

Guardians of Food Safety: Navigating Physical, Chemical and Biological Hazards in the Culinary Landscape

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Food safety means assurance that food is acceptable for human consumption according to its intended use. An understanding of food safety is improved by defining two other concepts — toxicity and hazard.

Toxicity is the capacity of a substance to produce harm or injury of any kind under any conditions. *Hazard* is the relative probability that harm or injury will result when substance is not used in a prescribed manner and quantity. Hazards can be physical, chemical and biological causing harmful / adverse effects on the health of consumers.

Physical hazard is any physical material not normally found in food, which causes illness or injury and includes wood, stones, parts of pests, hair etc.



Fig.1. Physical hazards in foods

Chemical hazards are chemicals or deleterious substances which may be intentionally or unintentionally added to foods. This category of hazards includes pesticides, chemical residues, toxic metals, polychlorinated biphenyls, preservatives, food colours and other additives.

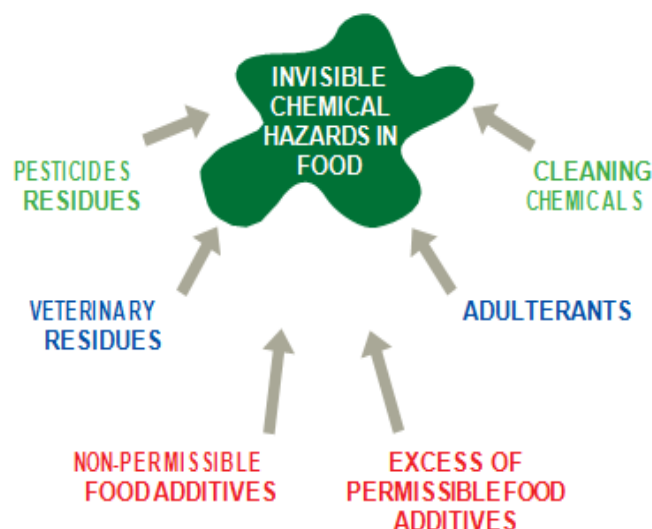


Fig. 2. Chemical hazards in foods

Biological hazards are living organisms and include microbiological organisms (Fig.3 and Fig.4). Those micro-organisms which are associated with food and cause diseases are termed food-borne pathogens. There are two types of food-borne diseases from microbial pathogens—infections and poisoning.

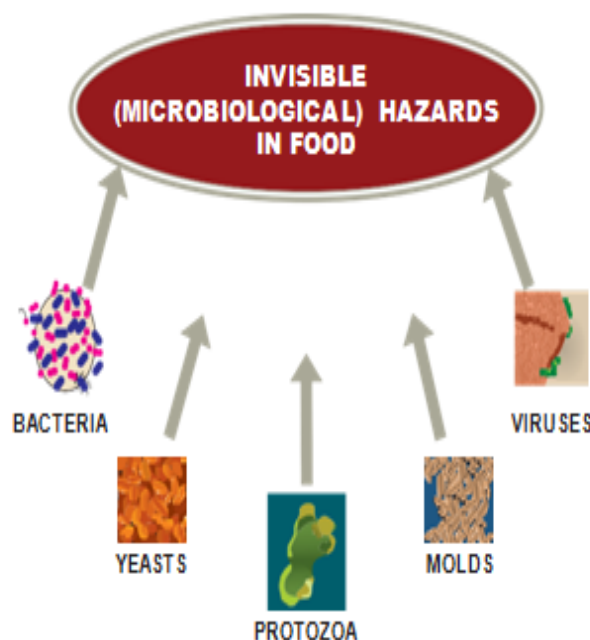


Fig. 3. Visible biological hazards in foods

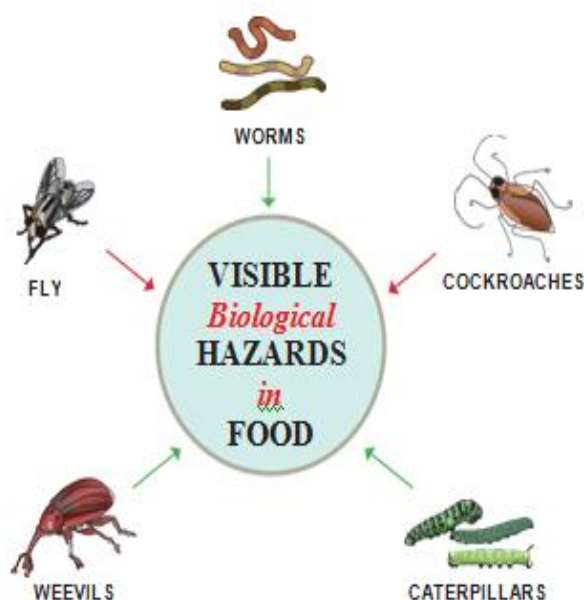


Fig. 4. Invisible/microbiological hazards in foods

Food infection /Food Poisoning results from ingestion of live pathogenic organisms which multiply in the body and cause disease. *Salmonella* is a classic example. This organism exists in the intestinal tract of animals. Raw milk and eggs are also sources. Heat destroys *Salmonella*; however, inadequate cooking allows some

organisms to survive. Often *Salmonella* is spread through cross-contamination. This could happen when a cook cuts raw meat/poultry on a chopping board and without cleaning uses it for another food which does not involve any cooking, such as salad. Food may become infected by *Salmonella* if an infected food handler does not wash hands with soap after using bathroom and before touching food. *Salmonella* can reproduce very quickly and double their number every 20 minutes. The symptoms of *Salmonella* infection include diarrhea, fever and abdominal cramps.

Food intoxication

Some bacteria produce harmful toxins which are present in food even if pathogen has been killed. Organisms produce toxins when the food has not been hot enough or cold enough. Toxins in food cannot be detected by smell, appearance or taste. Hence foods which smell and appear good are not necessarily safe. One example of such an organism is *Staphylococcus aureus*. Such organisms exist in air, dust, water. They are also present in the nasal passage, throat and on skin, hair of 50 per cent of healthy individuals. People who carry this organism, contaminate food if they touch these places on body while food handling. Diarrhea is also one of the symptoms of this contamination.
