20 LIVESTOCK PRODUCTS TECHNOLOGY

Unit 1: Basic and General Aspects of Livestock Products

Composition and physico-chemical properties of cow and buffalo milk. Milk proteins, lipids, carbohydrates, minerals, vitamins and other minor constituents of milk. Nutritive value of milk. Reception of milk - platform tests, filtration and clarification, Membrane processing and related techniques, chilling, separation, standardization, pasteurization and homogenization. Cleaning and sanitation of dairy equipments. Present status and future prospects of meat and poultry industry. Structure, composition, physical biochemical and nutritive aspects, and functional properties of different kinds of meat, fish, poultry and eggs. Sensory evaluation and organoleptic properties of livestock products. Post-mortem aspects of muscle as meat. Ageing of meat and chemical changes. Meat in human health. Bacteria, yeasts, molds, parasites important in food microbiology. General principles of spoilage. Chemical and deteriorative changes caused by micro-organisms. Contamination and spoilage of meat, fish, poultry and eggs. Food poisoning and food-borne infections. Assessment of microbial condition and wholesomeness of different livestock products. National and International microbial standards.

Unit 2: Abattoir and Poultry Processing Plants

Origin and source of animal foods. Lay out, construction, design, organization, operation and maintenance of abattoirs and poultry processing plants. Pre-slaughter care and slaughtering techniques for different food animals and birds. Effect of transport on meat Quality. Ante-mortem and post-mortem inspection. Judging and grading of animals and birds on foot and on rail. Carcass grading and preparation of cut up parts. Condemnation and disposal of unfit material. Disposal of slaughterhouse effluents. Sanitation, plant operation and maintenance. Sanitary standards for meat packing plants. Meat cutting and deboning. Adulteration and misrepresentation of meat. State, municipal and other regulations pertaining to meat trade. Meat food products order. Processing and utilization of various animal and poultry by-products, slaughterhouse and poultry plant offals. Methods of utilization of blood, fat, hides and skin, horns, hooves, wool, hair, feather, glands and other byproducts. Importance and utilization of by-products in industry, Application of computer science in abattoir operation. Robot technology and its application in meat and poultry industry.

Unit 3: PFA and FSSAI standards of different dairy products

Processing and Preservation Principles of processing of dairy products. Special milk: sterilized milk, flavoured milk, homogenized milk, soft curd milk, Vitaminized/irradiated milk, fermented milk, standardized milk, reconstituted/rehydrated milk, recombined milk, toned, double toned milk, skimmed milk, Humanized milk. Processing of dairy products: - butter, butter oil, ice-cream, fresh and ripened cheeses, cream, condensed milk, dried milk, dried milk products etc. Indigenous dairy products: ghee, khoa, dahi, misti dahi, makkhan, chhana, paneer, Khurchan, Lassi, kunda, milk cake, Organic milk. Principles of preservation of livestock products. Equipment and technology of processing and preservation. Industrial food preservation, chilling, freezing, freeze drying, dehydration, bio preservation, canning irradiation, pasteurization, curing,

smoking, use of chemical additives and antibiotics. Recent advances in preservation of livestock products. Cooking methods including micro-wave cooking. Tenderisation and use of enzymes for processed foods. Production of value added products, process methods, process optimization and quality control. Development and preservation self-stable (canned and dehydrated) intermediate moisture, textured, cured, fermented fabricated meat and poultry products. Sanitation, regulation and inspection of processed meat foods. Development of emulsified, communited, restructured and other processed meat products. Desugarization, freezing, pasteurization and dehydration of eggs. Principles involved in preparation of egg powder and other egg products. Effect of processing on nutritional, chemical, microbiological and organoleptic qualities of livestock products. Economics of pre-costing and product development. Application of biotechnology in processing and preservation of meat, poultry and fish products. Genetically modified foods. Bioactive products and biogenic amines.

Unit 4: Wool, Mohair and Fur

Basic aspects of wool science. Development and structure of wool fibers. Shearing, physical and chemical characteristics, processing, grading, standardization, storage and marketing of wool, mohair, fur and other speciality fibers (National and International).

Unit 5: Packaging

Principles of packaging. Types of packaging materials. Characterization, methods and systems of packaging. Gas packing, Vacuum packing, modified atmosphere packing, controlled atmospheric packaging, shrink and stretch packing, industrial packaging. Aseptic and retort pouches. Standardization and quality control of packaging material. Product attributes and packaging requirements for different livestock products. Latest trends in packaging of meat, poultry, eggs, wool and fish products: Active and smart packaging, antimicrobial packaging, edible films and coatings, nanocomposite materials for food packaging. Use of biosensors in livestock products packaging.

Unit 6: Quality Control

Grades and grading of livestock products. Stress factors effecting meat quality – PSE, DFD, Hot boning, Cold shortening, thaw rigor, freezer burn and electrical stimulation. Regulatory and inspection methods – Municipal and State laws. Bureau of Indian Standards and International Standards of fresh meat and poultry including their products and by-products. Detection of antibiotics, chemical residues, heavy metals and toxins in meat. Techniques for detection of adulteration of meat. Different techniques for meat speciation. HACCP concept of quality control of meat, fish, poultry and eggs.

Unit 7: Marketing

Livestock production and supply characteristics. Meat consumption and related demands. Present status, constraints and future aspect of livestock production and marketing. Types of market and trends in marketing livestock products and by-products, wholesale, retail and future trends. Consumer aptitude, education and awareness, and popularization of new products. Corporate

bodies in regulation of markets, marketing boards, Co-operative agencies, internal trade and development of international market for livestock products. Organization, operation and sanitation of meat, poultry, fish and egg retailing units. Fast food chains and super markets. Situation and outlook and methods for promotion and marketing of livestock products.