

Enzyme technology: The future of industrial biotechnology.

Shaik Muzafer*

Department of Food Engineering, Izmir Institute of Technology, Izmir, Turkey

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Introduction

Enzyme technology is an emerging field of industrial biotechnology that utilizes enzymes as biocatalysts to carry out various chemical reactions. Enzymes are biological molecules that catalyze specific reactions in living organisms. In recent years, there has been a growing interest in the use of enzymes in industrial processes due to their high specificity, efficiency and environmental friendliness. In this article, we will explore the potential of enzyme technology and its various applications in industrial biotechnology [1].

Description

Enzyme technology: The future of industrial biotechnology

Enzyme technology is a rapidly growing field of industrial biotechnology that has the potential to revolutionize the way we produce goods and services. Enzymes are biocatalysts that can catalyze specific chemical reactions under mild conditions, such as low temperatures and neutral pH, which makes them ideal for use in industrial processes. Compared to traditional chemical catalysts, enzymes are highly specific and can be used to produce high purity products with minimal by-products [2].

Enzyme technology has numerous applications in various industries, including food and beverage, pharmaceuticals and bioplastics [3]. For example, enzymes can be used to produce high fructose corn syrup, a sweetener commonly used in the food and beverage industry, from corn starch. Enzymes can also be used to produce antibiotics, vaccines and other pharmaceuticals, as well as biodegradable plastics from renewable sources such as corn and potato starch. Enzymes can also be used to improve the efficiency and sustainability of industrial processes. For example, enzymes can be used to break down complex organic molecules in wastewater, reducing the amount of pollutants discharged into the environment [4]. Enzymes can also be used to improve the efficiency of pulp and paper production, reducing the amount of energy and chemicals required to produce paper products.

Advantages of enzyme technology

Enzyme technology offers several advantages over traditional chemical processes. Firstly, enzymes are highly specific, meaning they can catalyze specific chemical reactions without producing unwanted by-products. This makes enzymes ideal for use in the production of high purity products. Secondly,

enzymes are efficient and can catalyze reactions at lower temperatures and pressures than traditional chemical catalysts, reducing energy consumption and costs. Thirdly, enzymes are environmentally friendly and can be produced from renewable resources, such as plant and animal sources, reducing the reliance on fossil fuels [5].

Challenges of enzyme technology

Despite the numerous advantages of enzyme technology, there are also several challenges that need to be addressed. Firstly, enzymes can be expensive to produce, limiting their use in industrial processes. Secondly, enzymes can be sensitive to changes in temperature, pH and other environmental factors, which can affect their stability and efficiency. Thirdly, enzymes can be inhibited by certain compounds, limiting their use in some industrial processes.

Future directions of enzyme technology

Enzyme technology is a rapidly growing field of industrial biotechnology that has the potential to revolutionize the way we produce goods and services. In the future, enzyme technology is expected to play an increasingly important role in various industries, including food and beverage, pharmaceuticals and bioplastics. Researchers are working to develop new enzymes with enhanced stability, specificity and efficiency, as well as new methods for producing enzymes in large quantities at lower costs.

Applications of enzyme technology

- **Food and beverage industry:** Enzymes are widely used in the food and beverage industry to improve the quality and production efficiency of products. For example, enzymes can be used to improve the texture and shelf life of bread and other baked goods, to clarify fruit juices, and to produce sweeteners such as high fructose corn syrup.
- **Textile industry:** Enzymes are used in the textile industry to improve the softness, color and appearance of fabrics. For example, enzymes can be used to remove impurities from cotton fibers and to create stone washed denim.
- **Paper and pulp industry:** Enzymes are used in the paper and pulp industry to improve the efficiency of the papermaking process and to produce high quality paper products. For example, enzymes can be used to break down the lignin in wood pulp, which makes it easier to separate the fibers and create high quality paper products.

- **Biofuels industry:** Enzymes are used in the biofuels industry to break down biomass into sugars that can be fermented and converted into biofuels. For example, enzymes can be used to break down corn and other crops into simple sugars that can be fermented and converted into ethanol.

Conclusion

Enzyme technology is a promising field of industrial biotechnology that offers numerous advantages over traditional chemical processes, including high specificity, efficiency and environmental friendliness. Enzyme technology has numerous applications in various industries, and researchers are working to develop new enzymes and improve existing ones to meet the growing demand for sustainable and efficient industrial processes. As enzyme technology continues to advance, it has the potential to revolutionize the way we produce goods and services.

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*Correspondence to

Shaik Muzafer

Department of Food Engineering,

Izmir Institute of Technology,

Izmir,

Turkey

E-mail: muzafer81@gmail.com