Indian Institute of Food Processing Technology, Thanjavur

Post Graduate Entrance Examination- 2020

M.Tech. (Food Technology) in Food Process Technology syllabus

Unit 1: Introductory to Food Science and Technology

Basics of food science and technology. Methods of food preservation such as heat processing, pasteurization, canning, dehydration, freezing, freeze drying, fermentation, microwave, irradiation and chemical additives. Refrigerated, modified and controlled atmospheric storage. Aseptic preservation, hurdle technology . Use of non-thermal technologies - microfiltration, bacteriofugation, high voltage electric fields, pulse electric fields, high pressure processing, irradiation, thermosonication, alternate-thermal technologies - ohmic heating, dielectric heating, microwave, RF, infraredbiological technologies -antimicrobial enzymes and bacteriocinsin food processing. Intermediate moisture food products, low acid foods, high acid foods and shelf stable foods.Unit operations of food processing viz. grading, cleaning, washing, sorting, size reduction, cryogenic grinding, crystallization, membrane separation processes; Evaporation, Distillation, Mixing, coagulation, mechanical separation processes, filtration, pressing, expelling, leaching, extraction, extrusion.

Unit 2: Fruits and Vegetable Processing

Post harvest handling. Primary, secondary, value addition and storage of fruits and vegetables. Extraction, clarification, concentration and packaging of fruit juice, jam, jelly, marmalade, squash, candies, tomato sauce, ketchup, and puree, chips, pickles- equipments used. Minimally processing of fruit and vegetables. Dehydrated fruits and vegetables. Technology of Preservation by sugar, salt, chemical.Fermented foods and beverages from fruitand vegetables. Aerated drinks,frozen fruits and vegetables, IQF products.By-products utilization of fruits and vegetable processing industry.

Unit 3: Processing of food grains, spices and plantation crops

Structure, composition, milling and processing of different food grains like wheat, rice, maize, oat, pulses, millets and oil seeds. Anti-nutritional factors in food grains and oilseeds. Milling of food grains. Primary and secondaryprocessing. Value added food grain products like breads, biscuits, cakes, doughnuts, buns, pasta goods, extruded, Instant ready mixtures, puffed foods, confectionary products, breakfast cereals, snack foods, malted food products, legume based food products. Milling and parboiling of rice.by-products of rice milling and their utilization. Oil seed processing: expelling, solvent extraction, refining and hydrogenation. Spices and plantation crops processing -Post harvest processing of major and minor spices, tea, coffee, cocoa, coconut, cashew and oil palm. Extraction of essential oils &oleoresins andencapsulation technologies.

Unit 4: Dairy Science and Technology

Milk compostion, Physical and chemical properties of milk. Milk reception. Dairy plant operations viz. receiving, cooling separation, clarification, pasteurization, standardization, homogenization, sterilization, storage, transport and distribution of milk. Toned, double toned, standaridised, UHT, fortified, reconstituted and flavoured milks. Technology of fermented milks. Milk products processing viz. cream, butter, ghee, cheese, condensed milk, evaporated milk, whole and skimmed milk powder, ice cream, khoa, channa, paneerand similar products. Judging and grading of milk products. Dairy plant sanitation and waste disposal, CIP.

Unit 5: Technology of Meat, Fish and Poultry Products:
Chemistry, Nutritional value and microscopic structure of meat tissue. Ante mortem inspection, principle and methods of slaughtering of various animals and poultry birds, Post mortem examination and Rigor mortis. Retails and wholesale cuts. Factors affecting meat quality. Meat tenderization, meat preservation like curing, smoking, freezing, canning and dehydration of meat, poultry and their products. Value addition and byproducts utilizations. factors influencing keeping quality of meat. Processing and preservation of fish and its products. On board handling and transportation of fish. Preservation canning, smoking and freezing of fresh and sea water fish and its products. Utilization of by-products from fish processing industries. Structure and composition of egg, factors affecting egg quality. Quality measurement of egg. Preservation methods of shell eggs and egg products freezing- pasteurization- desugarisation . Technology of egg products viz. egg powder, albumen and flakes.

Unit 6: Food Quality Management
Quality systems and tools used for quality assurance including control charts, acceptance and auditing inspections, critical control points, reliability, safety, recall and liability. Food adulterations & detection techniques. Measurement techniques and instruments for food quality determination. National Food laws and standards - PFA, FPO, BIS, APEDA. International standards and organizations – FDA, ISO, GRAS, EU, CAC, TQM, GMP, GAP, HACCP. International standards for export and quarantine requirements for export of Agricultural and Horticultural produce.

Unit 7: Food Packaging and labeling
Packaging terminologies.Functions of food packaging. Packaging requirements for different environments. Basis for selection of packaging material. Packaging materials *viz.* properties and testing procedures, packaging technologies for perishables and highly persables fresh and processed foods Packaging technologies for. Shelf life studies. Recent trends in packaging, aseptic, active packaging, smart packaging, intelligent packaging, modified atmosphere, vacuum and gas packaging. labelling requirements.

Unit 8: Food Product Development and Health Foods
Socio-cultural, psychological and economical consideration for food appearance, domestic and export marketing. Consumer trends and their impact on new product development. Product development *viz.* to conceive ideas, evaluation of ideas, developing ideas into products, test marketing and commercialization. Role of food in human nutrition. Nutritional disorders, natural contaminants and health hazards associated with foods. Diet therapy,probiotic and prebiotic foods Therapeutic, organic foods, designer foods, nutrogenomics, nutraceutical and functional foods.

Unit 9: Food Chemistry
Carbohydrates: structure and functional properties of mono-, oligo-, & poly-saccharides including starch, cellulose, pectic substances and dietary fibre, gelatinization and retrogradation of starch. Proteins: classification and structure of proteins in food, Lipids: classification and structure of lipids, rancidity, polymerization and polymorphism. Pigments: carotenoids, chlorophylls, anthocyanins, tannins and myoglobin. Food flavours: terpenes, esters, aldehydes, ketones and quinines. Enzymes: specificity, simple and inhibition kinetics, coenzymes, enzymatic and non-enzymatic browning. Nutrition: balanced diet, essential amino acids and essential fatty acids, protein efficiency ratio, water soluble and fat soluble vitamins, role of minerals in nutrition, co-factors, anti-nutrients, nutraceuticals, Chemical and biochemical changes during processing and storage.

Unit 10: Food Microbiology

Characteristics of microorganisms: morphology of bacteria, yeast, mold and actinomycetes, spores and vegetative cells, gram-staining. Microbial growth: growth and death kinetics, serial dilution technique. Food spoilage: spoilage microorganisms in different food products including milk, fish, meat, egg, cereals and their products. Toxins from microbes - aflotoxins: pathogens and non-pathogens including Staphylococcus, Salmonella, Shigella, Escherichia, Bacillus, Clostridium, and Aspergillus genera. Fermented foods and beverages: curd, yoghurt, cheese, pickles, soya-sauce, sauerkraut, idli, dosa, vinegar, alcoholic beverages and sausage.Thermal death time and process time calculations.