.1996. *Processed Meats*. 3rd Ed. Chapman & Hall.

Stadelman W & Cotterill OJ. 2002. *Eggs Science and Technology*. 4th Ed. CBS.

Suziki T. 1981. *Fish and Krill: Protein Processing Technology*. Applied Science Publ.

LPT 604 EGG AND EGG PRODUCTS TECHNOLOGY

1+1

Objective

To impart knowledge about composition and marketing of eggs and nutritive value of eggs, preservation methods –quality maintenance, functional and value added egg product development, packaging and standards

Theory

UNIT I

Preservation and maintenance of quality of eggs- spoilage of egg and its prevention.-Preparation of fast foods.

UNIT II

Egg breaking plant lay out and organization- freezing- pasteurization- desugarisation-dehydration – quality estimation.

UNIT III

Principles involved in preparation of egg powder and other egg products- Development of convenient egg based products- packaging of egg and egg products.

UNIT IV

Specifications, standards and marketing of egg and egg products-Quality control of egg products.

Practical

Evaluation of physical, chemical, functional and microbial quality of egg and egg products. Preservation of eggs- Preparation of dehydrated and convenient egg products- Visit to egg processing plant.

Suggested Readings

Romanoff AL & Romanoff AJ. 1949. *Avian Egg*. John Wiley & Sons.

Stadelman WL & Cotterill OJ. 2002. *Egg Science and Technology*. 4th Ed. CBS.

LPT 605 ABATTOIR AND POULTRY PROCESSING PLANT PRACTICES 1+1

Objective

Teaching about abattoir design, sanitation and basic slaughterhouse practices, effluent treatment and proper disposal of wastes.

Theory

UNIT I

Layout, designing – operation and maintenance of slaughter houses and processing plants-disposal of slaughter house effluents and different designs of effluent treatment plants - equipments, organization and Slaughter house, maintenance, record keeping and operation-sanitation of slaughterhouse-Sanitary practices in meat plant and its benefits; quality control.

UNIT II

Pre-slaughter judging, inspection, grading, pre-slaughter care, slaughter of meat animals; Humane slaughter – Principles and methods of stunning – Ritual slaughter of food animals and poultry – Machineries for slaughter and dressing- processing of different kinds of meat animals- Ante-mortem inspection and Post-mortem examination of animals. Disposal and

condemnation of unfit materials.

UNIT III

Carcass quality appraisal, judgement and their grading, meat cutting, measuring yields. Application of HACCP, GMP, ISO 9000, ISO 14000, ISO 22000, BIS Standards and any recent standards for meat and processing industries

Practical

Visit to slaughterhouse– Plan and outlay of modern abattoir- Procedure for slaughter of food animals and poultry - Ante-mortem and postmortem inspection, slaughtering, grading and meat cutting, carcass yield, meat bone ratio measurement of effluent characteristics: pH, BOD, COD, suspended solids etc.

Suggested Readings

Gerrard F. 1977. *Meat Technology*. Northwood.

Gracey JF. 1999. *Thornton's Meat hygiene*. 10th Ed. WB Saunders.

LPT 606 SLAUGHTER HOUSE BYPRODUCTS TECHNOLOGY 2+1

Objective

To Impart knowledge on animal by-products, processing and industrial utilization.

Theory

UNIT I

Slaughterhouse byproducts industry in India and abroad – Importance of utilizing slaughterhouse offals – Rendering- Planning a by-product plant - Utilization of blood, bones, hooves, glands, intestines, feathers, glandular by-products and other minor by-products for industrial exploitation.

UNIT II

Meat fat characteristics - Preservation and Processing of ruminal contents – Ensiling of ruminal contents – Value products preparation from slaughterhouse by-products. processing of animal byproducts for pet foods.

UNIT III

Flaying - Classification and factors affecting quality of hides and skin- Physical and chemical characteristics of hide and skin- Processing of hide and skin for manufacture of leather- Preparation and quality control of gelatin and glue. Microscopic, physical and chemical characteristics of leather; testing and marketing of leather- Preservation and packaging practices of various kinds of hides and skin.

UNIT IV

Designing of animal byproduct plant. Collection and scope for further utilization of slaughter house byproducts. Waste treatment and pollution control- Environmental Audits-Regulations on pollution control.

Practical

Identification of quality defects in leather- preparation of sausage casing- blood meal, feather meal and meat meal. Demonstration of carcass meal – Meat meal – Bone meal - Preparation of animal casings – Grading of casings and wool – Preparation of slime meal – Collection and preservation of

UNIT III

Layout Designing and organization of dairy plant, Milk procurement, handling and transportation. Chilling, centrifugation, separation, clarification, bacto-fugation and homogenization. Thermal processing- pasteurization, UHT processing, sterilization, bacto-therm and packaging, Storage and distribution of processed milk. Fortified, reconstituted and mild floured milks.

UNIT IV

Membrane processing and related techniques; application of ultrafiltration, reverse osmosis; nanofiltration and microfiltration in the dairy industry.

UNIT V

Current trends in cleaning and sanitization of dairy equipment, biological detergents, ultrasonic techniques in cleaning; biodegents. Disposal of dairy effluents.

Practical

Platform tests. Determination of fat, SNF, TS, protein, lactose and ash contents of milk. Standardization, pasteurization and sterilization. HCT profile of milk systems. Judging of different types of milks. Layout plan of market milk plant.

Suggested Readings

- Walstra P, Wouters JTM & Geurts TJ. 2006. *Dairy Science and Technology*. 2nd Ed. Taylor & Francis.
- Web BH, Johnson AH & Alford JA. 1987. *Fundamental of Dairy Chemistry*. 3rd Ed. Westport AVI Publ.

LPT 609 QUALITY CONTROL OF MILK AND MILK PRODUCTS 1+1

Objective

To impart knowledge about quality control, TQM, HACCP, SPS, CAC and legal standards.

Theory

UNIT I

Importance of quality control in dairy industry. PFA Act, BIS standards, AgMark standards and ISO standards of milk products.

UNIT II

Total quality management in processing of milk products – HACCP and SPS.

UNIT III

Types of microorganisms associated with milk and milk products-Milk borne diseases.

UNIT IV

Physico-chemical and microbial changes during procurement, processing and storage of milk and milk products.

UNIT V

Fundamental rules for sensory evaluation, Hedonic scale, score cards and their use for grading of milk and milk products.

Practical

Determination of pH and acidity, electrical conductivity, viscosity, phosphatase test, MBRT, Resazurin test, DMC, SPC. Analysis of milk and milk products in reference to BIS/PFA standards. Grading of milk and milk products.

Suggested Readings

Jennes R & Patton S. 1969. *Principles of Dairy Chemistry*. Wiley Eastern.
Yadav JS, Grover S & Batish VK. 1993. *Comprehensive Dairy Microbiology*. Metropolitan Publ.

LPT 610

TECHNOLOGY OF MILK PRODUCTS

2+1

Objective

To impart knowledge about techniques for preparation of different milk products.

Theory

UNIT I

Drying of milk and milk products; freeze dehydration, water activity; sorption behaviour of foods- dried ice cream mix – cream and butter powder.

UNIT II

Hurdle technology and its application in development of dairy products.

UNIT III

Manufacture of milk products; butter, evaporated milk, condensed milk, milk powders, ice cream and other frozen desserts. Manufacture of yoghurt-acidophilus milk-bulgaricus milk- kumiss-kefir. Manufacture of cheddar-mozzarella- cottage and processed cheese. Manufacturing of indigenous milk products- paneer- channa- khoa- ghee- dahi and shrikhand.

UNIT IV

Manufacturing of casein- caseinate- co-precipitates- Whey protein concentrate (WPC) - lactose- dairy whiteners; functional properties of whey proteins- casein- co-precipitates- Ultra Filtration retentate and their modifications.

UNIT V

Evaluation of functional properties. Packing, storage and marketing of milk products. Defects in milk products, their preventions and remedies.

Practical

Preparation of butter- paneer- channa- ghee- ice cream- cheese-cheddar-Mozzarella and cottage cheese- khoa- dahi- yoghurt- casein- caseinate-coprecipitate- determination of degree of browning chemical/physical methods; measurement of different functional properties of different milk products.

Suggested Readings

Aneja RP, Mathur BN, Banerjee AK & Chandan RC. 2002. *Technology of Indian Milk Products*. Dairy India.
Spreer E. 1993. *Milk and Dairy Products*. Marcel Dekker.

Walstra P, Wouters JTM & Geurts TJ. 2006. *Dairy Science and Technology*. 2nd Ed. Taylor & Francis.

LPT 611 BIOTECHNOLOGY OF FOODS OF ANIMAL ORIGIN 1+1

Objective

To impart knowledge about new techniques of biotechnology for improving food value.

Theory

Role of Biotechnology in productivity of livestock, Meat Speciation and quality control. Use of Biotechnology in production of food additive. Use of biotechnological tools for the processing and preservation and foods of animal origin, use of biotechnology improved enzymes in food processing industry, consumer concerns about risks and values, biotechnology and food safety. Future of food biotechnology in India.

Practical

Introduction of basic biotechnological techniques such as western blotting, enzyme isolation and identification, DNA extraction, amplification, different types of PCR, Acquaintance with RT-PCR, Multiplex PCR, gene identification and characterization.

Suggested Readings

Selected articles from journals.

LPT 612 IN-PLANT TRAINING 0+2
(Non Credit: Satisfactory/Unsatisfactory)

Objective

To impart industrial exposure to post graduate students in meat, milk, poultry and fish industry.

Practical

APT students will undergo in-plant training in any one of the specialized area of Animal Products Technology for a period of three weeks in an institute in private/public sector industry. After completion of the training, the student will submit a training report. Evaluation will be based on viva-voce examination and a report submitted by student-Preparation of Project report.

Suggested Readings

Selected articles from journals.

LPT 701 ADVANCES IN ABATTOIR PRACTICES AND ANIMAL 2+1
BYPRODUCTS UTILIZATION

Objective

To impart knowledge on advances in animal byproducts utilization such as leather, fat, casings, gelatin and abattoir effluent treatment. To expose the importance of environmental pollution and their pollutants.

Theory

UNIT I

Existing situation of slaughterhouses and processing plants in India - Collection of inedible and edible by-products for industrial uses – Disposal of

Prefabricated meat – Chemical residues in meat and their effects on the health of the consumer.

UNIT II

Principles of preservation – Methods - temperature control – Refrigeration – Chilling – Freezing – Mechanisation of chiller and freezer - Thermal processing – Canning – retort processing - Intermediate moisture meat – Moisture control – Dehydration – Freeze drying – Curing – Smoking – Direct microbial inhibition – Irradiation – Use of antibiotics and chemical preservatives – Organic acids – Recent advances in preservation of meat.

Meat adulteration and substitution – Different techniques for meat speciation - Packaging of meat and meat products-Critical assessment of ageing, chilling, freezing, smoking, curing, tenderization and irradiation techniques.

UNIT III

Basic meat processing procedure-Functional properties of tissue component in meat processing-forming processed meat products. Approaches for new product development-different equipments used for processing of meat products-Indigenous and heritage meat products-purpose of smoking-composition of smoke-method of smoking-liquid smoke preparation-Ham, bacon,sausages, patties, burger, meat loaves-various novel meat products.

UNIT IV

Fermented meat products-heat processing-restructured meat products-Reformed meat products-Effect of massaging,tumbling and flaking techniques and quality-intermediate, moisture meat-Enrobed meat products-Meat analogues and substitutes-Thermal processing of meat-Browning reaction-Enzymatic and non enzymatic-Protein changes in processed meat products-lipid changes-protein and lipid interaction-protein and carbohydrate interaction.

UNIT V

Meat additives and regulations pertaining to processed and convenient meat based products-Meat packaging and retailing practices-National and international standards, grading, specifications and quality control of meat and meat products.

Practical

Estimation of Colour - Estimation of texture profile of meat – Estimation of glycogen, Lactic acid, R-value, myoglobin, proximate analysis of meat and meat products – Estimation of hydroxy proline - Histological structure of muscle - Estimation of emulsion stability, thawing in meat and meat products– Identification of different packaging material – Agar gel immuno diffusion techniques – Demonstration of CIE, IEF, ELISA, PCR – Different methods of packaging of meat and meat products including poultry products - Visit to different cold stores.Evaluation of carcass quality,Estimation of muscle fiber diameter, Estimation of lipid profile of meat.

Organoleptic evaluation of meat-Estimation of Nitrate-Preparation of some novel meat products and studies on their shelf life-Total viable count and differential counts of meat and meat products-Visist of meat /poultry processing units.

Suggested Readings

- Kerry J, Kerry J & Ledward D. 2005. *Meat Processing-Improving Quality*. Woodhead Publ. Ltd., UK.
Selected articles from journals.
Swatland H & Compbell T. 2004. *Meat Cuts and Muscle Foods*. Nottingham Univ. Press.

LPT 703 ADVANCES IN POULTRY PRODUCTS TECHNOLOGY 2+1

Objective

Discussion on latest development in processing, preservation, quality control, packaging, regulations and standards of poultry meat.

Theory

UNIT I

Indian scenario of poultry processing industry Advances in poultry dressing, meat yield, preservation, microbiology and quality control methods. Automation in broiler farming, catching, transporting, control of shrinkage and methods of slaughter.

UNIT II

Preservation techniques, Room temperature preservation of poultry fast foods by multi hurdle technology critical evaluation of application of refrigeration, tenderization, canning, dehydration, irradiation, curing, smoking and cooking techniques in poultry processing and development of additional processed products.– Regulation of CAC and European standards of poultry meat and meat products.

UNIT III

Recent trends in packing and marketing of poultry and poultry products. Modified atmosphere packaging- Different packing materials for meat and cooked products.

UNIT IV

Policies and marketing trends in poultry meat -Regulations, specifications, standards and use of additives in poultry products.

UNIT V

Poultry product development formulation and profitability.

Practical

Cooked and uncooked meat quality standards- sensory evaluation of poultry meat- packaging material- Modified Atmosphere Packaging-Factors influencing meat quality at different freezing temperatures and thawing.

Suggested Readings

Selected articles from journals.

LPT 704 ADVANCES IN MILK AND MILK PRODUCTS TECHNOLOGY 3+1

Objective

To disseminate knowledge about production of high quality milk, preservation method, advances in processing of milk and milk products and packaging.

UNIT III

Rheology of milk products-Preservatives, antioxidants, antibiotics and pesticides residue in milk- Advances in bacteriological and physico-chemical analysis of milk and milk products

UNIT IV

Importance of quality assurance of livestock products for domestic and export trade – quality standards for meat - Effect of processing on nutritional and chemical qualities of meat products – Sensory evaluation of meat products – Physicochemical and microbiological quality assessment and standards - Economics of processing and product development.good manufacturing practices, meat hygiene regulations in relation to slaughter houses and processing plants-international regulations-State Municipal and other regulations pertaining to meat trade-Meat Food Products Order-ISO certification-Codex alimentarius-Bureau of Indian standards.

Suggested Readings

Selected articles from journals.

LPT 706

BIOTECHNOLOGICAL TECHNIQUES AND PROCESSES IN ANIMAL PRODUCTS

1+1

Objective

To impart knowledge about biotechnological techniques, methods, starter cultures and industrial application of biotechnology in meat industry.

Theory

UNIT I

Introduction, development and prospects of biotechnology in animal products, ancient and traditional food processing biotechniques.

UNIT II

Modern biotechnological methods and processes in animal products development, chemical and physical factors required for growing microbial cultures in nutritive substrate- Meat species identification- Quality control – Screening products for contaminants – Polymerase Chain Reaction (PCR) based products.

UNIT III

Basic principles of the industrial use of bio-reactions for production of biomass-upstream and downstream processing-application of micro-organisms as starter cultures in meat industry, microbial production of food ingredients.

Practical

Production, selection and purification of microbial cultures, making products using different microbial cultures, production of acidulation, buttery flavour, pigments, anti-microbial agents to improve the product quality and safety-Polymerase Chain Reaction (PCR).

Suggested Readings

Selected articles from journals.

LIVESTOCK PRODUCT TECHNOLOGY

List of Journals

- ❖ Advances in Food Research
- ❖ Beverage and Food World
- ❖ British Poultry Science
- ❖ Dairy Foods
- ❖ Dairy Indian
- ❖ Dairy Industries International
- ❖ Dairy Science Abstracts
- ❖ Flieschwirtschaft
- ❖ Food Processing
- ❖ Food Technology
- ❖ Food Technology
- ❖ Indian Dairy Man
- ❖ Indian Food Industry
- ❖ Indian Journal of Dairy Technology
- ❖ Indian Journal of Food Science and Technology
- ❖ Indian Journal of Poultry Science
- ❖ Indian Journal of Veterinary Research
- ❖ International Dairy Federation
- ❖ International Dairy Journal
- ❖ International Food Hygiene
- ❖ International Journal of Dairy Technology
- ❖ Journal of Animal Science
- ❖ Journal of Dairy Research
- ❖ Journal of Dairy Science
- ❖ Journal of Food Protection
- ❖ Journal of Food Science
- ❖ Journal of Meat Science
- ❖ Milk Industry
- ❖ Poultry Science
- ❖ Processed Food Industry
- ❖ Science of Food and Agriculture

e-Resources

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| ❖ www.meatscience.org | ❖ www.usa.gov |
| ❖ www.amis.org | ❖ www.fsis.usda.gov |
| ❖ www.meatami.com | ❖ www.poultryhelp.com |
| ❖ www.mla.org.au | ❖ www.nddb.org |
| ❖ www.FAO.org | ❖ www.ndri.res.in |
| ❖ www.agresearch.co.nz/mirinz | ❖ www.amul.com |
| | ❖ www.idfa.org |

Suggested Broad Topics for Master's and Doctoral Research

- ❖ Development of shelf stable meat products
- ❖ Development of intermediate moisture meat products
- ❖ Application of active packaging for improving shelf life
- ❖ Development of low sodium meat products
- ❖ Development of low fat meat products
- ❖ Enrichment of meat with fiber
- ❖ Enrichment of meat with calcium
- ❖ Utilization of edible byproducts
- ❖ Utilization inedible byproducts
- ❖ Prevention of oxidative rancidity in meat products
- ❖ Development in processing of poultry meat.
- ❖ Recent advances in processing of egg and egg products.
- ❖ Recent advances in preservation and quality control of egg and egg products
- ❖ Development in packaging, regulations and standards of poultry meat.
- ❖ Development in preservation and quality control of poultry meat.
- ❖ Development of functional casinates for food industry
- ❖ Development of phytoformula
- ❖ Development of geriatric biofoods
- ❖ Development of hydrolysed lactose milk drinks to lactose intolerants
- ❖ Membrane utilization in indigenous dairy products