Study on Nutritional Components Detection in Food Safety Based on Big Data

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Abstract. In recent years, food safety problems occur frequently, although only a very small number, but affect the nerves of the general public, "people take food as the sky ", in food safety is really not ambiguous. by expounding the requirements and expectations of food safety, this paper introduces the method of big data technology in contrast to the current situation and problems of nutrition detection in food safety. With the help of the application of big data, several suggestions are put forward in order to study an accurate, comprehensive and efficient method for the detection of food nutrition components.

Keywords: Big Data, Food Safety, Nutrients

1. Introduction
Mention food safety problem, many people will think of gutter oil, lean meat essence and other food safety incidents, as long as they think that the food they eat will be added to the harmful substances inside, it will make people feel chilling. In recent years, with the continuous improvement of the living standards of our residents, people began to pay more attention to the nutritional components contained in food while satisfying the basic food and clothing. How to effectively solve the food safety problems in our country on the basis of the existing is an important task that all relevant personnel need to give priority to.

Since the 18th National Congress, the state has attached great importance to the reform and improvement of the food safety supervision system, paid attention to solving the major problems in the field of food safety at present, revised the Food Safety Law, and stressed that food safety work should implement the principle of "prevention first, risk management, whole process control, social co-governance ", and establish a scientific and strict food safety supervision system. Food safety is a complex systemic problem, from production to circulation, every link affects food safety, these links have a lot of data, through the collection and analysis of data in each link, effective and timely data application can let us analyze a lot of valuable information from these data, so as to correctly deal with
food safety problems\cite{1}. Prime Minister Li proposed at the third session of the 12th National people's Congress to formulate an "Internet" action plan to promote the integration of mobile Internet, cloud computing, big data, Internet of things and modern manufacturing\cite{2}. Because of its better predictive analysis ability, big data has made many industries successful. Can the food industry with data characteristics such as volume, speed and type diversity use advanced technology such as big data, cloud computing to reduce the degree of food safety risk and solve food safety problems?

2. Basic requirements for food safety
It should be said that the basic requirement of food safety is a constantly updated content, with the development of the times. The basic demand for food safety has been continuously expanded in terms of the current level of development. The basic needs of food safety mainly include three aspects, that is, there can be no harmful ingredients to the health of life in food, food should contain certain ingredients that contribute to human health, and the nutritional ingredients in food should be comprehensive. Food cannot be harmful to human health ingredients food is people import things, directly related to the safety of people's lives. Therefore, food cannot be harmful to human health components, which requires that people can ensure the basic safety of diet. In essence, this requirement is a bottom line of food safety demand, which cannot be broken through at any time. The reason why this bottom line cannot be broken is that this bottom line is not only the bottom line of law, but also the bottom line of morality. Any food manufacturer produces food for the benefit of mankind, not to do harm to people's health. Food should contain certain ingredients that help people's health. Food should contain certain ingredients that help people's health on the basis of no harmful ingredients. With the development of society, people's demand for food is not only to solve the problem of appetite, but also to absorb more nutrients in food\cite{3}. Therefore, this part of the requirements is a manifestation of food safety to keep pace with the times, is a comprehensive reflection of the new ideas and new thinking in the era of food safety\cite{4}. The nutrition in the food should be comprehensive in the food safety demand, not only requires the food to have certain nutrition, but also has the nutrition ingredient to be comprehensive, should say the nutrition ingredient is single but the food cannot be called the nutrition reasonable. So, if you look closely at the relevant food safety requirements, it is not difficult to find that there is often a need for certain products to have several nutrients, and these nutrients become still need to be distributed several reasonable range. Such requirements arise from the increasing demand for food, on the one hand, but also reflect the food manufacturers in food production capacity level\cite{5}.

3. Present situation and existing problems of food nutrient test method in China
China's nutritional component detection method is a statutory analysis method, many of which are basically the same as the AOAC prescribed analysis method. A major problem is the "definition" of specific nutrients, in which the definition of nutrients in some national standard food detection methods and the definition of nutrients specified in the FDA is not exactly the same, such as the definition of total fat and sugar and the determination of detection methods. Some methods and AOAC prescribed analytical methods are inconsistent, such as analytical detection of dietary fiber. There are still some not established national standard analytical methods, and there is no detailed regulation, such as total energy and energy produced by fat, saturated fat, total carbohydrates, etc. the determination method of some nutrients needs to be further clarified and modified. Our country already has the national standard to use in the food nutrition ingredient detection analysis, among them about energy, fatty acid, cholesterol, monosaccharide, sugar alcohol and dietary fiber these 6
Ingredients new national standard method already or is in the process of developing. There are two main problems in the detection of nutritional components in food safety.

3.1. Detection method is inaccurate

There are some problems that hinder the improvement of food safety management in our country. First, there is no clear concept of food nutrition composition. Secondly, the method and procedure of food nutrition composition detection used are relatively single, which affects the accuracy of the test results; third, because the diversity of food types leads to the complexity of food components, it has a negative effect on food nutrition components detection, finally results in deviation. In order to solve the problems existing in the detection methods of food nutrition components, the inspectors must formulate different food determination methods according to different food types in their work, so as to master the concept of food nutrition components in an all-round way, and purposefully select the corresponding detection schemes to improve the accuracy of the results of nutrition detection.

3.2. Testing institutions are not professional

The increasing attention to food has led to the emergence of a large number of food testing institutions in society, but such institutions are profitable, so there is a fierce competition between institutions, and in this environment some problems are gradually exposed. First of all, the testing personnel in food testing institutions are not professional and have not been studied and trained professionally, so the detection level and operation ability are not high, which cannot guarantee the fairness and fairness of food nutrition test results[6]. Secondly, the relevant government departments do not pay more attention to and supervise the operation of food inspection institutions in the actual management work, which leads to the lack of self-discipline in the whole inspection industry, which affects the quality and efficiency of food nutrition component testing. In addition, the testing equipment in the food testing institutions is relatively backward, and the work is a mere formality, thus affecting the scientific nature of the results of the detection of food nutrients.

4. The role of big data in food safety

4.1. Food life cycle data sources

Operational data sources bring together a variety of data from within and outside the food supply chain in various ways. Big data food safety data sources are shown in figure 1.
4.2. Food chain data gathering area
At the data assembly area, various food data obtained from operational data sources are extracted, cleaned, converted and loaded by ETL processing.

4.3. Food-related data warehouse
Data warehouse is a set of decision support techniques that help decision makers (presidents, managers, analysts, etc.) of enterprises make faster and better decisions and provide various types of data support.

4.4. Food data safety information analysis
Food data safety information analysis includes food safety hot spot analysis, food safety trend analysis, food safety early warning analysis, food safety risk analysis, food safety comprehensive analysis, etc.

5. Some suggestions to improve food safety nutrient detection in big data age

5.1. Strengthening monitoring of food nutrition testing
Although China has given considerable attention to food safety, there are still some deficiencies in nutrient detection. To improve the effectiveness and authenticity of food nutrition testing, the relevant government departments are required to analyze the current situation of management, summarize the existing problems, establish a perfect food nutrition testing system, and clarify the food safety and nutrition testing standards. The government departments strictly follow the requirements of the third party food inspection agencies, cooperate with the food safety supervision agencies, strengthen the standards of social enterprises and institutions, and establish unified standards for the detection and certification of food ingredients\(^\[7\]\). Gradually establish a more systematic and standardized regulatory system, set up the responsibility and obligation of accountability mechanism. The food nutrition safety monitoring framework based on big data is shown in Figure 2.

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**Figure 1.** Food safety data sources

**Figure 2.** Food nutrition safety monitoring framework based on big data
5.2. Establishment of food nutrition testing center with detailed classification
In recent years, our government has strengthened the attention to food safety related issues in terms of system and legal norms, and promoted the improvement of food safety inspection in China to a certain extent. In order to further improve China’s food safety management and maintain market order, a special food nutrition testing and control center should be established for comprehensive management.

5.3. Strengthening advocacy and support for food nutrition and safety
In the traditional concept, people need food to alleviate hunger and meet people's physiological needs. People not only do not understand the nutritional components of food, but few people study the authenticity and balance of nutrients. In the new era of people's living standards, people's material life has been fully satisfied, and food pollution has gradually strengthened. At the same time, people pay more and more attention to the nutrition of food. In order to promote the development of food safety management, government departments can enhance food nutrition and food safety, and enhance public awareness of food safety.

6. Conclusion
Big data can bring not only commercial value, but also social value. By using big data technology to construct food safety risk analysis platform, it can provide comprehensive and accurate food safety information for government supervision departments, enterprises and consumers, thus reducing food safety risks. With the development opportunity brought by the era of big data, the national government should not only make full use of big data technology to construct clear food safety detection index as soon as possible in the future food safety quality supervision work, but also pay more attention to nutrition detection. To ensure that all commodity nutrition components testing institutions should clarify their own responsibilities and obligations, so as to provide more balanced nutrition and quality food for our residents and certainly support a strong umbrella for food safety.

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