



CVM UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: Master of Technology (Food Technology)

Semester: 3

Course Code: 202380302

Course Title: Enzymes in Food Processing

Course Group: Program Elective V

Course Objectives:

To develop an understanding of enzymes useful in food processing technology with respect to their applications in commodity technologies

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
3	0	2	4	50/20	50/20	25/10	25/10	150/60

* J: Jury; V: Viva; P: Practical

Detailed Syllabus

Sr.	Contents	Hours
1	Enzymes Introduction, classification, properties, characterization; Enzyme kinetics-enzyme concentration, substrate concentration, environment conditions and enzyme immobilization; Applications of enzymes in food processing: commercialization of enzyme processes, alternative method to use the enzymes, types of reaction; Sources of enzymes, legal and safety implications	9
2	Enzymes in dairy industry Enzymes in milk preservation, lactose hydrolysis; Use of enzymes for determining milk quality; enzymes in cheese manufacturing: Endogenous microbial enzymes, exogenous enzymes, Coagulant technology, enzymes in cheese preservation	6
3	Enzymes in beverage Application of enzymes in tea and cocoa processing; Application of enzymes in alcoholic beverages as beer, whisky, wine and ciders. Role of the enzymes in fruit juice production; factors affecting the enzymatic activity; Enzymatic clarification of fruit juices, factors affecting the clarity of fruit juices.	8



CVM
UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

4	Enzymes in baking industry Introduction, Enzymes for baking industry; Use of the proteases, lipases and other enzymes in baking industry; Starch degrading enzymes: sources, analysis and application of starch degrading enzymes; Hemicellulase: sources, analysis and application	8
5	Enzymes in the processing of fats and oils Specificity, stability and application of lipases and related enzymes; Role of enzymes in hydrolysis of triglycerides, interesterification and randomisation	7

List of Practicals / Tutorials:

1	Determination of alpha amylase activity
2	Effect of pH on alpha amylase activity
3	Effect of substrate concentration on alpha enzyme activity
4	Effect of temperature on enzymatic activity
5	Study of sucrose hydrolysis by yeast β -Fructofuranosidase
6	Estimation of lipase enzyme activity
7	Detection of enzymes presence in given solution
8	Preparation of clarified fruit juice by pectinase
9	Comparative study of enzyme aided and centrifuged clarified fruit juices
10	Effect of enzyme incorporation on fermented bread

Reference Books:

1	Flickinger MC & Drew SW. 1999. <i>Encyclopedia of Bioprocess Technology</i> . A Wiley- Inter Science Publ.
2	Kruger JE. <i>et al.</i> 1987. <i>Enzymes and their Role in Cereal Technology</i> . American Association of Cereal Chemists Inc.
3	Nagodawithana T & Reed G. 1993. <i>Enzymes in Food Processing</i> . Academic Press. Tucker GA & Woods LFJ. 1991. <i>Enzymes in Food Processing</i> .
4	Whitehurst R & Law B. 2002. <i>Enzymes in Food Technology</i> . Blackwell Publ.



CVM UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

Supplementary learning Material:

1	History of Enzymology with Emphasis on Food Production in Handbook of Food Enzymology by <i>Poul Børge Poulsen, Klaus Buchholz</i>
2	Enzyme Science and Engineering - https://nptel.ac.in/courses/102/102/102102033/
3	Enzymes: Catalytic and Regulatory strategies - https://nptel.ac.in/content/storage2/courses/102101007/downloads/PPT/LEC-07-PPT.pdf
4	https://www.foodenzymeinstitute.com/content/Why-Food-Enzymes-are-Important.aspx

Pedagogy:

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Industrial/ Field visits
- Course Projects

Internal Evaluation:

The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Simulation, Model making, Case study, Group activity, Seminar, Poster Presentation, Unit test, Quiz, Class Participation, Attendance, Achievements etc. where individual component weightage should not exceed 20%.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks						R: Remembering; U: Understanding; A: Application, N: Analyze; E: Evaluate; C: Create
R	U	A	N	E	C	
30	35	15	15	05	-	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.



CVM
UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Ability to explain the enzyme properties and enzyme kinetics	30
CO-2	Understand the effects of different parameters on enzyme activities	25
CO-3	Ability to have the knowledge of enzyme applications in food processing industries	45

Curriculum Revision:	
Version:	2.0
Drafted on (Month-Year):	June-2022
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June-2025