Discussion on Pollution and Safety Inspection in Food Processing

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Abstract: With the rapid development of modern society, the number of pollution problems exposed by the food processing industry is increasing, so the food safety problems are becoming more and more serious. Additives such as nitrite and Sudan Red pose a huge threat to people's lives, health and safety. Some businesses choose to add harmful ingredients to the food in order to make the food more attractive in color and more unique in taste, which is used to promote the increase in the production of food processing. Under such circumstances, it is extremely important to conduct targeted safety inspections of food processing. This article mainly analyzes the pollution and classification of food processing, and puts forward related safety inspection methods in order to provide reference for relevant units.

1 Introduction

In recent years, the problem of food processing pollution has become more and more serious. At the time when the problem of food processing pollution has been revealed by the majority of television stations, it is also deeply affecting the hearts of every Chinese. Under such circumstances, the attention of relevant government departments in my country has greatly increased, and investment in food processing safety inspection has been fully expanded. In the process of food processing safety inspection, relevant units or individuals should deeply conform to the relevant standards and indicators to clarify the hazards caused by different processing methods. Only in this way can food processing problems be fundamentally solved and the safety of food and processing guaranteed and people's lives, health and safety.

2 Types of Food Processing Contamination

In the process of targeted food processing, due to the steps of frying, high temperature and additives in the subsequent processing link, the internal composition of the food will change, which will lead to the corresponding pollution problem of food processing and the safety of food will be and significantly reduced. For now, food processing pollution mainly includes physical pollution, biological pollution and chemical pollution. No matter what type of pollution, it will bring harm to people's health. The specific manifestations are:

1) Physical Food Processing Contamination

Physical food processing pollution mainly refers to the personnel inadvertently mixing magazines in the food during the food processing, such as foreign radioactive substances, external adsorbed debris. Although such substances will not cause a significant impact on food safety, it will reduce the nutritional value of food. In addition, there are some physical food processing pollution manifested by consciously mixing additives that do not meet the prescribed standards or are outside the indicators, such as water-fed beef, mixed-sand rice, etc. Such behaviors will bring huge negative impact to people's health and safety.

2) Chemical Food Processing Pollution

Chemical food processing pollution is the most common type of pollution. It mainly refers to the process of food processing. Due to the influence of various chemical substances, the internal molecular structure of food is changed, and the safety is greatly reduced, and even many chemical substances bring harm to people's health.

3) Biological Food Processing Pollution

Biological food processing pollution is also a more common type of processing pollution. Specifically, in the process of processing, food is affected by microbial flora or viruses, and a large amount of mycomycin is derived. If such food is eaten, it is very likely cause food poisoning problems. If you can't get timely treatment, you may die. In addition, biological food processing also includes expired spoilage. If swallowed, it will still seriously affect people's health.
3 Harm Caused by Food Processing Contamination

First of all, when people eat foods with processing contamination, they are very likely to cause symptoms of acute poisoning. Some bacteria or viruses entering the human body through food processing pollution will cause continuous damage to human organs. The clinical symptoms are mainly gastrointestinal upset, nausea, retching, acute gastroenteritis and other symptoms, which shows the serious harm of food processing pollution. If it cannot be solved effectively, it will inevitably have unimaginable negative consequences.

Second, eating contaminated food may also cause chronic poisoning. Specifically, in the process of carrying out food processing work, the food contains some contaminants that are harmful to the human body due to certain pollution. However, there are very few contaminants in food, and it does not cause more serious harm. It is often difficult for people to detect effectively, but if such a food with a small amount of contaminants is used for a long time, it is likely to cause chronic similar symptoms such as metal poisoning. This kind of toxin accumulates in people's gastrointestinal tract for a long time, and it will be out of control after the final outbreak, which has a very serious impact on people's health and safety.

Finally, eating foods with processing contaminants can even cause people's genes to change. This is the most serious harm caused by food processing pollution, and the results are usually irreversible. The specific performance is as follows: pregnant women will have a corresponding impact on the unborn baby after taking food contaminated by food processing. These will affect the formation of fetal organs and their normal development, causing extremely serious effects, and may even lead to malformation of fetal development, and in some cases, the problem of stillbirth. At this stage, pesticides such as DDT, sodium pentachlorophenol, and carbaryl are likely to cause such problems.

4 Types of Contamination During Food Processing

With the rapid development of modern society, people's requirements on the appearance and taste of food are increasing significantly, which leads to the increasing abuse of additives and cooking methods in the food market. This has buried hidden safety hazards to a considerable extent, and will inevitably seriously affect people's health and threaten the normal development of the current society. The types of pollution in food processing mainly include the following:

4.1 Pyrolysis Products of Pyrolysis

The traditional eating habits of our country are to use high-temperature frying to process various foods, so as to effectively improve the taste and color of the food, to meet the needs of people's increasingly rich and full taste buds, but this will also be to a corresponding extent. Produce processing pollution problems. The root cause of food contamination is that high temperatures will cause denaturation of amino acids contained in food. At present, a large number of foods contain a large amount of protein,
and glutamic acid and tryptophan are an important basis for protein. Under the action of high temperature, they will generate a large amount of thermal degradation products, including heterocyclic amines. Such substances will greatly stimulate various mucosa in the human body, including oral mucosa, gastric mucosa and intestinal mucosa, and cause negative symptoms corresponding to organs. In addition, high-temperature fried food will also cause the fat in the food to be oxidized, which will generate a large amount of acrolein fumes, which has a strong irritant, and will also seriously pollute the air and water environment. In some cases, high-temperature processed foods will also lead to harmful substances such as dimers and peroxides. Such substances will greatly threaten people's health and safety, and will also cause the color of fats to change. For example, in some fried chicken restaurants, the color of the oil inside the frypot is almost close to black, which is caused by long-term use; or some barbecue restaurants often use open flames to grill directly, which will also generate corresponding harmful substance.

4.2 Benzopyrene Pollution

In the process of grilling food, smoking food or baking food, it often produces a pollutant called benzopyrene (BaP), which is an indirect carcinogen with high activity. The fundamental reason for the production of such substances is that fats at high temperatures will initiate thermal polymerization reactions, and there is a significant insufficiency in the combustion of fuel, which leads to the final generation of BaP. Its direct contact with food will cause food pollution. According to relevant surveys, people who like to eat smoked foods are often more significantly affected. According to the records of relevant data, the content of benzopyrene (BaP) contained in barbecue or grilled sausage is about 0.17-0.63μg/kg, and if it is a food grilled over an open flame, the content of benzopyrene will be as high as 4.2-11.2μg/kg. At the same time, in the process of processing food, transporting food and storing food, the lubricating oil and asphalt of equipment and machinery are often more significantly affected. According to the relevant surveys, people who like to eat smoked foods are often more significantly affected.

| Common sources of benzopyrene | Manufactured Food | Causes of Pollutants |
|------------------------------|------------------|---------------------|
| Poor quality sesame paste    | In order to reduce costs, unscrupulous merchants often use spoiled sesame or peanut, and such spoiled raw materials often contain aflatoxin |
| Peanut Oil                   | Some businesses simply filter out the seeds that have no obvious mildew when squeezing oil, but in fact, not only the mildewed seeds contain aflatoxin |
| Deep-fried food              | High-temperature vegetable oils used many times often produce benzopyrene, and the content of benzopyrene in fried food is almost ten times higher than normal food |
| Stir fry                     | Put oil in the pot after the smoke comes out, this method is likely to produce benzopyrene |
| Barbecue                     | Charcoal contains a small amount of benzopyrene, which is likely to invade food under the action of high temperature |
| Overnight dish               | Some overnight dishes do not have sufficient nutritional value and may produce nitrite |
| Preserved food               | Some unscrupulous merchants add coloring agents to preserved foods, thus greatly increasing the probability of generating nitrosamines |
| Processed meat products      | Some businesses add nitrite during food processing, which leads to the inclusion of carcinogens in meat products |

4.3 Nitrosamine Pollution

In the process of processing food, chemically generated nitrosamine compounds will pose a huge threat to people's lives and safety, which may cause acute or chronic diseases. If it is an acute disease, most of them will damage people's liver, while chronic diseases are
mainly carcinogenic. At this stage, the more common food processing method that will produce nitrosamines pollution is pickling. Especially in the process of pickling sauerkraut and marinating meat, some unscrupulous merchants will add coloring agent in the marinating process to ensure full color.

5 Food Processing Safety Inspection Method

If you want to accurately determine the contamination of food processing, you need to develop a corresponding inspection strategy based on the source of the food being tested and its processing plan. Due to the significant differences in the detection purposes of different methods, there are corresponding differences in the analysis methods used. For now, the most widely used food processing safety inspection methods mainly include sensory inspection, instrument inspection, chemical analysis, and electrode inspection.

5.1 Sensory Detection Scheme

This kind of detection scheme mainly uses human organs to determine whether the appearance of food meets the characteristics of normal processed food. It is used for targeted discussion and analysis, combined with statistical knowledge to make a deeper analysis, and finally obtain sensory evaluation results. Summarize the method of obtaining conclusions. The sensory detection scheme requires inspectors to have good visual, auditory, tactile and taste abilities, and to obtain information on whether food is qualified by direct judgment. It is the most simple and convenient safety inspection scheme for processed food. If the senses can clearly feel the food problem, we can directly judge it as unqualified without the need for follow-up inspection.

5.2 Instrument Inspection Plan

Instrument inspection schemes are often referred to as physical inspection methods, mainly in combination with the physical properties of food. Through the joint action of the corresponding detection equipment and analysis equipment, the composition of the food is accurately and skillfully analyzed to find harmful substances hidden in it. With the rapid development of modern society, the instrument inspection program has become more and more perfect, so it has received widespread attention and application in the food processing industry, and has achieved considerable results. Through the effective application of this method, the relevant personnel can accurately determine the composition of the food, and the accuracy of the test results is often beyond doubt. For now, the instrument inspection program mainly includes optical analysis and spectroscopy. The improvement of modern information technology has enabled many automation technologies to be applied to the field of food inspection, which will promote the development and construction of instrument inspection programs to a considerable extent, which will help to significantly improve the accuracy of instrument inspection data, while also being able to effectively protect food safety.

5.3 Chemical Inspection Program

The chemical inspection program is mainly aimed at the problem of chemical food contamination. The more common methods are quantitative analysis and qualitative analysis. At present, in the process of adopting chemical inspection programs, quantitative analysis is usually the core, mainly to check the food capacity and its quality, and at the same time determine the content of various ingredients inside the food, in this way to determine the food pollution during processing. This move will provide a more solid support for subsequent food processing and effectively avoid contamination problems.

5.4 Electrode Inspection Program

Heavy metal pollution is a relatively common food processing pollution problem. The inspection scheme is electrode inspection. This can help inspectors more accurately determine the composition of the metal elements contained in food processing. It is used to determine whether food processing can meet the specified processing standards. The basic principle of the electrode inspection scheme is to analyze the ion activity inside the test solution by means of ion selectivity to determine the proportion of metal elements, and to measure food samples through thin sheets between 1-2mm thick. After obtaining the observation results, we need to conduct in-depth analysis and calculations to ensure the accuracy of various inspection results. This will provide a large amount of data support for the subsequent progress and improvement of the food processing industry, while helping to solve the existing problems various illegal food processing issues.

6 Conclusion

In short, if the food processing industry wants to develop steadily, it must continuously increase the application of various high and new technologies and increase investment in food processing safety inspection. We need to find problems hidden in food through scientific and reasonable inspection methods, and then trace the roots to rectify various illegal processing behaviors. This will promote our country’s social progress to a considerable extent and lay the foundation for the improvement of national living standards basis.

References

1. Chen Long. Application of microbial enzyme technology in food processing and preservation[J]. Modern Food, 2020(04):116-118.
2. Liu Binggang, Ma Xu. Pollution and safety inspection in food processing [J]. Heilongjiang Science, 2019,
3. Wang Chunlin. Research on food quality and safety issues and overall quality management of food production [J]. Modern Food, 2019(08): 128-130.

4. Peng Haozhou, Huang Jing. Analysis on the status quo and countermeasures of food safety problems in my country [J]. Farm Staff, 2018(22): 155.

5. Zhu Pengyue. Analysis of the role of food additives and the importance of food safety [J]. Food Safety Guide, 2018(30): 49-51.

6. Han Zhiwei, Qingqing Licao. Research on the Growth Mechanism of Green Food Processing Enterprises in Qiqihar City [J]. Theoretical Observation, 2018(09): 11-13.

7. Liu Xiulan. Quality and safety problems and countermeasures in grain and oil processing [J]. Modern Food, 2018(17): 66-68.