FPT-501: INTRODUCTION TO FOOD MICROBIOLOGY, BIOCHEMISTRY & BIOTECHNOLOGY

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1. Introduction: Definition, historical development in food microbiology; prokaryotic and eukaryotic cell. Microbiology and reproduction of Bacteria yeast and mold. Techniques of pure culture: serial dilution, pour plate, streak plate, spread plate, slant, broth and enrichment culture, lyophilization.
2. Microbial growth: Definition, Growth curve, account of different phases, synchronous growth, doubling/ generation time. Relationship between number of generation and total number of microbes. Disinfecting Agents and its dynamics.
3. Introduction to cell biochemistry: Enzymes, specificity of enzymes, coenzymes, cofactors, enzymes inhibitors and activators. Metabolism of carbohydrates, lipids and proteins.
4. History, definition, scope and present status of biotechnology in India in relation to Food Technology and its general applications. Microbial propagation for production: production of microbial biomass-single cell proteins, definition, bacterial biomass and fungal biomass. Production of different microbial products – Beverages, antibiotics and vitamins with specific reference to substrates, optimum conditions micro organism used. Fermented food: origin, scope and development, sourkraut, youghurt, cheese, miso, tempeh, idli, dosa. Regulatory and social aspects of biotechnology of foods, application of enzymes in food industry, production of food flavour, colour, enzymes. Immobilised enzymes.

Reference Books:

1. Industrial Microbiology - Prescott and Dunn
2. Industrial Microbiology - Casida, LE., AVI
3. Food Microbiology - W.C. Frazier, Tata McGraw Hill
4. Lehninger Principles of Biochemistry - David L. Nelson et al. Lehninger
5. Biochemistry - A.V.V.S. Ramarao
6. Introduction to Biotechnology - Brown et al, Blackwell Science
7. Fermentation Microbiology and Biotechnology - T. El-Mansi et al, CRC Publication

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FPT-502: Food Engineering Operations – I

1. Introduction to Unit Operations; Concept of primary, secondary and tertiary unit operations in food processing. Material and energy balance for the processes.

2. Material handling: Conveyors, elevators; cleaning and handling of raw materials. Selection and design of material handling equipments.

3. Food machinery for size reduction, mechanical expression, mechanical separation, mixing and agitation; Emulsification and Homogenization.

4. Filtration, membrane separation; Sedimentation and centrifugation.

Reference Books:

1. Unit Operations in Food Processing - Earle, R.L., Pergamon Press New York
2. Food Engineering Operations - Brennan, J.G. et. Al.; Elsevier Applied Science, Amsterdam
3. Food Process Engineering - Heldman, R.R. and R.P. Singh, CBS Publication
4. Fundamentals of Food Engineering - Toledo, R.T., CBS Publication
5. Unit Operations in Chemical Engg. - McCabe, Smith and Harriot, McGraw Hill Book Co., New York
6. Transport processes and Unit Operations - C.J. Geankopolis, Prentice hall of India, New Delhi

FPT-503: FOOD PRODUCT TECHNOLOGY – I

1. Production process of milled rice; Parboiling and Parboiled rice. Processing of wheat, pulses, corn and maize and malting.

2. Processing of oil seeds: Production and processing of edible vegetable oils and fat, hydrogenated fat, bakery and shortening fat and fat substitute products like Margarine, Salad Dressing etc.

3. Principles of fruits and vegetables processing. Storage of fresh fruits and vegetables. Reception and preparation: Equipment, cleaning methods: sorting, grading, peeling and blanching. Fruits and Vegetables Preservation Methods: drying and dehydration of fruits and vegetables, freezing selected fruits and vegetables thermal processing of selected fruits and vegetables; types of containers and spoilage of canned foods; effects of processing on the quality of fruits and vegetable products.

4. Preservation by sugar and salt: ingredients and processes for manufacture of jam, jellies, marmalade, pickles and chutneys. Tomato ketchup, sauce, puree and paste. Preparation of Fruits beverages etc. FPo standard for fruits and vegetable products and utilization of by-products of fruits and vegetable processing industry.

Reference Books:

1. Food Science - N.N. Potter, CBS Publisher and Distributor, New Delhi
2. Technology of Food Preservation - Desrosier and Desrosier, CBS Publisher and Distributor, New Delhi
3. Agricultural Process Engineering - Singh and Sahay, Vikash Publishing House, New Delhi
4. Fruits and vegetable preservation - Girdhari Lal and Sidappa

FPT-504: FOOD STORAGE AND PACKAGING

1. Introduction to Storage, importance of scientifically devised storage systems to minimize loses of food grains, fruits, vegetables, dairy products, poultry and meat. Storage structures: functional and structural designs of grain storage structures such as cover and plinth (CAP), warehouse and silos. BIS Specifications.

2. Functional, structural and thermal designs of cold stores; controlled and modified atmosphere storage systems for semi and highly perishable products.

3. Functions of packaging and packaging materials, properties of different types of packaging materials: paper, plastics, metal, natural materials etc. and their application. Packaging requirements: Packaging requirements and their selection of various processes, viz. canning, dehydration etc. Packaging evaluation: WVTR, GTR, bursting strength, tensile strength, tearing strength drop test. Packaging environment: Inert gas, vacuum, aseptic, CAP and MAP. Packaging Machinery: Bottling, canning, form to fill and seal machines, bags and their manufacturing and closing.

4. Management practices: Labeling, record keeping and management of stores in godowns, silos and cold storages. Maintenance of buildings and equipments, sanitations of storage system to conform to BIS standards. Package labeling: function and regulations.

Reference Books:

1. Handling and storage of food grains in tropical and subtropical areas - Hall, C.W., FAO Publications, Oxford and IBH Pub. Co. Pvt. Ltd.
2. Handling, Transportation and Storage of Fruits and Vegetables - Albert Lloyd Ryall and Warner Flipton Ryall, Avi Pub. Co.
3. Preservation and storage of grains, seeds and their by-products - Multon, J.L., CBS Publishers and distributors
4. Food packaging materials - Mahadeviah, M. and R.V. Gowramma, Tata-McGraw Hill Pub. Co. Ltd

FPT-505: FOOD ANALYSIS FOR QUALITY TESTING AND EVALUATION

1. Introduction: Concept of quality, quality control and assurance, principles and functions of quality control, quality attributes (qualitative, hidden and sensory), plan and method of quality control within and outside the industry. Subjective and objective quality, HACCP; its benefits and application.

2. Food Analysis: Objective and purposes of food analysis, food adulteration and simple and quick method of adulteration detection, methods and purpose of estimation of moisture, crude fat proteins, crude fiber and ash.

3. Sampling: Definition of sampling, purpose, sampling techniques requirements and sampling procedures for liquid, powdered and granular material. Physico-chemical and mechanical properties: Colour, flavour, consistency, viscosity, texture and their relationship with food quality.

4. Sensory quality control: Definition, objectives, panel selection, Interpretation of sensory results in statistical quality control, TQM and TQC. Food Regulations: Objectives, requirements and benefits of food grades and standards (BIS, AGMARK, PFA, FPO, FAO, CODEX, WHO, ISO).

Reference Books:

1. Quality Control in Food Industry (Vol.I & II) - Kramer & Twigg, AVI
2. Handbook of Analysis F&V products - Rangana, McGraw-Hill Publishing Co.
3. Modern method of analysis - Stewart and Whittaker, Springer
4. Sensory Evaluation Techniques - Morten, C. et.al.
5. Food Analysis principle & technique - Dieter W., Geuwedit & Whitaker
6. Food Analysis: Theory and Practice - Pomeranz & Meloan, Springer