Application of Microbial Enzyme Technology in Food Processing and Detection

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Abstract: Microorganism is a Kind of Abundant Biological Resources. Its Application in Food Processing and Detection Pushes the Development of Food Industry to a New Stage. the Activation Energy Reaction in Food Processing Can Be Effectively Reduced by the Reaction of Specific Microorganisms in a Special Reactor, or by Adding Enzymes Directly in the Reaction Process, and the Raw Materials Can Be Transformed into Other Activated Substances, Which Has Achieved Remarkable Results in Improving the Reaction Efficiency. At Present, with the Improvement of Material Living Standard and the Continuous Development of Science and Technology, Food Market Attaches More and More Importance to Food Safety. Microbial Enzyme Technology as a Mature Technology Has Been Widely Used and Developed in the World, and Also Plays an Important Role in the Process of Food Production and Safety Detection. Based on the Introduction of Microbial Enzyme Technology, This Paper Analyzes and Expounds the Application of Enzyme-Linked Immunosorbent Assay (Elisa) and Enzyme Biosensor in Food Safety Detection from the Aspects of Food Processing Such as Fruits and Vegetables, Meat, Grains and So on, and Prospects the Future Development of Microbial Enzyme Technology.

1. Introduction

Microbial Enzyme Technology Refers to a Kind of Processing Method That Uses Special Reaction Vessel to Transform, through the Catalytic Effect of Enzyme Produced by Special Microorganism through Reaction or Adding Enzyme Directly, to Transform Components. the Addition of Enzyme Can Greatly Reduce the Activation Energy Reaction of Food in the Processing Process, and Can Also Change the Substrate into Other Activation Substances, Which Has a Good Effect in Promoting the Reaction Speed, the Highest Can Reach a Million Times Faster Than the Initial Reaction Speed, and the Effect is Very Good. Microbial Enzyme Technology Can Usually Be Carried out in Hot Conditions or Even At Room Temperature, Which Can Largely Avoid the Damage Caused by Temperature to the Nutrients in Food. Most of the Enzymes Used in Food Processing Can Be Produced by Edible Organisms or Green Safety Organisms, Which is Very Beneficial to the Control of Food Quality and Safety. in Addition, the Application of Microbial Enzyme Technology in Food Processing Makes the Process Have Better Development Space in Green Energy Saving, Safety and Environmental Protection, So It is Favored by Major Manufacturers and Enterprises.

Fig.1 Microbial Enzymes in Vivo

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2. Related Application of Microbial Enzyme Technology in Food Processing

In the current stage, microbial enzyme technology has been widely used and developed, especially in the field of food production and processing. Its application and related research have been fully developed in the application of food processing and detection, such as fruits and vegetables, grains, meat products, etc. In the food raw material processing industry, enzymes are widely used. For example, starch hydrolyzes by amylase to produce maltodextrin, maltitol, fructose, glucose, oligosaccharide and other raw materials; when food is baked, by adding protease, invertase, lipase, amylase of fermented dough and other substances to the dough, it can make the dough more delicate, porosity more delicate, compact, uniform and has good Flexibility and color; citrus petals treated with cellulase, pectinase and hemicellulase can effectively remove capsule wall coating to obtain very high quality canned orange; a newly developed lipase, which can degrade triglyceride, prevent accumulation in the body, and benefit healthy diet. This new technology can effectively eliminate the treatment of edible oil to avoid people from eating more containing In addition, microbial enzyme technology plays an important role in the following aspects. Application of microbial enzyme technology in grain processing. The variety is the characteristic of our country's grain agricultural products. Grain products are not only the most important agricultural products in China, but also the key raw materials of food processing industry. For the processing of grain and grain products, it appeared earlier in China's agricultural product market, but with the continuous development of food processing industry technology and market, the economic benefits of grain processing have not been significantly improved. Therefore, improving the efficiency and quality of grain processing has always been the focus of industry research. Through continuous exploration and efforts, it is found that the use of microbial enzyme technology in grain processing and overall development can effectively improve the overall efficiency of grain processing industry. Starch is a kind of material with high content and nutritional value. For example, wheat can be further treated and processed by specific microbial enzyme technology to realize production processes such as starch wine making and starch sugar making. In combination with some technology research and development and scientific research achievements in the field of nutrition and medicine, people's living habits and nutrition concepts will pay more and more attention to the use of various cereal products processed by microbial enzyme technology to meet their own body's nutritional needs, the diet will be more balanced, and the food field will be more environmentally friendly, healthy and safe. For example, in recent years, more popular emerging cereal food, such as dietary fiber. Application of microbial enzyme technology in fruit and vegetable processing industry. In the fruit and vegetable processing industry, fruit juice processing accounts for the largest proportion. For fruit juice processing, a large number of pectin physical production will make the viscosity too high, and these trace substances are not easy to filter and can not do the clarification of fruit juice, affecting the appearance and taste of fruit juice. By using microbial enzyme technology, pectinase can effectively decompose pectin in fruit juice, which can significantly reduce the viscosity of fruit juice, effectively improve the output of fruit juice and the clarification efficiency of fruit juice; in addition, in order to ensure the timeliness and maximum benefit, there are still a large number of immature fruits in the fruits commonly used by processing enterprises, which makes the starch content too high and increases the viscosity and The difficulty of clarification can be solved by the application of pectinase and amylase in the processing of fruits and vegetables. In the field of meat processing, microbial enzyme technology is also widely used. At present, people pay more and more attention to the choice of meat products and balanced nutrition. At the same time, the improvement of material living standard also urges people to tend to the meat products with low fat content and low salt content, which will also become the development direction of food processing industry in the future. More by-products will appear in meat processing. Using these by-products on the one hand can avoid waste of resources, build a green, environmental friendly and large-scale processing production line, and also can bring To stabilize economic returns. In the process of meat products processing, the quality and safety of products can be controlled through real-time monitoring, which can not be separated from the support of microbial enzyme technology. Meat products that can be effectively realized or maintained have more flavor, greatly or completely

avoid the generation and formation of harmful substances in the processing process. In this process, by hydrolyzing protein, meat products can be fresher, and the content of active peptide can also be increased, so that meat products have special flavor. In addition, the crosslinked protein can effectively improve the water holding capacity of meat, so that the strength of the gel can effectively enhance and promote the production and consumption of certain meat products. Microbial enzyme technology also has an important application in the storage of meat food. It can achieve the safety and stability of the storage environment by inhibiting the growth of microorganisms, so as to extend the storage period. For example, by using glucose oxidase to oxidize the gluconic acid produced by glucose, the pH value on the surface of fish products can be reduced, the growth of bacteria can be inhibited and deoxidized.

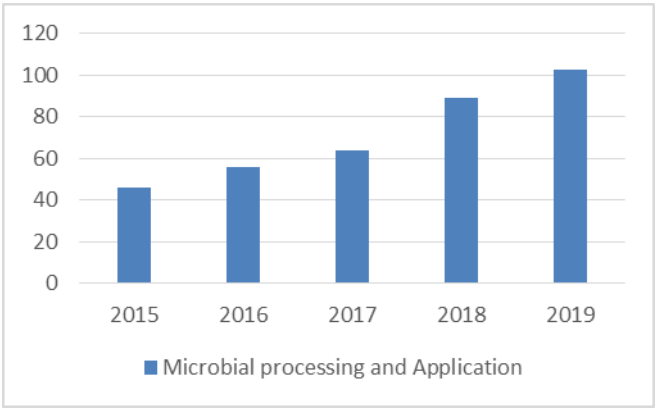

Fig.2 Application Area Data of Microbial Processing in Recent Years

3. The Role of Microbial Enzyme Technology in Food Safety Detection

When microbial enzyme technology continues to mature and develop, in addition to being widely used in the field of food processing, it also gradually acts on food safety detection, and its effect is very significant. At present, microbial enzyme technology mainly uses enzyme immunoassay and enzyme biosensor to detect food safety. Enzyme linked immunosorbent assay. In the late 1960s, Swedish and Dutch researchers first proposed the concept of ELISA. Enzyme-linked immunosorbent assay (ELISA) is used to detect food safety. This process is simple and easy to operate, and it can be used for quantitative analysis and detection. Therefore, once it is launched, it has attracted more attention. Enzyme-linked immunosorbent assay (ELISA) has become a common way of food safety testing. At present, many related substances and reagents used to detect toxic substances in food are based on enzyme-linked immunosorbent assay or related improved methods. However, for different kinds of detection reagents, there are still great differences in detection accuracy and application range. Enzyme biosensor method. In the 1960s, the idea of enzyme biosensor was first proposed by Clark, an American electrochemical analyst. He found that the detection of substrate content can be carried out by a combination of enzyme and electrode. This idea has been widely recognized and followed. The catalytic performance of enzyme is very specific, and electrochemical analysis is very convenient and fast: when enzyme and electrode are combined by special means, they can target the substrate in complex environment.

4. Conclusion

In conclusion, microbial enzyme technology has been quite mature now, and has been widely used in food processing and detection fields, and achieved remarkable results. It can be predicted that the technology will have a broader application prospect in a long time in the future, which plays an important role in improving the current level of food production and processing, especially in building a healthy and safe food market. But at present, the price of enzyme products used in food production industry is still very high, which has become the main factor restricting its development. Therefore, how to reduce the cost of microbial enzyme production and improve the production

efficiency will become the top priority of microbial enzyme technology researchers.

Microbial enzyme technology has been widely used in food processing and detection. At present, this technology is gradually mature and has a bright future. With the rapid development of biotechnology, the potential and advantages of microbial enzyme will be further developed to meet the needs of various fields of microbial enzyme technology.

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