FACULTY OF SCIENCES

Syllabus

Of

Food Science and Quality Control

For

B.Sc. Medical (Semester II,IV&VI)

(12+3 System of Education)

Session: 2020-21

The Heritage Institution

KANYA MAHA VIDYALAYA

Kanya MahaVidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATION OF THREE YEAR DEGREE PROGRAM

Bachelor of Science (Medical) Semester-II

(SESSION 2020-21)

Bachelor of Science (Medical) Semester II									
Course Code		**Course name**	**Course Type**	**Marks**					**Examination time (in Hours)**
				Total	**Paper**	**Ext.**		**CA**	
						L	**P**		
BSMM-2255	I	Food Science and Quality Control (Vocational) (Food Plant Hygiene & Sanitation)	E	100	Food Plant Hygiene & Sanitation	60	-	20	3
	P				Practical- Food Plant Hygiene & Sanitation	-	20		3

B.Sc Medical (Session 2020-21)

SEMESTER–II

Course Code: BSMM-2255

Course Title: Food Science and Quality Control (Vocational) (FOOD PLANT HYGIENE & SANITATION)

(THEORY)

Course Outcomes: After passing this course the student will be able to:

CO1: Understand hygiene, sanitation and importance of personal hygiene of food handler in food industries.

CO2: Learn various methods, basic principles and practices of cleaning and sanitation in food processing industries.

CO3: Understand requirements of waste management, waste disposal and treatment in food industries.

CO4: Understand requirements of water utilization and hygiene of water used for processing.

Bachelor of Science

(Medical)

(SEMESTER–II)

(Session 2020-21)

Course Code: BSMM-2255

Course Title: Food Science and Quality control(Vocational) (FOOD PLANT HYGIENE & SANITATION) (THEORY)

Examination Time: 3 Hours

Max. Marks: 100
Theory Marks: 60
Practical Marks: 20
CA: 20

Instructions for the Paper Setter: Eight questions of equal marks(12 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT - I

Importance of personal hygiene of food handler- habits, clothes, illness, education of handler in handling and service. Cleaning agents and disinfectants.Uses of different cleaning and sanitizing agents.GLP, GHP, CIP and COP.

UNIT - II

Cleaning methods– sterilization, disinfection, heat & chemicals, chemical tests for sanitizer strength.

UNIT - III

Food sanitation- principles & methods, control and inspection, sanitation in fruits & vegetables industry, cereals industry, dairy industry, meat, egg & poultry units.

UNIT - IV

Control of infestation, rodent control, vector control, use of pesticides, hygiene of water used for processing, analysis of total plate count and ecoli, planning & implementation of training programmes for health personnel, waste disposal and treatment.

Books Recommended:

1. Principles of Food Sanitation by Norman G. Marriott
2. Food Poisoning and Food Hygiene by Hobbs, B. C. and R. J. Gilbert
3. Quantity Food Sanitation by Longree K
4. Environmental Sanitation in India by Kawata K

B.Sc Medical

(Session 2020-21)

SEMESTER–II

Course Code: BSMM-2255

FOOD PLANT HYGIENE & SANITATION

(PRACTICAL)

Time: 3 hours **Max. Marks: 20**

Instructions for the practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya MahaVidyalaya, Jalandhar.

List of Practicals:

1. Sterilization of equipments used in the laboratory by using heat and chemicals.
2. Determination of B.O.D& C.O.D
3. Determination of sanitary status of plant equipment.
4. Chlorination of water.
5. To study the bacteriology of water.
6. Determination of Total dissolved solids (TDS) of water.
7. Determination of Hardness of water.
8. Determination of alkalinity and acidity of water.
9. Determination of organic matter of water.
10. Determination of chlorides and sulphates in water.

Kanya MahaVidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATION OF THREE YEAR DEGREE PROGRAM

Bachelor of Science (Medical) Semester-IV

(Session-2020-2021)

Bachelor of Science (Medical) Semester IV									
Course Code		**Course name**	**Course Type**	**Marks**					**Examination time (in Hours)**
				Total	**Paper**	**Ext.**		**CA**	
						L	**P**		
BSMM-4255	I	Food Science and Quality Control (Vocational) (Quality Assurance)	E	100	Quality Assurance	60	-	20	3
	P				Practical- Quality Assurance	-	20		3

Bachelor of Science

(Medical)

SEMESTER–IV

(Session 2020-2021)

COURSE CODE: BSMM-4255

Course Title: Food Science and Quality Control (Vocational) (QUALITY ASSURANCE)

(THEORY)

Course Outcomes: After passing this course the student will be able to:

CO1: Understand principles and methods of quality control and quality attributes(Colour, texture, size, shape and flavour).

CO2: Understand principles of HACCP and GMP.

CO3: Understand the principles of sensory evaluation, sampling.

CO4: Learn food laws and regulations (FSSAI, PFA, AGMARK, FPO, MFPO, BIS, ISO)

Bachelor of Science

(Medical)

(SEMESTER–IV)

(Session 2020-21)

COURSE CODE: BSMM-4255

Course Title: Food Science and Quality Control (Vocational) (QUALITY ASSURANCE)

(THEORY)

Examination Time: 3 Hrs.

Max. Marks: 100
Theory Marks: 60
Practical Marks: 20
CA: 20

Instructions for the Paper Setter: Eight questions of equal marks(12 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT-I

1. Objectives, importance and functions of quality control
2. Quality attributes

UNIT-II

3. Methods of quality assessment of food materials: fruits, vegetables, cereals, dairy products, meat, egg and processed products.
4. Color: Definition, importance, different color measuring instruments used in food industries.
5. Texture: Definition, importance, different texture analyzing instruments used in food industries to analyze texture.

UNIT-III

6. Sampling, specifications of raw materials and finished products
7. Sensory evaluation.

UNIT-IV

8. Concept of HACCP and GMP.
9. Food Laws and Regulations- FSSAI,AGMARK, FPO, PFA, MFPO, BIS, ISO.

Recommended Books:

1. Quality Control for Food Industry by A. Kramer and B.A. Twigg
2. Handbook of analysis and quality control for fruits and vegetable products by S. Ranganna
3. Food Science by N.N. Potter

B.Sc Medical (Session 2020-21)

SEMESTER–IV

COURSE CODE: BSMM-4255

QUALITY ASSURANCE

(PRACTICAL)

Time:3hrsMax. Marks: 20

Instructions for the practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE office, Kanya MahaVidyalaya, Jalandhar.

List of Practicals:

1. Determination of acidity and pH of milk.
2. Platform tests for determining the quality of milk.
3. Determination of cooking quality of rice.
4. Determination of iodine value of oil/fat.
5. Determination of saponification value of oil/fat.
6. Determination of reducing and non-reducing sugars.
7. Determination of interior and exterior quality of eggs.
8. Determination of alcoholic acidity of flour.
9. Adulterants in milk, cereals, oils and fats and their detection.
10. Cut out analysis of canned fruits and vegetable.

Kanya MahaVidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATION OF THREE YEAR DEGREE PROGRAM

Bachelor of Science (Medical) Semester-VI

(SESSION 2020-21)

Bachelor of Science (Medical) Semester VI									
Course Code		**Course name**	**Course Type**	**Marks**					**Examination time (in Hours)**
				Total	**Paper**	**Ext.**		**CA**	
						L	**P**		
BSMM-6255	I	Food Science and Quality Control (Vocational) (Food plant layout and management)	E	100	Food plant layout and management	60	-	20	3
	P				Practical- Food plant layout and management	-	20		3

Bachelor of Science

(Medical)

SEMESTER–VI

(Session 2020-2021)

COURSE CODE: BSMM-6255

Course Title: Food Science and Quality Control (Vocational) (Food Plant layout and management)

(THEORY)

Course Outcomes: After passing this course the student will be able to:

CO1: Understand the importance of plant layout and learn how to set up the proper plant layout to reduce the production cost and increase the productivity.

CO2: Learn how market research helps to understand the consumers,their needs and their satisfaction level.

CO3: Understand the societal changes and their impact on food consumption trends.

CO4: Learn about different types of food products and study the different steps involve in the product development.

Bachelor of Science

(Medical)

(SEMESTER–VI)

(Session 2020-21)

Course Code:BSMM-6255

Course Title: Food Science aand Quality Control(Vocational) (FOOD PLANT LAYOUT & MANAGEMENT)

(THEORY)

Examination Time: 3 Hrs.

Max. Marks: 100
Theory Marks:60
Practical Marks: 20
CA:20

Instructions for the Paper Setter: Eight questions of equal marks(12 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT-I

Importance of a plant layout selection of site and layouts of different food industries, selection of equipments, machinery and building material, selection and planning of manufacturing process and service facilities, maintenance and replacement, depreciation of machinery, management set up in a plant.

UNIT-II

Market and Consumer Research.Economic, Psychological, Anthropological and Sociological dimensions of food consumption pattern.Food situation in India and outside.

UNIT-III

Needs and types of Food consumption trends. Trends in social change and its role in diet pattern.Using social trends as a framework in new product innovation. Trapping the unconventional post-harvest losses and prospects of food processing for export.

UNIT –III

Traditional foods-Status and need for revival in the context of westernized non-traditional foods, urbanization and such factors. Product development: Primary Processing, Secondary Processing, Types of products e.g. Quick cooking, fast foods, fabricated food , convenience foods.

Recommended Books:

1. Principle of Food Sanitation by Marriott, 5th ed., 2006, CBS Publishers, New Delhi.
2. Food Processing Waste Management by Green JH and Kramer A, 1979, AVI Publishers, USA.
3. Food Science by Potter NN, 5th ed., 2006, CBS Publishers, New Delhi.

B.Sc Medical

(Session 2020-21)

SEMESTER–VI

COURSE CODE: BSMM-6255

FOOD PLANT LAYOUT AND MANAGEMENT

(PRACTICAL)

Time:3hrsMax. Marks: 20

Instructions for the practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE office, Kanya MahaVidyalaya, Jalandhar.

List of Practicals:

1. Calculation of depreciation and processing costs.
2. Preparation of layout and Process diagram of potato chips manufacturing plant.
3. Preparation of layout and Process diagram of jam/marmalade manufacturing plant.
4. Preparation of layout and Process diagram of bread making plant.
5. Preparation of layout and Process diagram of dairy industry.
6. Preparation of layout and Process diagram of wine making unit.
7. Preparation of layout and Process diagram of modern slaughter plant.
8. Preparation of layout and Process diagram of confectionary unit.
9. Determination of sanitary status of plant equipment.
10. Visit to various food industries.

FACULTY OF LIFE-SCIENCES

Syllabus

Of

Microbiology

for

B.Sc. Medical (Semester II, IV & VI)

(12+3 System of Education)

Session: 2020-21

The Heritage Institution

KANYA MAHA VIDYALAYA

JALANDHAR

KanyaMahaVidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATION OF THREE YEAR DEGREE PROGRAM

Bachelor of Science (Medical) Semester-II

(SESSION 2020-21)

Bachelor of Science (Medical) Semester II									
Course Code		**Course name**	**Course Type**	**Marks**					**Examination time (in Hours)**
				Total	**Paper**	**Ext.**		**CA**	
						L	**P**		
BSMM-2343	I	Microbiology (Basic Food Microbiology)	E	100	Basic Food Microbiology	60	-	20	3
	P				Practical- Basic Food Microbiology	-	20		3

B.Sc Medical (Session 2020-21)

SEMESTER–II

Course Code: BSMM-2343

Course Title: BASIC FOOD MICROBIOLOGY

(THEORY)

Course Outcomes:

After passing this course the student will be able to:

CO1: Understand the intrinsic and extrinsic factors affecting the growth of various microorganisms in foods and microorganisms important in food microbiology.

CO2: Learn about the origin and preparation of fermented foods (bread, dosa, idli, warri, tempeh, miso).

CO3: Understand the Principles of food preservation and various methods of preservation (high temperature, low temperature, drying, chemical preservatives) and applications of prebiotics and probiotics.

CO4: Understand the spoilage of food (milk and milk products, cereal and cereal products, vegetable and fruits, meat and meat products, canned foods) and food poisoning and infection.

Bachelor Of Science

(Medical)

(SEMESTER–II)

(Session 2020-21)

Course Code: BSMM-2343

Course Title: BASIC FOOD MICROBIOLOGY

(THEORY)

Time: 3 Hrs.

Max. Marks: 100
Theory Marks: 60
Practical Marks: 20
CA: 20

Instructions for the Paper Setters: Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT–I

1. Food as a substrate for microorganisms, intrinsic and extrinsic factors affecting the growth of various microorganisms in foods. Microorganisms important in food microbiology–bacteria, yeasts and molds, sources of contamination in foods.

UNIT–II

2. Fermented foods, origin of fermentation as a method of preparing indigenous foods, bread, dosa, idli, warri, tempeh, miso

UNIT–III

3. Principles of food preservation and spoilage, asepsis, anaerobic conditions, aseptic packaging, preservation methods, high temperature, low temperature, drying, chemical preservatives. Applications of prebiotics and probiotics.

UNIT–IV

4. Spoilage of various milk and milk products, cereal and cereal products, vegetable and fruits, meat and meat products, canned foods. Food poisoning and food infection. *Staphylococcal*, *Clostridium* and *Salmonella* intoxications.

Books Recommended:

1. Frazier. W.C. and Westhoff, D.C. 2006, 26th edition, Food Microbiology, Tata McGraw Hill Publishing Co., Ltd., New Delhi.
2. Banwart, G.J., 2012, Basic Food Microbiology, Springer Verlag, New Delhi.
3. Powar, C.B. and Dagniwala, H.F. 2012, General Microbiology Volume II. Himalaya Publishing House, New Delhi. 128

B.Sc Medical

(Session 2020-21)

SEMESTER–II

Course Code: BSMM-2343

Course Title: BASIC FOOD MICROBIOLOGY

(PRACTICAL)

Time: 3 hrsMarks: 20

Instructions for the practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya MahaVidyalaya, Jalandhar.

LIST OF PRACTICALS

1. To enumerate the total microbial cells in a suspension by serial dilution and pour plating.
2. To enumerate the total bacteria in milk by direct microscopic count.
3. To measure the size of microbial cells by ocular micrometer.
4. To study the morphology of bacteria, yeasts and molds.
5. To check the bacteriological quality of raw milk by methylene blue reduction test.
6. Baking of bread and making of dhokla&idli.
7. To study the spoilage of microorganisms present in spoiled bread and raw milk.

KanyaMahaVidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATION OF THREE YEAR DEGREE PROGRAM

Bachelor of Science (Medical) Semester-IV

(Session 2020-21)

Bachelor of Science (Medical) Semester IV									
Course Code		**Course name**	**Course Type**	**Marks**					**Examination time (in Hours)**
				Total	**Paper**	**Ext.**		**CA**	
						L	**P**		
BSMM-4343	I	Microbiology (Microbial Ecology)	E	100	Microbial Ecology	60	-	20	3
	P				Practical- Microbial Ecology	-	20		3

B.Sc Medical

(Session 2020-21)

SEMESTER–IV

Course Code: BSMM-4343

Course Title: MICROBIAL ECOLOGY

(THEORY)

Course Outcomes:

After passing this course the student will be able to:

CO1: Understand the Diversity of various microbial habitats.

CO2: Understand the various microbial interactions and competition for survival in nature (for nutrients, space and oxygen).

CO3: Understand the role of microorganisms in geochemicals cycles, concept of microbial toxins, biofertilizers and bioinsecticides.

CO4: Understand the microbiological aspects of pollution and concept of BOD and COD, effluent treatment, bioremediation and bioleaching.

B.Sc Medical

(Session 2020-21)

SEMESTER–IV

Course Code:BSMM-4343

Course Title: MICROBIAL ECOLOGY

(THEORY)

Time: 3 Hrs. **Max Marks:100**

Theory Marks: 60

Practical Marks: 20

CA: 20

Instructions for the Paper Setters: Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT–I

1. Diversity of microbial habitats: Environmental selecting factors:- physical, chemical and biological types of microbial habitats:- atmospheric, aquatic and terrestrial environments.

UNIT–II

2. Microbial interactions, antagonism, commensalism, symbiosis, parasitism miscellaneous associations in nature. Competition for survival in nature (for nutrients, space, oxygen).

UNIT–III

3. Role of microorganisms in geochemicals cycles: Carbon cycle, nitrogen cycle, phosphorus cycle and sulphur cycle, microbial toxins in the environment: Types of Microbial toxins, ecological consequences of microbial toxins as insecticidal agents, bioinsecticides, biofertilizers.

UNIT–IV

4. Concept of BOD and COD, Sewage and effluent treatment by primary, secondary and tertiary methods. Role of microbes in bioremediation of persistent pollutants and bioleaching of metals.

Books Recommended: (Edition of books updated)

1. Edmonds, P., 1978, Microbiology: An Environmental Perspective, MacMillan Publishing Co., Inc., New York.
2. Powar C.B. and Danginwala, H.F., 2017, General Microbiology, Volume II, 2nd ed. Himalaya Publishing House, New Delhi.
3. Sharma, P.D., 2010, Microbiology, Rastogi Publication, Meerut.
4. Pleczar, M.J., Chan, E.C.S. and Krieg N.R., 2011 (reprint), Microbiology, 2nd ed. Tata McGraw Hill Publishing Co., Ltd., New Delhi.
5. Patel, A.H., 2011, Industrial Microbiology, 2nded. Macmillan India Ltd., Delhi.

B.Sc Medical

(Session 2020-21)

SEMESTER–IV

Course Code: BSMM-4343

Course Title: MICROBIAL ECOLOGY

(PRACTICAL)

Time: 3 hrsMarks: 20

Instructions for the practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya MahaVidyalaya, Jalandhar.

LIST OF PRACTICALS

1. Isolation and enumeration of fungi from air and soil by pour plating and spread plating.
2. Determination of dissolved oxygen content (DO) of the given water sample by Titrimetric method.
3. Determination of COD of the given water sample by Titrimetric method.
4. To conduct bacteriological examination of water sample by MPN method.
5. To isolate symbiotic nitrogen bacteria from root nodules.
6. To perform crowded plate method for studying microbial interactions.
7. Determination of B.O.D.

KanyaMahaVidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATION OF THREE YEAR DEGREE PROGRAM

Bachelor of Science (Medical) Semester-VI

(Session 2020-21)

Bachelor of Science (Medical) Semester VI									
Course Code		**Course name**	**Course Type**	**Marks**					**Examination time (in Hours)**
				Total	**Paper**	**Ext.**		**CA**	
						L	**P**		
BSMM-6343	I	Microbiology (Applied Microbiology-II)	E	100	Applied Microbiology-II	60	-	20	3
	P				Practical- Applied Microbiology-II	-	20		3

B.Sc Medical

(Session 2020-21)

SEMESTER–VI

Course Code: BSMM-6343

Course Title: APPLIED MICROBIOLOGY-II

(THEORY)

Course Outcomes:

After passing this course the student will be able to:

CO1: Understand the processing and microbiology of different fermented foods.

CO2: Understand the role of yeast in fermentation process and the production of different industrial chemicals.

CO3: Understand the role of microorganisms in preparation of alcoholic beverages and industrial enzymes.

CO4: Understand the role of microorganisms in the production processes of vitamins, amino acids and antibiotics.

B.Sc Medical

(Session 2020-21)

SEMESTER–VI

Course Code:BSMM-6343

Course Title: APPLIED MICROBIOLOGY-II

(THEORY)

Time: 3 Hrs.

Max Marks:100
Theory Marks: 60
Practical Marks: 20
CA: 20

Instructions for the Paper Setters: Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

UNIT-I

1. Fermentation Process of Fermented Foods: Fermented cereal, legume and milk products. Microbiology of natural fermentation. Sauerkraut, Yoghurt, Soya sauce, Cheese.

UNIT-II

2. Microbial Cell as Fermentation Products: Baker's and brewer's yeast, single cell protein, mushroom farming. Production of industrial chemicals: Acetic acid, Citric acid, Acetone and Butanol.

UNIT-III

3. Production of alcoholic Beverages: Beer, wine and distilled beverages – Whisky, Brandy, Vodka, Gin production and applications of industrial enzymes: Amylases, Proteases, immobilization of enzymes.

UNIT-IV

4. Vitamins and Amino acids production by Microorganisms: Riboflavin (B2) and Cyanocobalamin (B12), Glutamic acid. Production of antibiotics: Penicillin and Streptomycin.

Books Recommended:

1. Read, G. 1982. Prescott and Dunn, *Industrial Microbiology*.CBS Publishers & Distributers, New Delhi.
2. Casida, L.E. 1991. *Industrial Microbiology*. Wiley Eastern Ltd., New Delhi.
3. Patel, A.H. 1984. *Industrial Microbiology*. Macmillan India Ltd., Delhi.
4. Trevan, M.D. Saffey, S., Goulding, K.H. and Stanberry, P. 1988. *Biotechnology: The Biological Principles*, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
5. Wiseman, A. 1995. *Handbook of Enzyme Biotechnology*. Ellis Harwood Ltd., London.
6. Wood, J.B.B., 1998. *Microbiology of Fermented Foods*, Volumes 1 and 2, Blackie Academic and Professional, London.
7. Power C.B. and Dagniwala, H.F.1992. *General Microbiology*. Volume-2. Himalaya Publishing House, New Delhi.

B.Sc Medical

(Session 2020-21)

SEMESTER–VI

Course Code: BSMM-6343

Course Title: APPLIED MICROBIOLOGY-II

(PRACTICAL)

Time: 3 hrsMarks: 20

Instructions for the practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya MahaVidyalaya, Jalandhar.

LIST OF PRACTICALS

1. Production of amylases and proteases in liquid medium using the selected organisms.
2. Assay of various crude enzymes preparations
    a. Amylase
    b. Protease
3. Production of alcohol from molasses and cereal grains.
4. Immobilization of microbial cells and enzyme preparations by calcium alginate entrapment method.
5. Comparison of submerged and solid state fermentation techniques for amylase production.
6. To study the production of wine and vinegar.
7. To study the kinetics of growth of yeast in batch/continuous culture.