

Application of Microbial Enzymes

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Introduction

Microorganisms have been utilized in meal fermentation since extinct times and fermentation processes are still applied in the preparation of several of the meal items.

Microbial enzymes play an important role in meal industries because they're more steady than plant and animal enzymes. They can be generated by means of fermentation strategies in a cost-effective manner with less time and space requirement, and due to their tall consistency, process modification and optimization can be done extremely easily.

Countless of these enzymes locate many applications in several industrial sectors, e.g. amylolytic enzymes locate applications in food, detergent, money and textile industries.

They're utilized for the making of glucose syrups, crystalline glucose, elevated fructose corn syrups, maltose syrups, etc. In detergent industry, they're utilized as additives to remove starch-based stains. In notes industry, they're utilized for the reduction of starch viscosity for appropriate coating of money.

In textile industry, amylases are utilized for warp sizing of textile fibres. Similarly, enzymes like proteases, lipases or xylanases have wide applications in meal sectors. The following sections provide detailed and updated databases about several meal enzymes of microbial origin.

-Amylases (EC 3.2.1.1) are starch-degrading enzymes capable of hydrolyzing -1,4 glycosidic bonds of polysaccharides, which results in the production of short-chain dextrins. These enzymes are widely distributed in all living organisms. Majority of -amylases are metalloenzymes and require calcium ions for their activity, stability as well as integrity. Wide applications of -amylases in food industry include baking, brewing, starch liquefaction as well as a digestive aid. They are widely used in baking industry as flavour enhancement and antistaling agent to improve bread quality. During baking, -amylases are added to the dough for conversion of starch to

smaller dextrans, which are subsequently fermented by yeast. It improves the taste, crust colour and toasting qualities of bread. -Amylases are also used in the manufacture of high-molecular-mass branched dextrans. They are used as a glazing agent for the production of rice cakes and powdery foods. In starch industry, they also find application for starch liquefaction, which converts starch into glucose and fructose syrups. Enzymatic conversion of starch involves three steps: gelatinization, liquefaction and saccharification. Gelatinization involves formation of a viscous suspension by dissolution of starch granules. This is followed by a liquefaction process, which reduces viscosity and involves partial hydrolysis. Glucose and maltose are further produced by saccharification. This requires highly thermostable enzymes and most of the starch saccharification is carried out with -amylases from *Bacillus amyloliquefaciens*, *Bacillus stearothermophilus* and *Aspergillus niger*.