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Editorial

Editorial: Utilization of Microbial Enzymes in the Food Industry

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Enzymes are used in various industries, including food, detergents, textiles, leather, pulp and paper, diagnostics, and therapy [1]. Enzymes accelerate reactions, are non-toxic, and can be inactivated after completion [2,3]. They can be acquired from several sources, including animals, plants, and microbes. Enzyme inactivation reduces negative product appearance and taste changes by preventing continuous enzyme activity [4]. Enzymes are utilized in food to enhance product qualities such as texture, shelf life, color, flavor, and odor [5].

Microbes such as bacteria, fungi, and yeasts are commonly used to get enzymes. Key industrial enzymes include protease, α-amylase, lipase, and glucose isomerase [6]. Enzymes are attractive for commercial and industrial applications due to their distinctive properties, including heat resistance, thermophilic nature, pH tolerance, and stability under extreme conditions [7].

Biological enzymes accelerate the chemical processes of living things. Cell complexity has long been recognized as a significant regulator of enzymatic activity. Rapid improvements in biological condensates, which macromolecules spontaneously produce by phase separation, promise novel ways to regulate cell enzymatic activities. Our review of recent studies of enzymatic reactions in biological condensates covers basic enzymology and phase separation's context-dependent effects on biochemical reactions [10].

With enzymes, most chemical reactions in living organisms are fast. Enzymes speed up reactions to help cells get energy, create cell components, and break down and expel waste. Example: Hexokinase starts glycolysis, which transforms glucose into chemical energy. Hexokinase transforms glucose into glucose-6-phosphate 1,000,000,000 times faster. Enzymes are employed in biotechnology to make cheese, sugars, amino acids, and antibiotics.

Microbial enzymes have been used commercially since the 1980s due to their ease of synthesis, availability, and cost-efficiency [8,9]. More than 2,000 enzymes are known, but about 50 are commercially manufactured in substantial numbers. Some are made from animal and plant tissues, and most are microbial. Using microorganisms in enzyme production has various benefits, such as quick growth and enzyme formation:

- Cheap raw materials lower enzyme production costs.
- Microbes use raw materials every nation has. A microbial enzyme industry can be established in any country.
- Easily detect and obtain thousands of microorganisms, including enzyme-producing ones.

- Increase enzyme synthesis by manipulating ambient conditions and fermentation medium.
- Genetic approaches enable large enzyme yields from microbial strains.
- Microbes can be directed to generate a specific enzyme.

The last quarter century has seen substantial research on microbial enzyme synthesis, notably extracellular enzymes. This trend is technological and economic for enzyme production from various sources. Intracellular enzymes are difficult to extract from cells; hence, they have yet to garner commercial attention like exoenzymes from microbes.

Enzyme-producing microorganisms are usually isolated from their most abundant and diverse habitats. For instance, rotting wood and forest soil should have bacteria that generate cellulases, pentosanases, and ligninolytic enzymes. Damaged fruits and vegetables contain pectolytic enzyme bacteria. Uric acid-degrading microbes are isolated from poultry farm soil, etc.

Enzymes work naturally in biological systems, although some are secreted outside cells to prepare nutrients for them. Industrial enzyme production hinges on two facts:

- Secreted enzymes can function independently of live cells.
- The plant produces certain externally released enzymes during production and others during eating. Thus, structuring the production process, having the plant go through these phases, and lengthening the first or second phase will boost production.

As natural items, customers always prefer enzymes because of their natural properties. There is a growing need in the industrial sector for enzymes and other similar compounds to replace chemical additives. This desire is particularly prevalent in the context of preservatives and additives found in food items. Enzymes have proven to be effective in manufacturing gluten-free food, bread that is high in fiber [11], glucose syrup, and natural sweeteners. Microorganisms are being investigated for their potential application in producing industrial enzymes due to the ease with which they may be produced in large quantities and their cost savings. Various strategies are being employed, ranging from isolating novel enzymes from microorganisms obtained from unique environments to genetically modifying organisms, rational protein design, protein engineering for recombinant proteins directed evolution to modify enzyme properties, and high throughput screening to select proteins [12].

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