Food quality inspection and control

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Keywords: food quality inspection and detection; Food safety; Quality control; Supervision system

Abstract: In recent years, the "food safety problem" has attracted the attention of the government, the reason is that the working relationship affects the life and health of the people and social stability, and the food poisoning incident publicized by the state in 315 also reflects the importance of quality inspection and testing work. By analyzing the common types of food safety at present, the paper points out the current situation and countermeasures, such as improving supervision, optimizing food inspection methods, implementing corresponding measures that meet the current requirements of food safety standards, etc., hoping that the implementation of these strategies can increase the accuracy and trust of food quality inspection, and ensure its safety.

1. Introduction

Food safety determines whether people's livelihood and society can achieve stable development. However, frequent food poisoning incidents in recent years have brought difficulties and challenges to the national food supervision departments of the government. At present, the national food safety situation is very serious, such as gutter oil, Sudanese red salted eggs, melamine and clenbuterol pork and other illegal incidents have been exposed by the media. Caused the concern of people from all walks of life, the inaction of food manufacturers endangers the life and health of the people, but also hinders the harmony and stability of the society, it can be seen that increasing the quality control of food quality inspection and testing is of great significance to maintain food safety.

2. Common food safety problem

2.1 Threatened by microbial contamination

As a common problem in food safety, microbial contamination is generally due to the lack of strict hygiene management in all aspects of food production, processing, storage and transportation, such as: In a food processing plant in xx City, because the production equipment was not cleaned and disinfected in time, the staff did not carry out the hygienic operation procedure according to the requirements of the regulations, resulting in bacteria and other fungi entering the food, consumers accidentally ate the contaminated products caused food poisoning, some patients appeared retching, diarrhea, fever and other symptoms.

2.2 Pesticide residues on fruits and vegetables

In order to prevent pests and diseases and promote animal development in agricultural production, some bad farmers may use pesticides and veterinary drugs, among which it is inevitable that drugs will be attached to the surface of agricultural products under improper or excessive use, such as: the surface of apple peel contains trace organophosphorus pesticides and carbamate pesticides; Pesticides may be used during grape growth, including; There may be drug residues on the surface of strawberries, which will pose a certain threat to human health (especially babies, pregnant women and lactating mothers). In addition, long-term intake of food containing pesticide and veterinary drug residues will increase the probability of cancer and neurological diseases[1].

  DOI: 10.25236/iceesr.2024.038

2.3 Illegal use of additives

In order to enhance the taste of food and extend its shelf life, some manufacturers will place additives in food. Improper use or excessive use will have a certain impact on human health. Once consumers consume a large amount of preservatives, they will have gastrointestinal discomfort or allergic reactions, and even children will have behavioral abnormalities or decreased learning ability due to taking a large amount of pigments. At the same time, illegal manufacturers use illegal additives (pigments, borax Na2B4O7·10H2O) and industrial raw materials to make food, without considering the serious harm caused by toxic and harmful substances to human health, such as: the use of opium poppy in restaurants, the use of nitrofuran drugs in livestock and aquaculture, and the sale of seafood vendors selling "yellow yellow" and so on.

2.4 Small workshop products without registered trademarks

In rural or remote areas, there will be some fraudulent use of well-known brands or forged quality certification marks of food, no registered business license or health license, the production of food that does not meet national standards, and even contains toxic and harmful substances. Fake and inferior food is often made of poor quality raw materials, such as: irregular health care products manufacturers add illegal drug ingredients to their products to deceive consumers and cause serious harm to their health.

2.5 Food spoilage or expiration

The manufacturer does not remove the products that have expired or are on the shelf in time, resulting in consumers eating the spoiled food. The spoiled products are very likely to contain a large number of harmful bacteria and mycotoxins, which will cause a series of adverse reactions to the buyers. For example, spoiled milk contains a large number of harmful bacteria, and people may have food poisoning after drinking it; Stale fruit will produce mycotoxins, once ingestion can lead to liver disease, etc., it can be seen that relevant companies and sales departments must carefully check the shelf life and storage requirements of food, to avoid expired spoiled food into the market caused unnecessary losses.

3. Food quality inspection and testing workflow

3.1 Collection work

Sample collection, as the first step of food inspection, requires the supervision department to have a certain representativeness and uniformity of the food samples collected. During sampling, attention should be paid to whether the production date and batch number are consistent, and the quantity of samples taken should be able to meet the requirements of the inspection project. And combined with the actual situation and project to decide the use of containers (hard glass bottles and polyethylene products), for example: if you encounter liquid samples, you can use such as test tubes, bottles, etc., and even choose self-priming pumps and other equipment for sampling; Solid samples are obtained by cutting, crushing, grinding, etc.

3.2 Sample preservation

Timely preparation and preservation work to prevent chemical changes or loss of predicted components. The first step is to observe whether the sample meets the inspection requirements, whether its external packaging and internal items remain intact, check the tested substance and the code of the tested substance in time with the circulation card, and then put the prepared assay into a clean and dry bottle for marking work. It is stored according to its storage conditions[2].

3.3 Pre-processing

Before the inspection, the technical personnel should combine the physical and chemical characteristics of the sample, the scientific basis and characteristics of the sub-determination method, the chemical differences between the compound to be measured and the interfering matter,

and use the correct method to separate the measured matter from the interfering matter to improve the accuracy of the inspection results.

3.4 Analysis and detection

Inspectors should combine food classification and composition to choose the correct analysis method, such as: when testing whether the nutritional content is up to standard, you can choose chromatography and electrochemical method, etc., but also need to prepare the correct chemical reagents and instruments to carry out solution dilution work, common tools are: balance, volumetric bottle, pipette, burette and so on.

4. The existing problems of national food safety inspection

4.1 Imperfect inspection system

At present, food safety supervision in some regions is divided into multiple departments and agencies, each of which may be responsible for only a small part of the food chain, and the existing model of segmented supervision may lead to uneven distribution of responsibilities (supervision gaps). Coupled with the uneven management requirements of some market institutions, the phenomenon of inconsistent regulatory standards for the same type of food will largely increase the compliance costs of producers, and even allow food with uneven quality to flow to the market.

4.2 Limited inspection capacity

The current food inspection methods and technologies cannot fully meet the needs of modern food safety, such as the lack of diversified multi-residue analysis technology, the low actual application rate of rapid detection methods, and the limitations of detection technology, which all reduce the accuracy of food detection technology. Some food inspection and testing institutions are still using traditional inspection methods, and they have not introduced advanced testing equipment and instruments in time, so they can not find contaminants in food ingredients. In addition, some regulatory departments have not determined standardized inspection processes, or the execution is not strict enough, reducing the accuracy of the test results.

4.3 Food supervision laws and regulations are not sound

Although China has established a series of laws and regulations related to food safety, there may still be gaps and loopholes in the entire system. Relevant departments will make timely adjustments to relevant laws and regulations as new food safety issues arise, resulting in the inability to continue regulatory work; One of the difficulties is the insufficient execution of market supervision and management, such as incomplete resources of law enforcement agencies, complex and diverse procedures, and staff not mastering management methods correctly, which prevent food safety issues from being properly regulated.

4.4 Food manufacturers have a weak sense of responsibility

Some production enterprises do not have a strong understanding of the importance of food safety and have not implemented corresponding management measures. They have not timely trained their staff, making it difficult for them to master correct food safety knowledge and skills, resulting in frequent occurrence of food safety problems; The attention and investment of relevant enterprises in the field of health need to be increased, and they cannot guarantee that the products produced fully comply with national standards, which increases the level of risk. Some personnel even pursue economic interests and engage in illegal operations, such as using prohibited raw materials, excessive use of additives, and deliberately concealing food safety issues, all of which seriously violate the moral bottom line of the enterprise and pose a serious threat to the life safety of consumers.

5. The importance of food quality inspection

5.1 Protect the safety of people's lives

Food is an indispensable consumer product in people's daily life. Its quality problems directly affect people's health and safety. The relevant supervisory departments carry out quality inspection and testing on food regularly, it can detect the harmful ingredients and improper use of additives in food in time, and prevent the substandard food from entering the market, so as to protect the health rights of consumers.

5.2 Form a healthy food industry chain

Food testing as an indispensable important work of the regulatory department, it can strictly regulate every link from production and processing to transportation, can detect the safety risks encountered in the production process through testing, so as to help enterprises improve the production process and improve the quality of their products, and drive the whole food industry to maintain a healthy and stable development.

5.3 Increase international food export opportunities

Many countries (such as the United States) and regions have strict quality and safety requirements for imported food, and only after strict testing can they enter the international market. It can be seen that strict inspection standards can not only drive the overall level of the entire Chinese food export industry, but also improve the competitiveness of the industry in the international market, coupled with the continuous improvement of testing technology and standards in the technical sector, to a large extent, accelerate the speed of the industry and international integration, help domestic products to go abroad, to achieve diversified development.

6. Effective strategies to improve food safety and quality

6.1 Increase the input of inspection equipment

Common basic testing equipment is like electronic balance, which is mainly used to weigh food inspection reagents, samples and standards; Add physical and chemical analysis equipment, such as: Acidity meters (measuring the average pH of food), refrigerated centrifuges (extracting the separation of nutrients or contaminants during food inspection), sterile worktables and microbiological safety cabinets (creating a local ultra-clean or clean safe operating environment in the laboratory), Sauxlet extractors and supercritical fluid extractors (helping staff discover the nutrients in food and extract them) Contaminants), magnetic stirrer (can mix samples and other liquids evenly), high pressure microwave digester, etc., to provide effective help for technical personnel; At the same time, it is also necessary to select applicable instruments according to actual needs (1) multi-functional food detector to rapidly detect various items in various kinds of food, such as agricultural chemical residues, SO , nitrite ions, benzoyl peroxide, diseased meat, etc. (2) The pesticide residue analyzer can generally be used to check the residues of harmful substances on vegetables and fruits and other related foods, especially to check organophosphorus and carbamate pesticides[3]. (3) The veterinary drug residue analyzer can help the regulatory authorities to check the actual situation of antibiotic residues, hormone residues and animal diseases in livestock products.

6.2 Develop the correct inspection method

The first step is to confirm the inspection object and objectives, and refer to domestic and foreign food safety regulations and standards for work, such as the Food Safety Law and the National Food Safety Standards. It is also necessary to confirm whether the testing direction matches the food safety requirements; Select the correct detection method in accordance with relevant provisions, such as selecting high-performance liquid and gas chromatography when detecting pesticide residues on the surface of an object; When the inspected object is heavy metal, atomic absorption spectroscopy or inductively coupled plasma mass spectrometry should be used, and method

selection should be based on high precision and high trust, taking into account the equipment and professional capabilities of the laboratory and technical personnel; Researching new modes of food testing, such as immunoassay and biosensors, and utilizing the fast and sensitive characteristics of these methods to improve overall testing efficiency, it is also necessary for laboratories to pay close attention to the latest technological trends and regulatory requirements, and timely introduce and apply new testing methods; Increase the number of training sessions for staff, requiring them to keep in mind requirements such as the Food Safety Regulations, inspection methods, and instrument and equipment operations. Combined with case analysis and practical operations, strive to improve the work ability and problem-solving ability of operators.

6.3 Improve the food testing laboratory environment

The supervision and management department should change the traditional pattern of Laboratory (Lab), requiring inspectors to avoid cross-contamination and operational errors as much as possible, and the lab area should be divided according to different functions, such as: Sample processing area, testing area, data storage area, etc., also need to keep the independence of each area and mutual contact, but also need to pay attention to keep the lab to maintain a good ventilation environment, to ensure that the interior is clean and tidy; Timely replacement and upgrading of laboratory equipment, such as the use of high-resolution mass spectrometers or chromatographs for detecting residues of hazardous substances in food; When the test object is the type of microorganism, the automatic identification system should be used. The introduction and application of these equipment not only improves the overall inspection efficiency and quality, but also provides a strong guarantee for food safety; Strengthen laboratory management, create an orderly and efficient working atmosphere, rationally allocate equipment maintenance tasks, and require maintenance personnel to maintain and calibrate equipment on time to ensure that equipment is always in a safe state; In addition, it is necessary to establish a sound sample management system in the laboratory to keep the inspected items stored in a suitable temperature and environment. For example, (1) conduct regular safety checks on the lab; (2) strengthen safety training for laboratory personnel; (3) formulate emergency response plans; and (4) require on-site personnel to follow laws, regulations and safety norms such as Laboratory Safety Management Regulations and Compilation of Laboratory Safety Management Regulations.

6.4 Create a comprehensive food supervision and management policy

The relevant departments can take the following specific measures when formulating detailed work plans according to the work food testing objectives: (1) Regular testing plan: set a fixed cycle of food testing, such as comprehensive food sampling testing on a monthly, quarterly and annual basis, to ensure that the food market produces high-quality products under supervision and management; Discover potential food safety hazards in a timely manner, establish a rapid response time and response mechanism for emergency testing, which can quickly respond to emergencies or safety issues of public concern, and grasp the specific time when testing personnel, equipment and resources are restored to place and start work; Assign testing tasks to different departments or teams based on geographical region and food type. For example, xx team is responsible for the testing of dairy products in the region, and other departments are responsible for the testing of imported food to ensure that employees clearly understand their responsibilities; In addition, the development and implementation of these strategies can also draw on the successful cases and data that have appeared in foreign countries. For example, the United Kingdom has successfully reduced the incidence of hazardous substance residues and microbial contamination in food by implementing strict safety regulations and standards; Through the promulgation and implementation of regulations such as the Federal Food, Drug and Cosmetic Act, the United States requires food producers and sellers to comply with a series of standards and requirements to ensure food safety and quality[4].

6.5 Strengthen food traceability system construction

Establish a unified national food traceability standard, requiring staff to carefully record information at each stage, ensuring clear recording standards throughout the entire process from

production, processing, circulation, etc; Increase the traceability awareness of manufacturers and require them to establish a sound quality management system, with detailed records of the entire food production process, including key links such as raw material sources, production processes, and quality control; By combining this technology with information technology, modern information technologies such as blockchain and the Internet of Things can be borrowed to create a nationwide food traceability information platform; Timely introduce independent and impartial third-party certification agencies, conduct regular and comprehensive audits of participants in the traceability system, improve the regulatory capacity of the enterprise and the overall level of the food traceability system, require the agency to have professional qualifications and rich experience, and be able to evaluate and certify according to international standards and best practices, and then go through a strict audit process to ensure the accuracy of data, thereby ensuring the safety and quality level of food; Strengthen the training and education of stakeholders in the food industry chain, enhance their awareness and ability to track the food supply chain, and promote its importance through various channels such as the internet to enhance consumer sensitivity to food safety issues.

7. Conclusion

Through continuous improvement of inspection and testing means and strengthening quality control measures, the occurrence of food safety incidents can be effectively reduced and the rights and interests of consumers can be protected. However, food safety still faces many challenges, which requires the continuous attention and efforts of relevant departments.

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