

FOOD AND THE ENVIRONMENT

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The foods consist of a large number of chemical constituents which undergo biochemical reactions in our body. The food constituents may either serve as the raw material for these reactions liberating energy and other body requirements or may form a part of the enzymes that may control the reactions. The foods also could contain unwanted constituents which could cause deleterious effects by themselves or by changing the normal biochemical reactions in the body leading to complications described as syndromes, or diseases, sometimes resulting in death. It is, therefore, important to adopt measures to prevent the ingestion of such deleterious substances along with foods.

Foods serve as a vehicle that could carry many substances through an unchecked passage from the environment into our body. The substances that could be carried so include injurious chemicals and harmful micro-organisms. It is, therefore, important to understand the types of deleterious substances that may get into food from the environment during production, processing and storage.

Metallic Contaminants

There are certain metals whose presence even as traces in foods could cause health hazards to humans. They may get into food without our

knowledge during food production and processing. There are several avenues by which the element lead and its salts could get into foods. The lead pipelines used for carrying water, the alloys containing lead used in the soldering of metal cans meant for storing food, the silicate glazes used in ceramicware, the exhaust gas containing lead tetraethyl from motor vehicles, which may deposit on leafy vegetables grown in areas with heavy traffic and the lead arsenates used sometimes as insecticides are some of the materials that contaminate foods.

Cadmium is another metal that could cause problems in trace amounts. In Japan, it is reported that a condition known as "Itai - Itai" occurred among humans due to consumption of rice containing cadmium. This element could be present as a contaminant in coastal waters and may be carried through fish; it may get into vegetables from certain sources of superphosphate fertilizer containing cadmium, or into acidic pickles from the glazes in ceramicware.

The Minamata disease that occurred in Japan in 1953 due to consumption of fish caught in the Minamata bay resulted in brain damage in more than hundred humans. The cause of the disease was traced to the presence of methyl mercury in the effluent from a acetaldehyde factory, discharged into the Minamata bay resulting in accumulation of mercury in fish caught for consumption.

The cans for the storage of acidic foods are coated with tin, which in turn is protected by a coating of lacquer. Damage of scratch in this second protective layer could

expose the metal to the acidic juices which has the ability to dissolve the metals posing a potential danger.

In Sri Lanka and in several South East Asian Countries, curry powders are consumed widely. It is observed that the concentration of iron in the curry powders increase three to five fold during grinding due to contamination from the cast iron grinding plates of the mills. It is reported that iron in this form is not readily absorbed by humans and its absorption could be increased in the presence of citrus juices or vitamin C. In contrast, it is notable that iron is absorbed and get deposited in the liver causing siderosis in some Bantu communities in South Africa where they cook the meals in iron vessels. However, the iron contributed from spices would be much less compared to what may come from cooking vessels, as spices are added only in small quantities to foods. It is worth examining whether this iron could contribute significantly to our diet.

Pesticides

Contamination of food resulting from unlimited use of pesticides is a problem with market vegetables today. In a survey carried out by Wettasinghe and Chandrasekera (1985) on the usage of pesticides by farmers it is reported that more than fifty percent of farmers spray a higher concentration of pesticides than what is recommended. The study also revealed that in more than thirty seven percent of the cases the interval between last spray and the harvest is less than seven days, and in more than eighty eight percent of the cases it is less than fourteen days. Such vegetables may carry residues harmful to humans.

The high concentration of pesticides in foods may be the result

of direct or indirect applications and sometimes may contain chemicals that do not degrade rapidly.

Microbial contaminations

The micro-organisms are present well spread in our environment; in the air, in water, on our skin and in the faecal matter. They come in contact with the foods readily and may be carried into our body in large quantities as they multiply rapidly obtaining nourishment from the foods.

These organisms could either cause infections, or may liberate toxic substances on the food or in our body leading to intoxications. Among the bacteria, the Salmonella and Escherichia coli whose primary habitat is the faecal matter, the organism Staphylococcus aureus that could be present in the nasal cavity of most humans, and the soil organisms Clostridium botulinum and C. welchii are some of the harmful types of organisms causing frequent illness through foods. Of these the Salmonella infections are frequent due to faecal contamination of foods and water from the environment. The presence of Clostridium is not of much significance in Sri Lanka due to our heavy cooking habits and low consumption of canned food.

In a survey carried out in Kandy by Kodikara, Silva and Aturaliya (1983) on hygienic quality of fruit drinks, pastries and ice cream only nineteen percent of ice cream tested were free of E coli type I. Poor bacteriological quality noted with ice cream in several surveys highlight the importance of maintaining a clean environment, and avoiding faecal contamination of water.

The allergic reactions occurring frequently in some individuals

on consumption of "heaty" fish is caused by histamines produced by bacteria in fish. This is referred to as "scromboid poisoning" and could be avoided by maintaining clean transport and storage conditions.

In a study on microbial quality of meat carcasses in an abattoir a simple technique such as washing with chlorinated water was found to reduce the microbial counts drastically. The practices required to maintain a clean environment and clean food are not always very expensive.

Mycotoxin contamination

The growth of moulds in foods during harvest and storage is a common occurrence under tropical conditions of high humidity and high temperatures. Some of these moulds such as Aspergilli and Penicillia produce toxins. Among them, the aflatoxins produced by Aspergillus flavus and Aspergillus parasiticus are observed to cause cancer in animals and there is evidence to show their harmful effects with humans. Among Sri Lankan foods, the oilseeds, copra and peanut are reported to carry heavy contaminations of aflatoxins under poor processing conditions.

Proper storage and drying conditions could prevent the growth of fungi that produce toxins.

Preventive measures.

Proper monitoring of the food environment and the processing conditions are essential in maintaining food quality for better health. Precautions should be taken in utilization and disposal of effluents containing toxic metals to avoid them getting into the food chain. The

spray of pesticides should be done only with proper guidance and understanding of their residual effects and their biodegradation under different conditions.

The transfer of micro-organisms from the environment to the human body could be minimized by good hygienic practices. The proper disposal of faecal matter and personal hygiene play an important role here. The contamination from the environment could be minimized by drying grains and nuts to moisture levels below eight percent prior to storage. The high moisture foods should be stored under low temperatures. Heat processing of foods prior to consumption, and storage, of cooked foods away from insects and flies avoid most microbial contaminations. Repeated heating and cooling of foods encourage microbial activity. The food regulations are meant to reduce the possibilities of food contamination from the environment. It is the duty of every citizen to assist in implementing food regulations for a better health.