

Fast food fears

Considerable disquiet is being expressed over the risk to health posed by acrylamide traces in fast foods, particularly fried dishes. The discovery by scientists in Sweden earlier this year that certain foods, notably fried potatoes and French fries, contained significant concentrations of acrylamide triggered a number of warnings by health authorities throughout the world.

The World Health Organization has listed acrylamide among probable carcinogens for humans. However, despite the increase in consumption of fast foods during the past three decades, there has emerged no indisputable indication that cancers associated with exposure to acrylamide have increased in incidence. The compound, also known as propanamide, is nevertheless ranked as toxic and irritant, absorbable through intact skin and giving rise to central nervous paralysis. Traces have been found in bread, vegetables and meats.



In a report published in the *Journal of the American Medical Association* for 6 November 2002, it is stressed that there is at present no consensus over the possible hazard of acrylamide in the concentrations in which it has been detected. The Food and Drug Administration in the United States, at a meeting on 30 September 2002, called for better assessment of exposure to acrylamide in food and development of techniques for reducing its formation during the processes of cooking. There are plans for extending studies, since acrylamide is claimed to be not only carcinogenic but also mutagenic to sperm at low concentrations.

Food experts are concerned with discovering precisely how acrylamide is formed during cooking and how to identify dietary items other than European and North American foods that contain significant quantities of it. Previous studies have shown that acrylamide may be formed when foods are heated above 120°C

because of reactions between amino-acids such as asparagine (in potatoes and cereals) and reducing sugars. Its safe level of consumption is unknown, and there is wide variation in its concentration, depending on the techniques employed by the cook.

The air we breathe

We cannot avoid breathing to stay alive, and when we have to breathe polluted air, illness, minor or major, is inevitable. Many studies have been carried out on pollutants in recent years to determine whether it is possible to set limits that might be considered safe. The results have been disappointing.

In a review in *The Lancet* for 19 October 2002, Bert Brunekreef of Utrecht and Stephen Holgate of Southampton remark that in the developed world of the 1970s, concentrations of aerial pollutants in industrialised societies were considered unlikely to affect health adversely, but since then the problem has emerged as a major health issue. Although pollution from the combustion of traditional fossil fuels has greatly decreased in developed countries, though not in the developing world, other air pollutants have gained prominence. Ozone, nitrogen oxides and particulate matter are particularly worrying.

For many millions of people who live in rural areas in developing countries, indoor pollution from biomass fuels is vastly greater than elsewhere and results in the deaths of more than two million children every year from acute respiratory infection. Fossil fuels from heating and power systems and motor vehicles account for most of the anthropogenic emission of nitrogen oxides. Then particulates as solids and liquids suspended in the air, varying in size from a few nanometres to several micrometres, may penetrate into the lungs.

Guidelines for ozone, nitrogen dioxide and particulate matter in ambient air have been set by the World Health Organization, the United States Environmental Protection Agency and the European Union, but they reveal some disparities. In particular, for nitrogen dioxide the WHO and EU standards are only 40 per cent of the limit set by the US. WHO has stated that it is unable to define a threshold dose for particulate matter below which no

adverse effects might be expected. And risks for death calculated by different countries show great disparities. Respiratory and cardiovascular conditions calling for hospital admission, and days of restricted activity due to exposures, vary widely, but health effects from polluted air are estimated to be greater than those from many other environmental factors. Air pollution, therefore, must be regarded as a major menace to health.

Mercury menace

Mercury is an element with highly unusual characteristics and associations. For one thing, it has no known physiological role in the scheme of things, which sets it apart from other elements present in our natural habitat, especially since it is otherwise highly reactive. It exists in three distinct forms, to wit, elemental mercury, inorganic mercury compounds, and organic mercurials, notably methylmercury. Exposure to inorganic mercury is recognised as an occupational hazard, and it may be encountered in dental surgery in the form of a mercury-silver amalgam.

As methylmercury the element occurs in rivers and seas as the result of contamination, and human exposure to it follows the consumption of fish, shellfish and marine mammals as food. Large predatory fish such as swordfish and sharks are likely to contain the highest concentration of about 1 microgram per gram, while trout, tuna, pike and bass may contain up to half this amount. Shellfish normally have lower concentrations.

Two papers published in the *New England Journal of Medicine* for 28 November 2002 report findings related to the possible effects of methylmercury on health. Since the poisoning episodes in Japan some years ago it has been understood that adverse clinical outcomes range from paraesthesias and blurred vision to more specific effects such as concentric vision and deafness, and in extreme cases coma followed by death. In pregnant women suffering methylmercury effects there may be retarded neurological development in a foetus. The National Academy of Sciences in the United States has advised that women who are pregnant, or likely to become so, should avoid eating fish likely to contain the greatest amounts of methylmercury, notably king mackerel, tilefish, shark and swordfish. The same advice has been given to breast-feeding mothers and young children. Only when consumption exceeds about 340g per week of these fish is methylmercury poisoning likely to occur.

The papers published in the *NEJM* do not support any association between mercury exposure and risk of coronary heart disease, although there may be a weak relation. It is thought that the cardioprotection of the fatty acids in fish may diminish with rising methylmercury content.