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Short Communication

Microbiological Hazards in the Food

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ABSTRACT

This paper describes the microbiological hazards in food. For protecting human health, nowadays food safety authorities face with many challenges. Food safety is one of the main objectives related to public health protection. It is expected to prevent, minimize or eliminate risks on different stages of the food chain and in the meantime maintain, provide, and distribute high-quality food to meet consumer demands. However, millions of cases of food-borne diseases occur every year worldwide. Microbiological hazard, or bio-hazard, is a biological substance that poses a threat to the health of living organisms, primarily humans. This could include a sample of a microorganism, bacteria microbial hazards in food comprise mycotoxin-producing moulds, protozoae, viruses and prions that can adversely affect human health.

Keywords: Food safety; Mycotoxin; Microbial hazards

ABOUT THE STUDY

The presence of botulinum neurotoxins in food is not new, but still an important issue because of their high toxicity to human. Botulinum neurotoxins are high-molecular thermolabile proteins produced by *Clostridium botulinum*, botulin neurotoxins are divided into seven types A-G, however only types A, B, E and F are toxic to humans and some animals. Verocytotoxigenic *Escherichia coli* has been isolated in Germany on 2011. It was characterized by unique features such as presence of enteroaggregative *Escherichia coli* genes (aatA, aggR, aap, aggA, aggC) and resistance to most antibiotics [1]. Increasingly common microbiological hazard in food is Methicillin-Resistant *Staphylococcus aureus* (MRSA). Viruses may contaminate food either through contamination at source, principally through sewage pollution of the environment, or in association with food. Food-borne diseases can be caused consuming food or water contaminated by pathogenic microorganisms such as bacteria and their toxins, fungi, viruses, and parasites. Food can be contaminated both at the source as raw material, and during food processing up to storage and distribution [2]. Also people (infected persons or carriers of pathogens) and the environment (food contact surfaces and facilities) can spread microorganisms on raw or processed food. The genetic variation and phenotypic characteristics of *L. monocytogenes* isolates from retail raw foods, as well as the growth potential of isolates from milkshakes, prepared from naturally contaminated ice-cream scoops linked to a listeriosis outbreak were studied and reported.

Clostridium botulinum is an anaerobic, gram-positive, spore-forming bacterium that produces a potent neurotoxin. The spores are heat-resistant and can survive in foods that are incorrectly or minimally processed. It can grow between a temperature of 3°C to 50°C and a pH of 4.6-9.0. There are 7 distinct forms of botulinum toxin, types A-G. Four of these (types A, B, E and rarely F) cause human botulism. Types C, D and E cause illness in other mammals, birds and fish [3-5].

Escherichia coli are gram negative, rod shaped, non-spore forming bacteria belonging to the family, *Enterobacteriacae*. It is a harmful bacterium that is particularly dangerous because it has the ability to survive during refrigeration and freezing and has been shown to be tolerant of acid, salt and dry conditions. It can grow between temperature of 7°C-46°C and at a pH as low as 4.4. Botulism is caused by a neurotoxin formed during the growth of *Clostridium botulinum*. This neurotoxin binds to the neuromuscular junction and blocks excitatory synaptic transmission by inhibiting acetylcholine release causing (flaccid) paralysis and sometimes fatal respiratory failure. Foodborne botulism, caused by consumption of improperly processed food, is a rare but potentially fatal disease if not diagnosed rapidly and treated with antitoxin.

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Escherichia coli are commonly found in thelower intestine of warm-blooded organisms. It can produce a toxin (Shiga toxin) which can cause serious illness [6]. It can affect all ages; however there have been higher mortality rates occur in the elderly and young. The infective dose of *Escherichia coli* is estimated to be very low, in the range of 10 to 100 cells [7,8].

CONCLUSION

To prevent the growth of *Clostridium botulinum* and toxin production in chilled foods with a shelf-life of more than ten days, heat treatment of 90°C for ten minutes or equivalent lethality, a pH of 5 or less throughout the food and all components of complex foods. A minimum salt level of 3.5% in the aqueous phase is needed in all complex foods, a Water Activity (AW) of 0.97 safety of canned food is based on the destruction of the spore's i.e., 121°C for a minimum of 3 minutes also known as Botulinum Cook. The control starts on the farm with the implementation of good agricultural practice which can help reduce the shedding of *Escherichia coli* from animals such as cattle. The prevention also requires controls during manufacturing and preparation of foods such as preventing cross-contamination of foods and cooking food so that the core reaches at least 70°C for 2 minutes. Water supplied to food businesses, including private supplies, must meet potable water standards. In this way we can prevent microbial hazards of food by maintaining the optimum temperature and proper atmospheric conditions.

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