

CBCS

Food science

SYLLABUS

II , IV and VI semesters

CBCS B.Sc. FOOD SCIENCE AND MANAGEMENT [VOC] OPTIONAL SUBJECT
FOR THE BATCH ADMITTED IN 2017- 18

SEM – II PAPER – III FSM 201 (W) POST HARVEST TECHNOLOGY

AIM:

CREDITS - 4+1

To impart knowledge in after cultivation and post harvest management of various foods.

Objectives:

1. To educate about Post Harvest losses and their Prevention.
2. To teach about basics of engineering as used in food processing.
3. To introduce to novel areas of processing, such as, extrusion, fermentation technology and high protein food technology.
4. To teach waste management and bio-utilization.

UNIT – I

1. Post-Harvest Technology – concept and science, statistics, general loss and recovery. Need, importance and role, principles and methods involved, role of post-harvest technologists, present status in India; futuristic post-harvest technology
2. PHT OF food grains: Organizations for storage – SGC, FCI, C.W.H., - Aims, objectives, functions and allied programmes. Storage requirement, Storage structure. Types of storage. PHT of fruits and vegetables, spices and condiments, plantation crops

UNIT – II

1. Extrusion technology – introduction, definition, selection of raw materials basic principles, classification of extruder systems; cold extruders, extrusion cooking, single screw extruders, twin screw extruders, merit and demerits and uses of extruded foods, different types of extruded foods, developing extruded foods with food industry by-products.
2. High protein food technology – leaf proteins, food yeast, chlorella, marine algae and microbial synthesis of proteins from hydrocarbons

UNIT – III

1. Fermentation Technology – Definition, advantages and disadvantages, controlling fermentation's in various foods by acid, alcohol, use of starters, temperature, oxygen and salt.
2. Enrichment and fortification technology in developing and developed countries– fortification of foods, properties of micronutrient compounds ,impact of other technologies on fortification procedures , technical problems requiring analytical consideration and health implication.

UNIT – IV

1. Quality control in food industry – methods of evaluation and control of the various aspects; quality of raw materials, manufacturing process and the testing of finished products.
2. Waste management; solid and liquid wastes; industrial effluents and their management, wastes from oil refineries, sugar industry, dairy industry and other food processing industries. Bio-utilization of wastes and by products.

Reference Books;

1. Food Science & Quality Control by SMT. B. Poornima - Centrum Press First edition 2014.
2. Post-Harvest Management of Horticultural crops - S. Saraswathy, T.L. Preethi AGROBIOS (India) 2013.
3. A Handbook of Agn. Food processing and marketing by S.C. Gaur, Agro Bios (India) 2012.
4. Quality Control for value edition in Food processing – by Dev Raj, Rakesh Sharma & V.K. Joshi New India Publishing Agency, 2011.
5. Food processing and preservation – Subbulakshmi, G. Shobha, A. Udipi, New Age International (P) Ltd., 2006.
6. Food Technology processing and laboratory control – Ayland, Allied Scientific Publisher, 1999.
7. Post-Harvest – RBH Mills Etal, A V I Publishing Co., 1981.
8. Food processing Waste Management – Green & Kremer, A VI Publishing Co., 1979.
9. Introduction to food engineering – Paul Singh R and Dennis R Heldman
10. Food science and food bio technology- Sheetal Singh.

**CBCS FOOD SCIENCE AND MANAGEMENT [VOC] OPTIONAL SUBJECT FOR
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SEM – II PAPER – IV– FSM 202 (W) FOOD ADULTERATION

CREDITS 4 + 1

AIM:

To introduce students to food safety and standardization act and quality control of foods.

Objectives:

1. To educate about common food adulterants and their detection.
2. To impart knowledge in the legislative aspects of adulteration.
3. To educate about standards and composition of foods and role of consumer.

UNIT – I

1. Food adulteration – Introduction of Food adulteration, definition. New adulterants in foods
2. Historical Food legislation in India; Central food laboratory, Municipal laboratories,
3. Export inspection council laboratory, Central grain analysis laboratory, standards of weights and measures act, solvent extracted oil deoiled meal and edible flour order, export and quality control and inspection act and other acts and orders.

UNIT – II

1. Food Safety and Standards Act 2006. vertical standards Vs horizontal standards
2. Food safety officer; powers, procedures, role of food analyst most important international laws; Codex alimentarius, FDA, USDA, FAO and WHO
3. Other International regulatory bodies like EFSA –European food safety authority
Food standards of Australia and Newzealand , Soudi Arabia food regulations

UNIT – III

1. Consumer protection; role of voluntary agencies such as, Agmark, I.S.I. Quality control laboratories of companies ,private testing laboratories, Quality control laboratories of consumer co-operatives,.
2. Standardization of Foods; Definition, Standards of Quality, for cereals, starchy foods, spices and condiments, sweetening agents, meat and meat products, vinegar, sugar and confectionary, beverages-alcoholic and non alcoholic , carbonated water etc., Milk and milk products , oils and fats , Canned foods , fruits and vegetables products.

UNIT-IV

- 1 Food additives – classification, nature and characteristics and use of additives in food such as antioxidants, chelating agents, coloring agents, curing agents, emulsions, flavors and flavor enhancers, flour improvers, humectants and anti caking agents, nutrient supplements, non-nutritive sweeteners, pH control agents, stabilizers and thickeners. Raising agents – types and their role in food processing., artificial colors
Artificial flavors
- 2 Consumer education , consumers problems rights and responsibilities, copra 1986, tips for wise purchasing, redressal measures how to give complaints and proforma of complaints

Reference Books;

1. A first course in Food Analysis – A.Y. Sathe, New Age International (P) Ltd., 1999.
2. Food Safety, case studies – Ramesh. V. Bhat, NIN, 1992.

B.Sc. FOOD SCIENCE AND MANAGEMENT [VOC] OPTIONAL SUBJECT

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SEM – II PAPER – III FSM 251 (W)

FOOD ADULTERATION – 1, PRACTICAL SYLLABUS

I. Testing adulteration of Milk and products:

A) Adulteration of Milk

Physical Tests:

Detergent Test

Filter Test

Flow Test

B] Chemical Tests:

Clot on boiling test

Test for starch in Milk

Test for cane sugar in Milk

Test for Buffaloes Milk in Cow's Milk

Test for added colours in Milk

Test for skim milk power in milk

Detect the presence of added carbonates and bicarbonates in milk

Test for soda in milk.

Test for glucose.

II. Adulteration of Ghee:

Test for vegetable fat:

Nitric acid test

Soda ash test

Valenta test

Test for added alkali.

Baudouin test.

Analysis of butter: Test for Dalda in butter.

Adulteration of Khoa: Test for starch in Khoa.

Adulteration of Paneer: Presence of starch in paneer.

III. Testing adulteration of oils and fats:

Test for sesame oil in other oils

Halphen test for cotton seed oil

Hexa bromide test for linseed oil

Test for added mineral oil

Test for added castor oil

Detection of argemone oil in other oils

Test for rancidity in oils

Kries test for testing quality of oil.

IV. Testing adulteration of spices and condiments.

Cardomom: Extraction of flavour.

Coriander power: Test for starch & horse dung power.

Chilli powder. Test for oil soluble dyes, powdered bran, saw dust and brick powder.

Turmeric Powder: Test for metanil yellow and lead chromate polish.

Cloves: Test for exhausted cloves.

Curry powder: Test for metallic colours.

Poppy seeds: Test for Amaranths seeds.

Sajeera: Test for sand, stones and other seeds.

Mustard seeds: Visual examination.

Pepper: Test for papaya seeds.

Saffron: Detection of maize cob tendrils.

Cumin seeds;

Cinnamon: plant bark.

V. Food adulteration awareness campaign – know your food quality

VI. Visit to a State food testing Laboratory / NGRA Food Quality Testing Laboratory.

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SEM – II PAPER – IV FSM 252 (W)

FOOD ADULTERATION – 2, PRACTICAL SYLLABUS

I. Testing adulteration of cereal and cereal products:

Wheat flour: Test for sand, dirt, husk and chalk powder.

Suji: Test for iron fillings.

Whole grain; adulteration with datura.

Wheat; burnt kernel.

Test for urea in parched rice.

II. Testing adulteration of pulses.

Testing for organic and inorganic matter in dals.

Test for kesari dal in other dals.

Test for Metanil yellow in dals.

Test for lead chromate in dals.

Test for kesari flour in besan.

III. Testing adulteration ofr sugars & Preserves.

Test for extraneous matter, washing soda in sugars.

Test for artificial colour and chalk in jaggery.

Test for purity of honey.

IV. Testing adulteration of Beverages.

Test for chicory tamarind seed powder and starch in coffee powder.

Test for artificial colour, iron fillings in tea.

V. Testing adulteration of Miscellaneous products:

Test for powdered stone or chalk in common salt.

Test for non-permitted colour in laddus.

Test for rhodamine B in peppermint.

Test for colour in biscuits and ice candies.

Presence of saccharin in sweets.

Test for mineral oil in vinegar.

VI. Filing a complaint

VII. Forming a Food consumer club -Consumer awareness through KABP by creating brochure in Telugu and English focusing on house wives and students

VIII. Celebrate Consumer Day

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SEM - IVPAPER – VII FSM 401 (W)

FOOD MICROBIOLOGY

AIM:

CREDITS 4+1

To introduce to basics of food microbiology, contamination and spoilage of foods.

Objectives:

1. To teach basics of food microbiology, such as, organisms, contamination and spoilage in foods in theory and practicals.
2. To educate about food borne diseases and infections.
3. To educate about benefits of micro organisms.

UNIT – I

1. Introduction to Food Microbiology, Origin and scope.
2. General characteristics of Bacteria, Fungi, Virus, Protozoa and Algae.
3. microbiological Contamination of foods and different agents of contamination such as sewage, soil, water and air; contamination during handling and processing

UNIT – II

1. Food spoilage;; Nature; Intrinsic factors : [Nutrient content Ph and buffering capacity Redox potential Anti microbial barriers and constrains Water activity]. Extrinsic Factors [Relative humidity, Temperature and Gaseous atmosphere]Changes of spoilage; General appearance, Colour changes, Texture, Odour and Flavor, Chemical changes caused by Micro Organisms.
2. Growth curve Factors affecting growth of Micro Organisms. Temperature , moisture content, O-R potential, ,hydrogen ion concentration, nutrient content and inhibitory substances and biological structures and combined effects of factors affecting growth

UNIT – III

1. Contamination, Spoilage and preservation of Cereals and Cereal products; Sugar and Sugar products.
2. Vegetables and fruits; Eggs.
3. Canned foods; Miscellaneous foods.

UNIT – IV

1. Contamination, spoilage and preservation of Milk and Milk products.
2. Meat & Meat products, Fish and Sea foods; Poultry.
3. Beneficial effects of Micro Organisms; Fermentation of Indigenous food products, Economically important fermentations and other uses of Micro Organisms in Food industries.

Reference Books;

1. Food Microbiology – Frazier, W.C., Ed-4, Mc. Graw Hill – 2013.
2. Microbiology by John Garbult Essentials of Food Microbiology - Arnold International Student edition 1997.
3. Betty - c Hobbs & Diane Roberts – Food poisoning and food hygiene sixth edition by Arnold International Students edition – 1993.
4. Practical Food Microbiology & Technology – Mountnety Gould, Ed-3, Krieger Publishing Company, 1992.
5. Modern Food Microbiology – Jay J.H. CBS Publishers, 1990.
6. The Microbiological safety of processed foods – Growther, Marthi, Oxford and IBH Publishers Pvt. Ltd., 1988.
7. Basic food Microbiology – Banwart G.T., CBS Publishers, 1987.

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SEM – IV PAPER – VIII FSM 402 (W)

FOOD SAFETY MANAGEMENT

AIM:

CREDITS – 4 + 1

To introduce students the aspects of food safety and work safety.

Objectives:

1. To teach about toxins and their hazards in foods.
2. To educate about safety in work place.
3. To educate about sanitation and hygiene in food processing institutes.
4. To educate about HACCP, GAP GMP, GHP, TQM.

UNIT – I

1. Introduction: Common terms associated with FSM.' History and Necessity of Food Safety. Communicable diseases ; Microorganisms of importance to food safety; classification, The trail of Infection from Farm to Fork, signs and symptoms, prevention and control; Food born diseases; Bacterial, Fungal, Viral, Protozoa etc
2. Food safety measures in Food service establishments; Safety in procurement Handling, manufacturing and Storage, Management of Water safety.
3. G M Foods And Their Safety Issues ; Advantages And Disadvantages

UNIT – II

1. Naturally occurring toxins in foods,
2. Chemical toxins; Pesticides residues, Heavy metals, toxins from food contact materials, veterinary drug residues, Toxins of processing. Effect of toxins on Human beings.
3. Microbial toxins; Bacterial and fungal; Testing the food safety for toxins and chemical residues

UNIT – III

1. Food safety and Hygiene in tropics
2. Food Sanitation hygiene and safety of Food processing plants, equipment; cleaning methods, agents.
3. Health Hazards of personnel working in food industry; planning and implementation of training programme.

UNIT – IV

1. Assessment of microbiological quality of foods ; techniques used for analysis
2. HA CCP an approach to Food safety, **GAP**, GHP, TQM.
3. International and National standards for food safety.

Reference Books;

1. Betty - c Hobbs & Diane Roberts – Food poisoning and food hygiene sixth edition by Arnold International Students edition – 1993.
2. Food Toxicology Vol. I & II – Conn Conn.
3. Modern Toxicology Vol. I, II & III – Chaplin P.K. &Salunkhe D.K.
4. Quality Control for the food Industry Vol. I & II – A. Krammer.
5. Quality Control in Food Industry Vol. I, II & III – S.M. Hetschedoerfer.

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SEM – IV PAPER – VII - 1 FSM 451 (W) PRACTICALS

FOOD MICROBIOLOGY-1

1. Introduction
 - i. Use of Microscope
 - ii. Tools of Microbiologist

2. Study of Bacteria
 1. Simple staining
 2. Differential staining by jenson's modifications method

3. Study of Yeast
 1. Study of chemical reactions of yeast on starch.
 2. Study of culturing of Baker's Yeast.
4. Determination of detergent strength – Reidal-walker test.

5. Direct Microscopic count:
 1. Identification of Bacteria – Pickles, jams, jellies, squashes.
 2. Identification of Molds - Pickles, jams, jellies, squashes.

6. Study of Molds in foods – Bread, Coconut, Wheat etc.

7. Planning a training programme for laboratory staff and non teaching staff in the college work shop on food sanitation and hygiene with the help of resource person

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SEM - IV PAPER – VIII FSM 452 (W) PRACTICALS

FOOD MICROBIOLOGY- 2

1. Serial dilution techniques
2. Bacteriological analysis of water
3. Bacteriological Examination of preserved foods.
4. Bacteriological Examination of Nail swab.
5. Bacteriological Examination of Processing equipment.
6. Determination of fill of the can
7. Determination of water holding capacity of containers.
8. Estimation of Microbiology count based on Metabolism.
 - A. Dye reduction test
 - Methylene Blue
 - Resazurin test
 - 2, 3, 5 triphenyltetrazolium chloride.

thermostable nuclease test for staphylococcus aureus

- B. pH of Meat
- C. Catalase test.
9. Identification of Micro Organisms involved in food spoilage.
10. Beneficial Effects of Microorganisms; Fermentation

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SEM –VIPAPER –XI FSM 601 (W)FOOD ANALYSIS

AIM:

CREDITS - 3 + 1

To educate students about the analysis of various foods and their standardization.

Objectives:

1. To teach about sampling and preparation in food analysis.
2. To teach about physical and chemical methods, used for analysis of foods, such as, cereals, milk and milk products, fats and oils, food additives.

UNIT – I

1. Introduction to food Analysis; Food composition and Factors affecting food composition.
2. Sampling and Sample preparation; Selection of Sampling procedures; Factors that affect choice of sampling plan Risk in selection of a plan; Sampling procedures, Problems in Sampling, Preparation of samples.
3. Physical & Chemical properties of foods.

UNIT – II

1. Physical Methods of Food Analysis; Refractometry; Polarimetry specific Gravity Viscosity.
2. Food Rheology, Freezing point determination, Surface tension.
3. Electro analytical determination; Polarography.

UNIT – III – General Chemical Methods of Food Analysis;

1. Analysis of Moisture and Total solids.
2. Carbohydrate Analysis; Importance of Analysis, Methods of analysis for Mono Saccharides, Oligosaccharides, Polysaccharides; Structural and nonstructural, dietary fiber (brief outline).
3. Fat Analysis; Importance of Fat Analysis, Methods of Analysis (Analytical and instrumental) Fat characterization; its importance and Methods of analysis.

UNIT – IV

1. Protein Analysis Importance; Methods of Analysis, Protein separation and characterization.
2. Analysis of Vitamins; Importance, Methods of Analysis.

Analysis of Ash Importance; Analysis of minerals, importance; Methods of Analysis.

Reference Books;

1. Techniques of Food Analysis – Winton & Winton Allied Scientific Publishers, 1999.
2. Food Analysis – Pomeranz, CBS Publication.
3. The Chemical Analysis of Food & Food products – Marris and Jacob, CBS Publishers.
4. Chemical Analysis of Foods – Susanenielson, 2003.

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SEM - VIPAPER XII FSM [602] W

BASICS IN MANAGEMENT AND ACCOUNTING

AIM:

CREDITS - 3 + 1

To educate students about the basics of Management and Accounting.

Objectives

- To provide knowledge in the Basic Principles of Management
- To enable the students to estimate the Working Capital Requirement
- To acquaint the students with the techniques of Inventory Management

Unit-I Principles of Management

Management-Definition-Administration Vs. Management-Levels of Management-Principals and Functions of Management-Organization-Definition-Line-Staff Functional Organization Structure-Concepts of Authority, Power, Delegation-Leadership Styles-Leadership Skills, Powers of Leader – Constraints over Managerial Performance (Theory only)

Unit-II Working Capital Management

Meaning-Objectives-Operating Cycle & Estimating Working Capital Requirement (Including Problems)-Cash Management-Receivables Management (Theory only)

Unit-III Financial Accounting

Definition of Accounting-Book Keeping-Accounting Concepts and Conventions-Accounting Cycle-Rules of Double Entry-Journalizing-Posting to Ledgers-Trading and Profit and Loss Account-Balance Sheet (Theory only)

Unit-IV Cost Accounting

Definition of Cost Accounting-Cost Concepts-Cost Classification-Elements of Cost-Cost Sheet(Including Problems)-Procedure for Purchasing of Materials-Bin Card-Stores Ledgers Pricing of Issues (problems on LIFO and FIFO Method)-Techniques for Inventory Management-ABC-EOQ-Stock Levels-Just in Time (Theory only)

Suggested Readings

1. Principles & Practice of Management/T.N. Chandra, Dhanpat Rai & Sons, New Delhi, 6th edition 2000.
2. Finance Management, Theory & Practice-Prasanna Chandra.
3. Modern Accounting-A Mukherjee and M.Haniff.
4. Cost and Management Accounting: Prof. Prashanta Athma, Himalaya Publishing House.
5. Financial Accounting : Prof. Prashanta Athma, Himalaya Publishing House.
6. Financial Accounting-S.P. Jain and K.L. Narang, Kalyani Publications.
7. Principles & Practice of management-L.M. Prasad, Sultan Chand Publications, New Delhi, 6th edition 2001.
8. Cost and Management Account : Jain and Narang, Kalyani Publications.
9. Cost and Management Accounting : MN Arora, Himalaya Publications.

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SEM - VIPAPER – XI FSM 651 (W) FOOD ANALYSIS – 1

1. Analysis of Moisture content of different foods.
 1. Hot air oven methods.
 2. Infra-red Moisture balance.

2. Estimation of Ash for different food samples.
 1. Total Ash, Water Soluble, Water insoluble.
 2. Acid soluble Ash, Acid insoluble Ash.

3. Analysis of Sugar and Sugar related products
 1. Estimation of Sugar in milk by Iodometry
 2. Estimation of Reducing Sugar in Honey by Berlin Institute Method.
 3. Fructose – Glucose ratio.

4. Analysis of cereals and their products.
 1. Alcoholic Acidity
 2. Crude Glutene
 3. Diastase Activity
 4. pH Value
 5. Bleach value
 6. Dough raising capacity

5. Analysis of fruits and fruit products
 1. Color
 2. Firmness
 3. Total pectin as Capectate in fruit products

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SEM – VI PAPER – XII FSM 652 (W)

FOOD ANALYSIS – 2

1. Analysis of Fat & Oils

1. Acid Value
2. Iodine value
3. Peroxide Value
4. Saponification value
5. Melting point
6. TBA test

2. Analysis of Milk & Milk products

1. Titrable Acidity of Milk, Butter, Cream
2. Aldehyde figure in Milk
3. Total solids in Milk
4. Specific gravity
5. Proteins by Titrimetry

3. Analysis of foods for the presence of common Additives.

A Confirmation tests for Vegetable colours in foods.

1. Caramel
2. Cochineal
3. Turmeric
4. Annatto
5. Chlorophyll
6. Beet Dye
7. Lycopene
8. Beta carotene
9. Anthocyanin
10. Tannins
11. Phenols
12. TBHQ
13. Non enzymatic browning

B. Synthetic Sweetening Agent - Saccharin

C. Estimation of Common Additives.

1. Sodium Benzoate
2. Sodium bi-carbonate.
3. Sulphur Dioxide by modified ripper titration method
4. NaCl in food products

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SEM- V PAPER – IX[B] retail food vending FSM501-B [W]

AIM

Credits 3+ 1

To Teach the Techniques Of Retail Food Vending

Objectives:

1. Identify the different areas and segments of the food service industry
2. Explore foodservice associations and organizations

UNIT I.

The evolution of retail in India ; Drivers of retail change in India ; Changing income profiles, Changes in consumption patterns ; Food and food services ; Challenges and threats to retail development in India ; Bargaining power of suppliers and buyers ; Types and Styles of Foodservice Operations, Commercial places of business, Transportation and receiving, Certification of workers, Grocery stores, convenience stores, restaurants, clubs, hotels, HACCP, Street Vending.

UNIT – II; -

Current Food Trends; Coffee clubs, Tea corners, Soda planets, Tiffin centres, Chat foods, desert delights, milk parlours, seasonal sizzlings and New food trends.types of beverages and their importance; status of beverage industry in India;

Manufacturing technology for juice-based beverages; synthetic beverages; technology of still, carbonated, low-calorie and dry beverages; isotonic and sports drinks; role of various ingredients of soft drinks, carbonation of soft drinks,

Soups—classification Stocks, preparation, types, use Preparation of ideal soup,

Specialty beverages based on tea, coffee, Tea/ coffee - Types, use, preparation, manufacture (explain only flow chart), types, Preparation of ideal soup Tea/ coffee--preparation if ideal tea, coffee, Iced Tea, lemon Tea, Masala tea, Green Tea, Irish Coffee, Mocha, Cappuccino, Expresso cocoa, ,

UNIT IV :- DAIRY TECHNOLOGY:

Present status of milk & milk products in India and Abroad; Composition of milk, procurement, transportation and processing of milk, Special milks such as flavoured, sterilized, recombined & reconstituted toned & double toned. Condensed milk- methods of manufacture; dried milk, methods of manufacture of skim & whole milk powder. Cream-

classification, composition, evaluation, defects in cream; Butter- composition, classification, methods of manufacture, theories of churning, evaluation, defects in butter.

Indigenous milk products - Present status, method of manufacture of yoghurt, dahi, khoa, burfi, kalakand, gulabjamun, rosogolla, srikhand, chhana, paneer, ghee, lassietc; Ice cream- Definition, composition and standards, nutritive value, classification, methods of manufacture, evaluation, defects in ice cream, and technology aspects of softy, Cheese: composition, classification, methods of manufacture, cheddar, Gouda, cottage and processed cheese, evaluation, defects in cheese

References:

1. Banerjee B. 2002. Tea Production and Processing. Oxford Univ. Press. Minifie BW.
2. Chocolate, Cocoa and Confectionery Technology. 3rd Ed. Aspen Publ. NIIR. 2004.
3. Handbook on Spices. National Institute of Industrial Research Board, Asia Pacific Business Press Inc.
4. Coffee Processing Technology. Sivetz M & Foote HE. 1963. AVI Publ.
5. Technology of Indian Milk Products. Aneja RP, Mathur BN, Chandan RC & Banerjee AK. 2002 Dairy India Publ.
6. Outlines of Dairy Technology. De S. 1980. Oxford Univ. Press.
7. Fluid Milk Industry. Henderson JL. 1971. AVI Publ.
8. Fundamentals of Dairy Technology - Theory & Practices. Rathore NS et al. 2008 Himanshu Publ
9. Milk and Dairy Products. Spreer E. 1993
10. Dairy Technology. Marcel Dekker. Walstra P. 1999
11. Dairy Science and Technology. Marcel Dekker. Walstra P. (Ed.). 2006 2nd Ed. Taylor & Francis.
12. Fundamental of Dairy Chemistry. Web BH, Johnson AH & Lford JA. 1987. 3rd Ed. AVI Publ.
13. Handbook of Brewing. Hardwick WA. 1995
14. Handbook of Food and Beverage Fermentation Technology. Marcel Dekker. Hui YH. et al 2004
15. Handbook of Brewing. Marcel Dekker. Priest FG & Stewart GG. 2006 2nd Ed. CRC.
16. Commercial Wine Making - Processing and Controls. Richard P Vine. 1981. AVI Publ.
17. Beverages: Technology, Chemistry and Microbiology Varnam AH & Sutherland JP. 1994.
18. Beverages: Carbonated and Non Carbonated. Chapman & Hall. Woodroof JG & Phillips GF. 1974 AVI Publ.

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SEM- V PAPER – IX[B] retail food vending FSM551-B [W]

1. Detection of microbial quality and adulteration in spices;
2. Storage and packaging of spices;
3. Visit to spice processing Units.
4. Study on basics of reception of milk at the plant; platform tests in milk;
5. Estimation and fat and SNF in milk; Operation of LTLT & HTST Pasteurization;
6. Preparation of special milks;
7. Cream separation & standardization of milk;
8. Preparation and evaluation of table butter,
9. Ice-cream,
10. Cheese
11. Indigenous milk product such as Khoa, Chhana, Paneer, Ghee, Rosogolla, GulabJamun, Shrikhand, Lassi, Burfi etc.;
12. Visit to dairy plants.
13. Running any of the following vending units:
 - a) Coffee Club
 - b) Tea corner
 - c) Soda planets
 - d) Tiffin Centers
 - e) Chat streets
 - f) Curry points
 - g) Desert delights.
 - h) Dairy delights.
 - i) Seasonal Sizzlings.