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Biotechnology in the Food Industry

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Introduction

Much recent advancement in the food business demonstrates the importance of food biotechnology. Taste, shell life, nutrition, and food quality are all improved by genetically modified plants and animals. GM yeast and bacteria, on the other hand, are employed to manufacture enzymes for the food industry. Biotechnological approaches, specifically genetic engineering, are used to create these GM foods. The goal of genetic engineering is to insert a foreign gene of interest into a living creature. The goal of this foreign gene introduction is to improve the quality and quantity of food. As a result, these strategies can be utilised to alleviate hunger among the impoverished of the third world, particularly in Africa. There are certain concerns, in addition to the beneficial elements. We are altering DNA that can be beneficial, detrimental, or neutral, resulting in a variety of unforeseen outcomes. These outcomes could include health issues. Some people are opposed to food biotechnology because of these issues. Food biotechnology is also opposed by naturalists. They believe that genetic engineering is interfering with nature. Biotechnological tools are used to create genetically modified food. Genetic engineering, genetic modification, and transgenic technology are all terms used to describe modern biotechnology. Nuclear DNA is changed with this approach by inserting a gene of interest (gene encoding desired trait). Recombinant DNA is the name given to this changed DNA. Recombinant DNA encodes the desired product when it expresses. Food technology refers to technology that is used to improve the quality or yield of food.

Taste, yield, shell life, and nutritional value can all be improved using modern biotechnology. This is also beneficial in the food processing industry (fermentation and enzyme involving processes). So, in the third term, biotechnology is effective in eradicating hunger, malnutrition, and diseases in impoverished countries. Modern biotechnology products are financially viable, allowing them to improve agriculture and the food sector, resulting in increased income for poor farmers. The uses of modern food biotechnology are listed below.

Food Biotechnology's Role in Food Processing

Fermentation

Breweries are created through the fermentation process. At the commercial level, different yeast strains are utilised to build breweries. We can now manufacture light wine thanks to genetic engineering. A foreign gene expressing glucoamylase is used to genetically modify yeast. Glucoamylase is an enzyme produced by yeast that converts starch to glucose during the fermentation process.

Malolactic fermentation is possible with yeast strains employed in wine production. There are two steps to making wine:

- Yeast is used in primary fermentation to convert glucose to alcohol.
- Bacteria are used in secondary fermentation, and their product is lactic acid, which causes an increase in acidity. To address this issue, various solutions are employed, all of which are costly. The malolactic gene (Lactobacillus delbrueckii) was inserted into an industrial yeast strain to alleviate the problem. This gene reduces malate conversion, decreasing the acidity of the wine.

Enzymes

Enzymes are utilised in the production and processing of food products that are produced at a commercial level. Food processing firms have been employing enzymes produced by genetically modified organisms since the second decade of the twentieth century. Proteases and carbohydrases are among the enzymes found in this group. These enzymes' genes have been cloned in order to increase production in a shorter amount of time. These enzymes are employed in the production of cheese, curd, and food flavouring. The food business uses a large fraction of these enzymes; in the United States, more than half of proteases and

carbohydrases are employed in the food sector. Rennin and -amylase are two of these enzymes.

Biotechnology as a Means of Improving Food Nutrients

All required components are not present in every dietary item. As a result, no food item is perfect in terms of nutrition. Rice, for example, is a staple cuisine in many countries around the world. However, because it lacks vitamin A, it is not an ideal staple meal. Biotechnological approaches were used to overcome these issues by introducing a foreign vitamin A gene. Proteins and essential amino acids: Plants produce more than half of the world's protein, but they lack some important amino acids including lysine and sulfur-containing amino acids. Corn has been genetically engineered to express proteins generated by Bacillus thuringiensis, a soil microbe. To compensate for a lack of necessary amino acids.