Review Article

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New Ways to Avoid Hazards in Human Food

Fahim A. Shaltout*

Food Control, Faculty of Veterinary Medicine, Benha University, Egypt.

***Correspondence:**
Fahim A. Shaltout, Food Control, Faculty of Veterinary Medicine, Benha University, Egypt.

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ABSTRACT

A food contaminant refers to any substance that is present in the food and can potentially cause harm to the consumers. The Food contaminants may be biological, chemical, or physical in nature. They can be naturally occurring in the food material or introduced during the food production, handling, or storage. Every food business is mandated to establish controls and monitoring procedures against the food contaminants. A food object is referred to as contaminated if it comes in contact with an unwanted substance and could result in severe illness or injury if consumed. Contamination can occur through various means, including biological, chemical, or physical sources, and it is a significant concern for the food safety and quality assurance in the industry.

Keywords

Food contaminants, Hazards, Biological, Chemical, Physical.

Introduction

The Food contamination is a severe public health issue worldwide, leading to the food-borne diseases that affect humans annually. Contamination describes a situation of the presence of unwanted elements that is not appropriate for use. The Food contamination usually happens when foreign particles such as microorganisms, chemicals, and insects are present. Recently, many incidents related to the food contamination, the food mislabeling, and the food safety have been reported, which has attracted increasing attention [1-7]. However, the development of reliable and efficient techniques of detection was challenging due to the complexity of the food matrices and trace levels of contaminants in the food. The biosensor is an alternative with the excellent selectivity, the specificity, the sensitivity, the usability, the flexibility, the low cost, and the quick processing time. The toxicological elements, and the biosensor technology risk analysis [8-14]. The Different applications of the biosensor technology for the identification of the chemical contaminants, including the pesticides, the heavy metals, the migratory substances from the packaging materials, the pollutants, and the unapproved and the dangerous food additives in the food [15-21].

Types of the food contamination

The three types of the food contamination are the following:

The Biological contamination, The Chemical contamination, The Physical contamination

These types are the major categories of the food contamination and do not include others, such as allergenic contamination and radiological contamination. Depending on the type of raw materials and products being produced, the most common food hazards in a business may vary [22-28].

The Biological contamination

One of the most common types of contamination, biological contamination, refers to the presence of harmful microorganisms such as bacteria, molds, yeasts, viruses, and parasites. These harmful agents are collectively known as the food pathogens. Depending on the biological hazards in the food, their effects can range from mild problems such as the nausea to the life threatening foodborne illnesses. Some of the most common biological contaminants in the food industry include the Norovirus, the Salmonella, the Nontyphoidal Salmonella, the Escherichia coli (E.coli), the Shigella, the Hepatitis A [29-36]. These pathogens are the top six microorganisms that cause foodborne illnesses in the US. Other pathogens such as the Clostridium botulinum, the Staphylococcus aureus, and the Listeria are also top contenders in this category. The Biological contaminants or otherwise termed the microbiological contaminants. Every year, the effect of these pathogens accounts for at least 20% of the foodborne illnesses in the US. The Effects and examples of the biological contamination [37-42]. The Biological contaminations can produce distinct

changes in food items after a while.

In favorable conditions, such as in the temperature danger zone, the biological contaminants can produce the following changes to the food, Produce acid and lower the pH of the product, Produce a bad smell, Change the color of the food, Soften the texture of the food. These changes indicate the food spoilage and that the food products are not safe for consumption anymore. Although the effects of biological contamination can be severe, they can always be prevented and controlled. The Proper food safety practices and constant monitoring are key to controlling biological contaminants. With an effective food safety management system, the sources of these contaminants can be controlled and rooted out. Some biological contaminants are naturally part of fresh produce, especially those that are grown from the soil and are exposed to environmental contaminations, such as root crops. Other perishable foods, such as unpasteurized milk, milk products, raw sprouts, leafy greens, raw fish, and raw meat, are very nutritious, and they make a good growing medium for infectious organisms. They can cause health risks when not handled properly. In addition, drinking water contaminants can be a very dangerous source of these biological contaminants [31-36]. The Contaminants can enter the food production system during the food preparation process through contaminated water when raw materials are washed. This fact tells you that any food ingredient must be properly prepared and cooked to prevent disease causing microorganisms from causing any damage or harm to consumers. The Hands with blue latex gloves disinfecting tomatoes to decontaminate the fruit from coronavirus. Washing the fruit with water and lye to remove viruses [37-42].

The Chemical contamination

The Chemical contamination refers to the presence of the unwanted chemicals in the foods that can compromise their safety. The most common chemical contaminant examples in the food establishments include the Cleaning solutions, the Fertilizer residues, the Pesticides, the Industrial oils, the Additives, the Production by products.

The mentioned chemical contaminants can enter a food business at any point and contaminate the foods. The Chemical contaminants carry a great threat to the health of the consumers [43-48]. Their effects can vary depending on the sources and the concentrations. the Chemical contaminations can be divided into different categories based on their origin, the Industrial, the Agricultural, the Toxic heavy metal, the Natural While the chemical contaminations occur less often than the biological contamination, their potential to cause the damage is significant. The Effects and the examples of the chemical contamination, Some the chemical contamination, such as the cleaning agents, can cause the burning, the swelling, the gastric problems, and sometimes even the longterm effects [49-54]. The Chemical substances may be introduced to the food being made through improper use and the food handling. Some examples of the chemical contamination in a food establishment, the Cleaning products, when not properly removed, can stay on the kitchen surfaces and then become transferred to the food. The kitchen tools coated with the nonfood grade materials have been reported to have the contaminated foods with the toxic metals. The Agricultural products such as the fertilizer residues and the pesticides can stay on the raw produce [55-60]. The Substances such as the additives can be considered contaminants when added in excess or found in the products that shouldn't be in. The preparation of the food also plays a great role when it comes to the chemical contamination. For instance, the improper washing of the fresh produce can leave traces of the fertilizers or the pesticides that can find their way into the other food products. The effects of these unwashed contaminants can worsen when exposed to the heat and served to the customers. Additionally, the byproducts such as the acrylamide can be used as an indication of the temperature abuse. This substance is a harmful chemical that is considered a carcinogen. Controlling the chemical contamination. The Sanitizer Concentration Log and The Cleaning and the Sanitation Checklist help to minimize and control cases of the chemical contamination in the commercial food facilities [61-65].

The Physical contamination

The Physical contamination is the presence of the unwanted foreign materials in the food. These foreign materials can cause the injuries, the bleeding, the choking, and the broken teeth when ingested. At worst, the physical hazards can block the air passage and prevent the normal breathing [66-71]. The Physical contaminants can be categorized as the natural or the unnatural depending on the nature of the contaminant. Some examples of the physical contamination include the presence of the following, the Natural physical contaminants, the Bone fragments, the Feathers or hair, the Pit, stem, and the skin of the raw fruits, the Pest droppings, the Unnatural physical contaminants, the Glass, the Plastic, the Soil or sand, the Metal shards, the Personal effects (e.g., jewelry). the Natural physical contaminants are naturally part of the food materials, such as the fruit stems, whereas the unnatural ones include the stones, the glass, and the metal fragments. The Physical contaminants, depending on their size, can be detected through the visual detection [72-77]. The Effects and examples of the physical contamination When undetected, the physical contaminations can cause serious injuries to the consumers. Some may cause the injury, whereas others can create the cuts to the throat or the mouth. The Physical contaminants can come from the food handlers and become transferred, such as the fingernails or the hair in the food. In addition to causing the injuries, these contaminants can become precursors to other types of the contamination, such as the biological contamination [78-83]. The Fingernails can introduce the harmful organisms to the food. Such is also the case when it comes to the physical contamination from the pests. The Foodborne pathogens and diseases can result if these contaminants are introduced into the food. This effect highlights the importance of the pest management outside of the production area. Cases of the physical contamination can result in a widespread food recall in the food manufacturers. In recent years, the presence of the physical contaminants has topped the charts of the food recalls. These contaminants were reportedly composed of the hard and the soft plastics, the metal, the rubber, and the glass, which may originate from the packaging materials

and the unmaintained equipment. The concept of the fast food and the ecology. A man in a cap and a beard, holding a hamburger, and with disgust pulls out a thread [84-88].

The effective way to control the different types of the food contamination. While these contaminants can easily go into the food being prepared, the food handlers can prevent them with an effective food safety management system. The Proper preventive and control measures can be put in place to ensure that these contaminations are well monitored. Your best bet is to implement a digital the Food Safety Management System (FSMS). At Food Docs, we offer an intuitive solution to control the risk of the food poisoning. Using our smart Food Monitoring System, you can be sure that the food safety practices are done effectively and on time [89-94]. The Common sources of the food contamination can be addressed even before they can create any damage. With our monitoring tasks set at autofill, your kitchen staff can save time and promote the accuracy of recordings. Additionally, our Food Safety System features detailed instructions on how to perform the food safety tasks. With this feature, you can ensure that every employee will perform the tasks exactly as instructed, ensuring the food safety daily. You can also upload your versions of the instructional materials to make training more personal for your business [95-100].

The Monitoring tasks with detailed instructions. The main cause of the food contamination. The main cause of the food contamination is the biological agents including the pathogenic bacteria, the viruses, the molds, the yeasts, and the parasites. Of the 250 identified foodborne diseases by the Centers for Disease Control and Prevention (CDC), the majority are attributed to different types of the bacteria, the viruses, and the parasites. The Foodborne illnesses resulting from the biological contaminants cause symptoms such as the vomiting, the diarrhea, and the abdominal pain. When left untreated, they can become life threatening [101-106].

One factor why the biological contaminants are considered the main cause of the food contamination is their ability to transfer from one place to another. The Bacteria and other types of the pathogens can easily be spread through the cross contamination. Because the pathogens are too tiny to be seen, the food handlers who do not practice the safe food handling can spread them from one point to another. By simply holding the raw foods and then a piece of the equipment or a clean utensil, the naturally present pathogens can spread [107-112]. You can learn more about how quickly the bacterial contamination can occur from one of our articles. More specifically, below are the five most common ways for the food to become contaminated in a food establishment are the Cross contamination, the Low quality materials, the Improper storage conditions, the Unclean preparation conditions and the Poor personal hygiene [113-119].

Conclusion

This is why one of the best ways to prevent the microbial contamination is to regularly and correctly wash the hands. The worst carrier of contamination in food service is a food handler who does not regularly wash his or her hands. The Microorganisms can be controlled through the proper food handling practices. Their number can be easily controlled with the operations such as cooking properly, the cleaning and the sanitizing, and the storing foods in the right conditions.

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