## Frequently asked questions (FAQs)

Q1: What are enzymes?

Enzymes are biological catalysts that promote most of the biochemical reactions which occur in the cell. As is typical for catalysts they speed up biochemical reactions without being consumed in the process.

Q2. Write a short note on different classes of enzymes?

Enzymes are classified into six classes:

Oxidoreductases: Transfer of electrons from one substrate molecule to another (e.g., dehydrogenases, reductases, oxidases).

Transferases: Transfer of functional group from one substrate molecule to another (e.g., glycosyl transferases, acetyl transferases and aminotransferases).

Hydrolases: Transfer of functional group from substrate to water (e.g., glycoside hydrolases, peptidases, esterases).

Lyases: Elimination of functional group from substrate with the formation of double bonds (e.g., pectate lyases break glycosidic linkages by beta-elimination).

Isomerases: Transfer of groups from one position to another in the same molecule (e.g., glucose isomerase).

Ligases: Addition of function group to substrate usually coupled

with ATP hydrolysis (e.g., glycine – tRNA ligase).

Q3: What is rennet?

Rennin is a mixture of chymosin and pepsin obtained mainly from animal and microbial sources and used for coagulation of milk in the first stage of cheese production.

Q4. Write a short note on Glutein?

Gluten is a combination of proteins that forms a large network during dough formation. This network holds the gas in during dough proofing and baking. The strength of this gluten network is therefore extremely important for the quality of all bread raised using yeast. Enzymes such as hemicellulases, xylanases, lipases and oxidases can directly or indirectly improve the strength of the gluten network and so improve the quality of the finished bread. Q5. Write a short note on enzymes involved in fats and oils processing?

Lipases are a ubiquitous class of enzymes which catalyze hydrolysis, esterification (synthesis), and transesterification (group exchange of esters). These enzymes are involved in fat hydrolysis, flavor development in dairy products, transesterification of fats and oils and production of chiral organic compounds. These are produced by Candida sp., Staphylococcus sp., and Geotrichum sp. The other type of the enzyme is 1,3-specific lipase which releases fatty acids

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from 1,3 positions and preferentially free fatty acids and di- and monoglycerides as the reaction products. This type of lipase is produced by Aspergillus, Mucor, Rhizopus, and Pseudomonas sp. Q6. Write a detailed note on enzymes in starch conversion? Three types of enzymes are involved in starch bioconversion: endo-amylase, exo-amylases, and debranching enzymes. Alpha-Amylase hydrolyzes internal Alpha-1,4-glycosidic bonds of starch at random in an endo-fashion producing malto-oligosaccharides of varying chain lengths. Glucoamylase cleaves glucose units from the non reducing end of starch and it can hydrolyze both alpha-1,4 and alpha-1,6 linkages of starch. Beta-Amylase hydrolyzes the alpha-1,4-glycosidic bonds in starch from the non reducing ends, generating maltose. Pullulanase (pullulan alpha-1,6-glucanohydrolase) or isoamylase (glycogen alpha-1,6glucanohydrolase) cleaves the alpha-1,6-linked branch points of starch and produces linear amylosaccharides of varying lengths. Q7. Which enzymes are involved in wine production and what are their benefits?

Three main exogenous enzymes used in wine production are pectinases, beta-glucanases and hemicellulases. The main benefits of using these three enzymes during wine making include: (1) better skin maceration and improved colour extraction; (2) easy must clarification and filtration; and (3) improved wine quality and stability.

Q8. Write short note on enzymes in meat and fish processing? Proteinases, either indigenous (cathepsin) or those obtained from plants and microorganisms, are used in the meat and fish industries to tenderize meat and solubilize fish products. Plant proteinases include papain from papaya, ficin from figs, and bromelain from pineapples. Microbial enzymes include fungal (A. oryzae, A. niger) and bacterial (B. subtilis, B. lichiniformis) proteases.