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Application of Molecular Biotechnology in Food Testing

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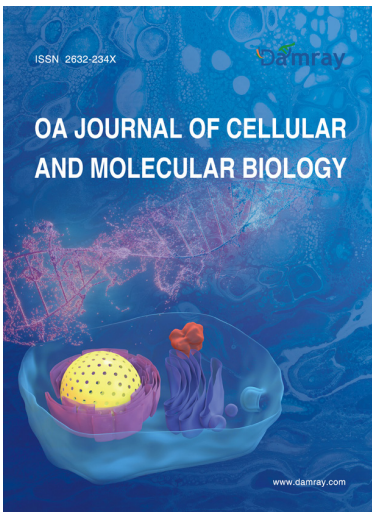

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Abstract

With the development of the times, China's food testing-related content has been developed very well, and can achieve certain new technology integration. But for now, the time for molecular biotechnology to be integrated into food testing is still relatively short, and a lot of content still needs to be studied and explored to ensure that molecular biotechnology can play its due role. Therefore, it is very critical to explore the application of molecular biotechnology in food testing.

Keywords

Molecular biotechnology, food testing, application

Introduction

With the rapid development of our country's social economy and the further improvement of material conditions, more and more people are gradually concerned about food safety, and the standards for food safety are also continuously improved, which can reversely stipulate that relevant departments use various Such advanced technology is used to test food safety and quality. Judging from the current situation, molecular biotechnology is an extremely widely used technology in food testing. The application of this technology in food testing has greatly enhanced the accuracy of food testing results, which is very important for ensuring the quality of food in our country and Safety is extremely critical[1].

1. Overview of Molecular Biotechnology

Molecular biotechnology is a new type of high-tech, which is an important part of the core of high-tech in the 21st century. The main function of molecular biotechnology is to process and transform living organisms so that living organisms can be fully utilized. Today, molecular biotechnology has become a national-level key technology in developed countries, and various developed countries have carried out more active exploration and development of it[2]. It is not difficult to see molecular biotechnology in various fields such as industry and agriculture, food processing, and medical care. The figure of biotechnology. Not only that, in food packaging, testing, etc., people often add molecular biotechnology, which shows that molecular biotechnology has been fully utilized.

2. Common molecular biotechnology

2.1 Biochip technology

Processing chip technology is a modern detection technology that has emerged in recent years and has very remarkable characteristics. In terms of food testing, the processing chip technology is mainly the application of relevant information technology and the fusion of light guide point generation technology. The advantages of processing chip technology in food testing mainly lie in its wide application and relatively fast testing speed, which can be effectively used for large-scale testing, especially for some high-quality food testing and quality testing of imported trade products[3].

2.2 Immunological detection technology

The application principle of this technology is the reaction between antigen and antigen body , including immunoagglutination experiment, immune labeling technology and immunoprecipitation reaction . Immunoassay technology has the advantages of high sensitivity, strong specificity, rapidity, and convenience . Generally speaking , a large number of them are suitable for detecting proteins in food. With the rapid development of science and technology , scientific researchers have developed and designed a new type of immunoassay technology , including fluorescent immunoassay and radioimmunoassay. For example, the commonly used PCR-ELISA technology , its detection principle is to fully combine the enzyme-linked immunosorbent assay and PCR technology to detect Escherichia coli in food. The specific antibody is marked with an enzyme , and the specific catalytic reaction of the enzyme reacts with the antigen body , and the level of the phosphorylated chromogenic agent fully reflects the composition of the chemical substance to be tested[3]. Because the enzyme itself has a very strong catalytic reaction and high efficiency , the reaction can be further increased on the original basis , providing a further guarantee for the accuracy and stability of the test results.

2.3 Biosensor technology

Biosensor detection technologies include energy devices, biomaterials, and signaling devices with chemical recognition functions. Biosensor technology has great advantages in food detection, not only is it easy to operate, but also has high detection speed and low sample consumption in the detection process. Through the effective application of sensor technology, it is possible to detect all harmful substances in food and complete online detection. Generally speaking, the sensor is an active component, and its volume is not very large. When it is applied, it will carry out the detection operation of the tested chemical substance according to the technology. When the specified parameters are entered into the system software, the information can be scientifically identified and reflected. In addition, relevant testing staff can also conduct a comprehensive analysis of sugars and proteins in the detection of bacteria, and can also highlight harmful substances such as Escherichia coli and fully clarify the actual content percentage. This technology can obtain test results in a short time, with relatively high accuracy, and is commonly used in food testing[4].

3. Application of molecular biotechnology in food testing

3.1 Pesticide residue detection

During the specific agricultural and animal husbandry production, a certain amount of chemical fertilizers will be applied, especially in the aspect of pest control, the application of chemical fertilizers is unavoidable, which also leads to a large amount of pesticide residues in the body or surface of plants. If we take food with high pesticide residues for a long time, it is very easy to cause related diseases, and even life-threatening in severe cases. Therefore, food testing units need to establish the actual pesticide residue specifications for food crops, so as to provide correct judgment standards for future testing work. In the traditional detection of pesticide residues in the past, spectroscopy and chromatography are the main application methods. These two methods can only detect methyl parathion pesticide residues, and

cannot show high sensitivity in the process of detecting pesticide components. Greatly increased food safety risks. If modern detection technologies such as enzyme-linked immunosorbent assay (ELISA) and sensors are used, not only can the accuracy of detection be further improved, but at the same time, special pesticides remaining in food can be analyzed to prevent people's physical and mental health from being affected. extremely serious impact[5].

3.2 Detection of harmful microorganisms

Generally speaking, there are a lot of microbial strains in food, such as streptococcal infection and Escherichia coli, etc. Once such bacteria enter the human body, it is very likely to cause skin inflammation and leukemia and other diseases. In order to better detect harmful microorganisms in food, food testing personnel usually use enzyme-linked immunosorbent assay (ELISA) technology to perform detection tasks. This process has very high detection efficiency and Detection precision. If this method is used to detect Salmonella in food, the specific detection accuracy and sensitivity can reach 100%. In addition, pathogenic bacteria such as Vibrio parahaemolyticus often appear in seafood such as fish and crabs, leading to food poisoning, nausea, vomiting, abdominal pain and other symptoms. Therefore, in the detection of seafood, enzyme-linked immunoassay technology can also be applied to directly reflect the environmental pollution of seafood.

3.3 Food processing

Judging from the current development trend of the food processing industry , agricultural processing has the characteristics of small scale, scattered production layout, and extensive processing. However, through the use of molecular biological science and technology , the raw material structure of traditional grain oil production can be improved , so that the processed agricultural products have higher nutritional value , and at the same time , the traditional processing technology has been changed. On the basis of controlling the cost of different raw materials in agricultural products[6]. Through the use of molecular biological innovation technology to optimize the allocation structure of agricultural resources , carry out bioprocessing of grain, oil and food , and thus drive the improvement of the comprehensive economic benefit value in agricultural food production , and create more diversified and safe commodities for the agricultural food market. For example, in the improvement project of rice variety genome , the zein gene, potato pollen lysine protein gene, etc. are integrated into the rice genome code to increase the concentration of lysine, threonine and other substances in rice individuals , Furthermore , the nutritional value of agricultural products is increased to achieve the goal of species selection , and the efficiency of food output is improved at the level of genetic modification of raw materials[7].

3.4 Detection of genetically modified food

With the improvement of science and technology, there are more types of food, including genetically modified food, which can be said to be the current research boom, but there are still obvious shortcomings in genetically modified food, and these shortcomings will have serious consequences for people's health. serious impact. Therefore, in the determination of social environment molecular biotechnology, PCR technology can be used for the qualitative and quantitative use of transgenes, and it can also be combined with other detection methods, and it also has the advantages of simple operation and low cost[8].

3.5 Application in the detection of prohibited additives

In addition to the above applications, molecular biological detection technology can also be applied to the detection of prohibited additives. In order to obtain more economic benefits, most of the manufacturers now add illegal additives to food without regard to the physical and mental health of consumers, which has a huge impact on people's health. Enzyme-linked immunoassay technology can accurately detect various additives in food, the specific detection quality is high, and the actual operation is relatively simple[9].

Conclusion:

To sum up , with the rapid development of modern food engineering technology , the scope of application of modern molecular bioengineering technology is gradually expanding. In the future development process , relevant government personnel should further innovate and develop modern biological science and technology , actively explore new research fields and directions for the development of modern biological science and technology , and provide more sufficient guarantee for the progress of food engineering technology[10].

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