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Application of genetically modified technology in food

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Abstract. At present, the arable land area in China is continuously decreasing, but the population is steadily increasing, and the demand for food quality among people is also increasing. Genetically modified food, with its high yield, disease and insect resistance, high survival rate, and excellent quality, will be rapidly developed, and the development prospects of genetically modified food are bright. Compared with non-genetically modified foods, genetically modified foods have similar nutrition, equal safety, and excellent quality. It will bring greater economic benefits. With the development of the times, science and technology are constantly changing, and genetically modified engineering is gradually entering our lives, affecting our lives. Food is one aspect of it. The application of genetically modified technology in food is increasingly attracting people's attention. The research method used in this article is a literature review, which studies the benefits and disadvantages of genetically modified technology on food, as well as the advantages and disadvantages of genetically modified technology on food, and our measures. Advantages: Increase crop yield and quality, and improve nutritional value. Disadvantages have an impact on human health or the management and use of genetically modified foods, the following targeted measures can be taken: strict safety assessment and supervision, strengthening research and development, etc. The conclusion of this study is to continue to refine genetically modified technology and comprehensively strengthen the regulation of genetically modified foods, to benefit humanity better. The study provides suggestions about public health security, food safety, and supply, accumulation of scientific knowledge

Keywords: Genetically modified technology, food, human.

1. Introduction

The background of genetically modified food is the globalization and industrialization of agricultural production. In the context of globalization, countries rely on each other's economies and exchange technologies, which enables the rapid spread of genetically modified technology on a global scale. At the same time, industrial production has improved efficiency, reduced costs, and enabled large-scale production and sales of genetically modified foods. Genetically, modified foods have nutrition, equal safety, and excellent quality. It will bring greater economic benefits [1]. These factors jointly promote the development and popularization of genetically modified foods. In addition, population growth and changes in dietary habits are also one of the reasons for the rise of genetically modified foods. With the growth of the population, the demand for food is also increasing. Meanwhile, with improving living standards, people's requirements for food nutrition and health are also increasing. Genetically modified

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foods can meet these needs and are therefore favored by consumers. The progress of technology is a double-edged sword, which can bring convenience to people's lives while also bringing a series of problems.

The study investigates the application of genetically modified technology in food through literature analysis. This article mainly studies the benefits and drawbacks of genetically modified foods and strengthens the supervision of genetically modified foods.

This study is based on the impact of genetically modified technology on food, and understanding the advantages and problems of genetically modified food. For possible problems, several small suggestions are proposed, such as strengthening supervision, hoping to contribute to human health and the progress of genetically modified technology.

2. Application of genetically modified technology in food

The application of genetically modified technology in food refers to the use of genetic engineering technology to introduce or delete specific genes in food, thereby changing the composition, nutritional value, taste, storage characteristics, etc. of food. At present, the application of transgenic technology in food mainly includes Genetically modified crops, genetically modified food, and genetically modified food additives. Genetically modified crops are a type of food that has been genetically modified to increase crop yield, improve crop quality, enhance crop disease and insect resistance, and shorten the crop growth cycle. Genetically modified crops can solve some problems that traditional agriculture cannot solve in certain situations, such as insect resistance, disease resistance, drought resistance, etc., thereby reducing pesticide use and production costs. In addition, genetically modified crops can also improve the nutritional value of crops, enhance their adaptability to different environmental conditions, reduce their growth cycle, and thus increase farmers' income. Genetically modified crops refer to the use of transgenic technology to transfer the genes of some organisms to the genomes of other species so that these species can obtain some new traits or functions. These Genetically modified crops may have stronger disease resistance, insect resistance, drought tolerance, cold tolerance, high yield, and other advantages. At present, transgenic technology has been widely used in agriculture, animal husbandry, Fishery and other fields, involving crops such as soybeans, corn, cotton, rape, potatoes, cows, fish, etc. Among them, transgenic insect-resistant cotton is the first Genetically modified crop commercially produced in China, and also one of the most widely commercially planted Genetically modified crops in the world. Genetically modified food additives refer to the use of genetically modified technology to transfer the genes of certain organisms into food additives, enabling them to have new properties or functions. These additives can be used in food production to enhance the nutritional value, improve taste, or extend the shelf life of food. At present, some GM food additives have been developed and commercially produced, such as Yeast extract produced by GM yeast and glucoamylase produced by GM corn. These additives can be used in food production, such as making meat products, beverages, seasonings, etc.

The application of genetically modified technology has indeed brought advantages in certain aspects. Firstly, genetically modified technology can increase crop yields and meet the growing needs of the global population. Secondly, genetically modified technology can improve the quality of crops, enhance the nutritional value of food, and improve human nutritional status. In addition, genetically modified technology can also enhance the ability of crops to resist diseases, pests, and droughts, reduce agricultural production costs, and improve agricultural efficiency.

However, there are also some issues with genetically modified technology. Firstly, the safety of genetically modified foods is still controversial. Although some international authoritative institutions such as the World Health Organization and International Agricultural Biotechnology Application Research believe that genetically modified food is safe, there are also some institutions and individuals who believe that genetically modified food may have potential risks. Secondly, genetically modified technology may alter the properties and taste of food, affecting its quality. In addition, genetically modified technology may also introduce new allergens and toxins, increasing the risk of food allergies.

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3. Advantages of genetically modified technology in food applications

3.1. Increase in crop yield

Transgenic technology can increase crop yield, mainly by increasing the resistance to pests, diseases, and droughts of crops themselves. Through transgenic technology, crops can improve their resistance to pests, diseases, or droughts to a certain extent, thereby increasing crop yield. Fifty percent of the 32×106hm2 maize grown in the United States is affected by the European maize worm, which costs the United States $1 billion a year, and the average yield increased by 9 percent in both 1996 and 1997 when the maize worm was modified to be resistant to the worm [2].

In addition, transgenic technology can also increase crop yield by increasing the expression of yield genes in plants. Scientists will introduce genes with the ability to increase yield in crops, such as disease resistance genes, which can increase crop yield when affected by diseases.

3.2. Improvement of crop quality

Genetically modified technology can also improve the quality of crops. Through genetically modified technology, the content of specific nutrients in crops can be increased, thereby enhancing their nutritional value. For example, the introduction of Ferritin genes from cereals into plants can increase the content of iron in plants, thus improving the disease resistance and tolerance of plants. In addition, scientists have also introduced specific aroma genes into food to give it a better taste and taste. It is well known that the nutritional content of food we eat determines the nutritional value of food. Transgenic technology can increase the nutritional content of food by obtaining β-carotene gene and SOD transgenic enzyme. At present, GM food is used to increase the nutritional content of crops such as rice and potato [3].

Therefore, genetically modified technology can alter the properties of crops themselves, making them more nutritious and adaptable, thereby increasing the supply and diversity of food.

3.3. Promotion of crops to resist diseases pets, and drought

Genetically modified technology can enhance the disease resistance, insect resistance, and drought resistance of crops, including:

Disease resistance. Scientists introduce disease-resistant genes into crops, allowing them to improve their disease resistance to a certain extent when they are affected by diseases, thereby increasing crop yield.

Insect resistance. Scientists have introduced genetically engineered "insect-resistant genes" into plants to resist the erosion of specific pests, thereby reducing the degree of crop damage caused by pests and increasing crop yield. Insect resistance to genetically modified food refers to the effect of the Bt gene in food. Essentially in soil, a fungus called "thuringiensis bacillus" of a certain period of insect resistance strong gene transplant into the seeds of processed foods, raw materials, and the growth of the crops to produce toxic genes in the process of protein, the gene protein after eaten by worms, make the insect gut internal decay, Let the worm die. Thus, instead of the function of pesticides to the insecticidal function. This transgenic technology has been widely used in crop pest resistance, which can remove the pollution caused by pesticides and ensure that crops are free from chemical pesticide pollution[4].

Drought resistance. Scientists have introduced drought-resistant genes from barley into wheat, making it more drought-resistant and able to grow normally under drought conditions.

Therefore, genetically modified technology can improve the disease resistance, insect resistance, and drought resistance of crops, thereby increasing the supply and diversity of food.

4. Application of genetically modified technology in food

4.1. Safety

There are certain safety issues with genetically modified technology in food. Although the safety assessment of genetically modified organisms has been conducted for many years and many countries

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around the world are currently using genetically modified organisms to produce food, some people still express concerns about the safety of genetically modified organisms.

Among them, the potential impact of genetically modified organisms on human health is a widespread concern. Some people believe that genetically modified organisms may carry foreign genes, which may express foreign proteins in the human body, posing potential risks to human health.

In addition, the safety of genetically modified organisms also involves the stability of ecosystems. Some people believe that genetically modified organisms may have irreversible impacts on ecosystems, thereby affecting global climate and the environment and disrupting the ecological environment. Herbicide-resistant genetically modified crops can drift onto weeds in the form of gene flow through cross-pollination, causing weeds to grow in large numbers and become superweeds, breaking the ecological balance of nature. The exogenous genes artificially embedded in genetically modified crops are likely to spread to related wild plants, resulting in widespread gene pollution and disrupting the biodiversity balance in the ecological environment [4].

Therefore, it is necessary to adopt a more cautious attitude towards the application of genetically modified technology in food, and strictly evaluate and control the safety of genetically modified organisms.

The impact on human health. The impact of genetically modified foods on human health is controversial, and there is a lack of strong evidence of their safety [5]. Although there is no clear evidence to prove that genetically modified foods are harmful to people's health, there are a large number of negative reports on genetically modified foods, indicating that the safety of genetically modified foods is not scientifically guaranteed.

4.2. Affects the quality of food

Genetically modified technology may alter the original characteristics of certain foods, such as taste, color, taste, etc., thereby affecting the quality of food. In addition, genetically modified technology may add new substances to food, such as antibiotic resistance genes, thereby increasing food safety risks. The purpose of genomization is to remove or inactivate unknown but fundamental substances. For example, soybeans with herbicide resistance genes produced through genetically modified technology have relatively reduced cancer prevention components. Although genetically modified tomatoes with characteristics such as aroma and luster have been stored for a longer time, their nutritional value has decreased compared to non-genetically modified products. When consumers make purchases, they often rely solely on appearance and texture, but cannot have a deep understanding of the quality of the product [6].

4.3. Increasing the risk of food allergies

The risk of introducing new allergens and toxins into genetically modified foods mainly stems from the introduction of exogenous proteins during the transgenic process. These exogenous proteins may come from different species or genomes, some of which may trigger allergic and toxin reactions. For example, foreign genes introduced in genetically modified maize encode proteins from another plant or animal, which may trigger allergic and toxin reactions. Brazil nuts contain a protein 2S albumin rich in methionine and cysteine. To improve the nutritional quality of soybeans, in January 1994, researchers from Pioneer Seed Company in the United States attempted to transfer the gene encoding protein 2S albumin in Brazilian nuts into soybeans. However, they realized that some people have allergic reactions to Brazilian nuts and immediately tested soybeans that have been transferred to the gene encoding protein 2S albumin. They found that people allergic to Brazilian nuts are also allergic to this soybean, and protein 2S albumin may be the main allergen in Brazilian nuts. So Pioneer Seed Company cancelled this research plan. Allergic reactions are directly related to the human immune system, and there are many allergens under natural conditions, and genetically modified foods may induce or exacerbate the risk of allergic reactions. In traditional crops, some people have allergic reactions to certain crop foods, and it is safe to consume other crop foods. Genetically modified crops usually insert specific gene fragments to express specific proteins, and if the expressed proteins are known to be allergens, it is

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possible to introduce these genes with allergic reactions into foods that were originally not allergic to consumption. Therefore, its gene transfer can cause the human body to develop allergies to foods that are not originally allergic, leading to adverse reactions in allergic populations [7].

5. Conclusion

People take food for a day. Food is one of the most important parts of life, and its safety deserves more attention. After the emergence of transgenic technology, people have doubts about it. To prevent the safety problems caused by genetically modified food and strictly supervise its safety, we should look at the rise of genetically modified food in advance and discover its great potential in life. In a word, genetically modified food should not be generalized and should be viewed with a dialectical perspective, neither completely negative nor completely positive [7]. The academic community has proposed different strategies and solutions to address the advantages and disadvantages of genetically modified technology. In terms of safety, the academic community suggests strengthening the supervision of genetically modified foods and establishing strict testing and approval systems to ensure the safety of genetically modified foods. We need a complete set of laws and regulations on genetically modified food to cooperate with the implementation of relevant departments, facilitate the strict detection of relevant departments, ensure the rights and interests of consumers, and be responsible for people's health[7].In terms of quality and taste, the academic community suggested strengthening the research on Genetically modified crops and food, understanding the impact of GM technology on food quality and taste, and looking for alternatives. In terms of allergic risks, the academic community suggests strengthening the labeling and supervision of genetically modified foods, allowing consumers to have the right to know and avoid allergic risks. In addition, the academic community also suggests strengthening the regulation and research of genetically modified technology and seeking safer, more efficient, and environmentally friendly alternative solutions. In short, genetically modified foods have both advantages and disadvantages for humans. It must evaluate and judge them based on different situations and scientific evidence. We need to continuously research and improve relevant laws and regulations on genetically modified technologies so that they can better benefit humanity. There are still many shortcomings that need to be corrected in the research process, such as the lack of visits and research on the steps and safety identification of genetically modified food in the production and processing process, as well as the attitude of the people towards genetically modified food, which cannot better reflect the advantages and disadvantages of genetically modified food and will be corrected in the future The development of the economy has brought the people living standard rise, people of genetically modified food is also more and more attention, evaluation and testing on the safety of genetically modified (gm) food has also been more attention in the consumer and the research [8].

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