WHAT ARE FOOD CONTAMINANTS?

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INTRODUCTION

Food is one of man's most basic needs. In supplying the increasing demand for more food, both the amount and the type of food produced are important factors. Another problem of food supply is caused by food contaminants.

Food contaminants are substances which have accidently got into food. This can happen because of the way the crop was grown or the way it was processed, packaged or stored. In some cases it may simply be due to the presence of a high concentration of the contaminant in the general environment.

Good, clean food helps the body to grow strong and healthy but any contaminants present in food can cause diseases and even death. Helping people to understand the dangers of eating contaminated food is a basic step in dealing with this problem.

Three of the important types of food contaminant - pesticides, mycotoxins and heavy metals - are discussed in this article. These contaminants affect a wide variety of crops and food products in many countries of the world.

PESTICIDES

Pesticides are chemicals which are applied to crops or crop land to kill agricultural pests such as harmful insects, plant pathogens (disease causing organisms), weeds and rodents.

Like many other agricultural chemicals, pesticides are important tools for improving food production and supply. The increasing presence of pesticides in food, however, is causing a great deal of concern. This is because they are poisonous to many forms of life and can be very dangerous to humans and domestic animals.

Unfortunately, it is not always possible to tell by just looking at food if it is contaminated by pesticides or if it is fit to eat. The only way to do this and to find out what contaminants are present is to use chemical methods. These can only be carried out by qualified people in a properly equipped chemical laboratory.

After they have been applied to the crop, some pesticides, such as phosphine, are quickly broken down into harmless substances. Others, however, such as DDT, stay toxic for a much longer time. It is this second group of pesticides which is most likely to cause food contamination.

One way of reducing the amount of pesticide present in food is to delay harvesting crops after the last application of pesticide until the chemical has had time to break down.

To further reduce the risk of food being contaminated by pesticides, the use of these chemicals should be carefully controlled. They should be used only on the crops they are recommended for, and only against the pests they are known to control. Directions for the use of pesticides must always be followed exactly.

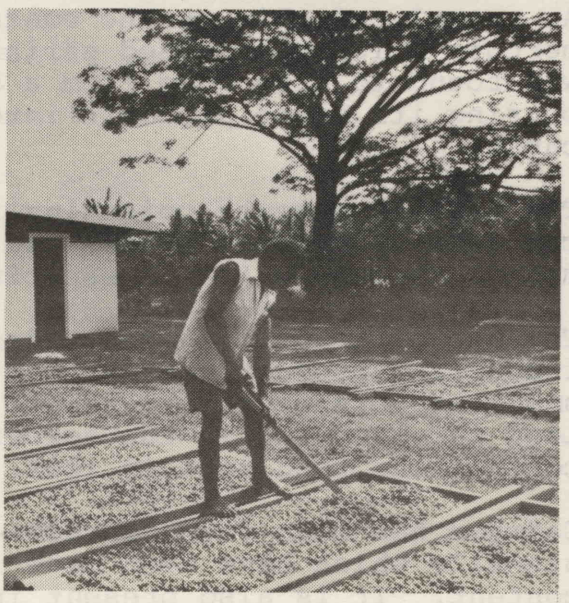
It is important to remember that pesticides can build up over a long period in the bodies of humans and other animals and so taking in a number of small doses of some pesticides can be just as dangerous as taking in a single high dose.

MYCOTOXINS

Mycotoxins are substances produced by moulds and other fungi which can grow on some food products. These fungi were thought to attack the crop only during handling and storage but it now seems that they can also attack in the field before harvest if the conditions are favourable.

One example of a mycotoxin is the chemical aflatoxin which is produced by a type of mould called *Aspergillus flavus*. A lot of work has been done on aflatoxin contamination since 1960 when it caused the death of a large number of turkeys in England which were fed contaminated groundnut meal.

Groundnuts are by far the most likely type of food to develop aflatoxin contamination, but copra, maize, cottonseed and other oil seed crops have also occasionally been contaminated by this chemical. These food products are more likely to develop aflatoxin contamination if they have been damaged by insects or if they are kept in conditions of high moisture, high relative humidity, or temperatures of between 10 and 42°C. Because of this, drying of agricultural products to a low moisture level and the use of proper storage facilities are the basic methods of preventing fungal growth



Drying groundnuts in the sun at the Alzera Peanut Co-operative in the Markham Valley. Photo: Ofice of Information

and thus aflatoxin contamination. Aflatoxin is heat resistant and so, once it has developed, it is not destroyed by cooking, heating or roasting the food although there might be a slight reduction of contamination during food processing.

In general, aflatoxin is more dangerous to young animals than to adults, and even a low level of aflatoxin uptake can cause death. In older animals, aflatoxin poisoning may lead to poor performance and a loss in production. It may also make it easier for other infections to gain a hold and has been shown to cause cancer in tests on a number of animals.

So far the effect of this chemical on humans is not fully known. However, there is no reason to suspect that it is not dangerous to them.

HEAVY METALS

Small amounts of some metals are a necessary part of our diet. The most important of these essential metals are potassium, sodium, iron, calcium, phosphorus, magnesium, zinc and copper. These metals occur naturally in soil and water and are taken up from there by the plants and animals which we use as food.

The heavy metals mercury, lead and cadmium are very different from the essential metals. They are of no nutritional value and so are considered as contaminants when they are present in food. The heavy metals are poisonous and, like pesticides, can build up in the body over a long period of time. This means that even very small amounts can have harmful effects when taken in by human or other animals. Because of this, the level of heavy metal contamination which can be permitted in food and drinking water is very low.

The amount of heavy metal which gets into food from natural sources is usually too low to cause any harm. However, high levels have recently been found in some types of food. This has caused a great deal of concern and seems to be due to industrialisation and the resulting increase in the output of industrial waste containing heavy metals.

An example of this is the contamination of fish and shell fish by mercury which has caused serious problems in Japan. The mercury was found to have come from a chemical processing plant which was pouring its waste products into the sea near where the fish were caught.

The risk of mercury poisoning is made worse by some bacteria which can take up mercury wastes and use them to produce a chemical called methyl mercury which is especially poisonous.

The use of lead in insecticides, petrol, paints and many other industrial products means that there is plenty of opportunity for small amounts of this metal to get into food and contaminate it. Lead is also used in the soldering of some containers and may contaminate food kept in them.

Cadmium has been found in some earthenware cups and other cooking utensils which have been made from materials with a high cadmium content. It is also present in some super-phosphate fertilisers.

CONCLUSIONS

The levels of contamination which make food unacceptable have been worked out from tests on animals for a wide range of food contaminants and food types. These are only guidelines, however, and are always being checked against new research findings and altered if necessary.

In order to reduce the dangers of food contamination, it is important to set up an effective quality control system which can be used to check for the presence of contaminants in all food products. Food which was found to be unacceptably contaminated could then be withdrawn from sale and a high standard of food quality could be maintained.

It is also necessary to investigate methods of protecting food from contamination and to introduce and enforce any suitable measures.