

SYLLABUS

Dairy Processing

Status of dairy industry in Indian and abroad. Principles and practices for production of high-quality milk (Clean milk production). Methods of milk procurement, payment, quality assessment, detection of adulterants, transportation of milk. Methods of raw milk preservation. Physical properties, chemical composition and legal standards of milk of cow, buffalo and other species of milch animals. Centrifugal separation, clarification, bactofugation and factors affecting their efficiency. Homogenization: theories, efficiency and factors affecting the process and its impact on milk. Thermal processing of milk. Principles and methods of pasteurization and sterilization. UHT processing and aseptic packaging. Special milks, Cleaning and sanitization of dairy equipment. Detection of adulterants and preservatives in milk. Operation flood, recent policies related to dairy sector.

Traditional Indian Dairy products: Classification, characteristics, legal standards, Method of production & yield, physico-chemical changes during manufacture; Packaging systems, shelf-life, common defects during storage. Fat-rich dairy products: concepts in production and processing of different types of cream, butter, margarine, fat spreads, butter oil and ghee., legal standards and defects. Ice cream and Frozen Milk Products: Definition, classification and composition, Role of milk constituents and other ingredients, processing steps, technological aspects of freezing, packaging and storage.

Cheese : History, definition, classification of cheese, Quality of Milk in relation to cheese making. Pre-treatments of milk for cheese making. Cheese Additives. Manufacture of Cheddar, Gouda, Mozzarella and Swiss cheeses. Role of starter cultures in cheese quality. Types of rennet, cheese ripening. Storage and defects. Condensed and dried Milks: History, Definition and legal standards: Processing and technological aspects, Heat stability of milk, role of stabilizers in the stability of condensed milk, defects in condensed and dried milk, their causes and prevention, Instantization of milk powder, Manufacture of infant foods, malted milk foods.

Packaging materials and their Characteristics, Retort packaging system, Legal requirements of packaging material and product information. Packaging of milk and dairy products, MAP, Aseptic Packaging, Packaging system. Dairy By-products: By-products from milk processing, method and technological aspects related to processing, Physico-chemical characteristics, Nutritional value and legal standards of By-products. Membrane processing, Waste Management of dairy plant.

Dairy Chemistry

Specific compositional differences among milk from various species; Factors affecting composition of milk, Colloidal State, emulsion, physico-chemical properties of milk (density, specific gravity, Surface tension, Viscosity, Refractive index, Freezing point, Electrolytes, Ionic Equilibria, Buffer capacity, Oxidation-Reduction potential, thermal conductivity. Fundamentals of human nutrition, nutrient requirements of different age groups. Nutritional value of milk from different species, digestion and absorption, Vitamins, Hormones, Milk intolerance and hypersensitivity, food additives, toxic elements, antibiotics, radionuclides in milk and milk products. Nutraceutical, antioxidants, food toxins, anti-nutritional factors. Chemistry of milk: Definition, structure, classification, physico-chemical properties of Carbohydrate, lipid, protein, Lactose, different types of estimation techniques and their principles for these milk constituents. Chemistry of different milk products.

Dairy Microbiology

Classification of Microorganisms, Prokaryotic and Eukaryotic Microorganisms, Microbial Growth and Nutrition, Diversity of Microorganisms, Microbial Genetics and Immunology, Milk Microflora, Milk Spoilage, Mastitis and Public Health, Clean Milk Production, Microbiology of Fluid Milk, Milk-borne Diseases, Microbiology of Cream and Butter, Microbiology of Condensed Evaporated and Dried Milks, Microbiology of Ice Cream and Indigenous Dairy Products, Starter Cultures in Dairy, Probiotics and Fermented Milk Products, Food Safety and Quality Systems, Rapid Microbial Detection Techniques, Animal Husbandry and Dairy Management.