EDITORIAL

CHEMICAL RESIDUES IN FOOD OF ANIMAL ORIGIN

The presence of chemical residues in food of animal origin has been of great concern worldwide. The chemicals of interest include pesticides, drugs, growth hormones and environmental contaminants which accidentally find their way into the food chain. Because these residues are in extremely low concentrations, it is not possible to state with a high degree of certainty their toxicological significance. Nevertheless, they must be considered undesirable. The publication of a book, *Silent Springs*, by Rachel Carson in 1962 marked an important watershed and created public awareness regarding the deleterious effects of pesticide residues. Initially dismissed as a ñhysterical womanò, she is now considered one of the most influential writers of all time. In her book, she described a future time in which birds, non-target insects (honeybees), earthworms, etc would have been eliminated by pesticide residues leading to a ñbiological desertò devoid of bird songs. Most of her comments were directed at DDT residues.

The ó*Codex alimentarius'* sets the maximum residue limits (MRL) for specific chemicals in different animal species and tissues. For example, the MRL for chlortetracycline in cow milk is 100 εg/l. while that for neomycin in chicken egg is 500 µg, among others. The MRL is normally attained if the ówithdrawal timesô for drugs used in food producing animals are observed. The withdrawal time or withholding period is the time after treatment when milk, eggs or flesh from the treated animal are not to be consumed. In the case of pesticides used on plants, the MRL is achieved by specifying the post harvest interval (PHI). For water, the MRL may be specified depending on certain considerations. The assumption is that pesticides (insecticides, herbicides and fungicides) degrade progressively or are eliminated until they fall below the MRL.

From September 2008, new regulations were enacted in the European Union in an attempt to control pesticide residues in food and horticultural products. Article 152 of the treaty establishing the European Community gives details regarding residues of Veterinary Medicines and some pesticides in food of animal origin. The specific details are to be found in ó*Council Directive 96/23/EC*ô that lays down strict requirements that must be met regarding residues in live animals and products of animal origin.

In the USA the problem is addressed through the Food Animal Residue Avoidance Databank (FARAD) which the FDA relies on in the registration of drugs meant to be marketed for use in animals. Legislation regarding chemical residues in food and horticulture has been used as trade barriers to hinder import and export of these products, particularly from African developing countries.

At the international level, the problem of chemical residues has been addressed adequately by the joint ó*FAO/WHO Expert Committee on Food Additives*ô. The most recent meeting of this committee was held at the FAO headquarters in Rome between February 4th and 12th in the year 2004. The proceedings of this meeting are available as the Sixty-second Report of FAO/WHO (WHO Technical Series No. 925). In this report, the committee specifically considered the problem of chloramphenicol residues. Ironically, chloramphenicol is not used in food producing animals such as cows, goats or chicken. For some unexplained reasons, however, it has received a lot of attention. For example it was considered in the 12th, 32nd and 42nd reports of FAO/WHO of 1969, 1988 and 1995, respectively. A number of other agencies have also reviewed the issue of chloramphenicol residues. These include the International Agency for Research and Cancer (IARC) in 1990, the European Committee for Veterinary medicine products and the US Food and drug Administration. Surprisingly, chloramphenicol has been detected in food samples in

shrimps, prawns, honey, royal jelly, meat, sausage casings and milk powder. These latter observations bring into sharp focus the emotive subject of environmental pollution, responsible for introducing chemical residues into the food chain, culminating in their ingestion by humans.

There is inconclusive evidence linking human illness such as allergic reactions and antimicrobial resistance to sub-therapeutic levels of drug residues. Antibiotic residues also interfere with cheese and yoghurt manufacture since they inhibit microorganism growth. In the case of chloramphenicol, there is suspicion it may be linked to genotoxicity, embryotoxicity, fetotoxicity and carcinogenicity. An article in this issue of the journal by Wesonga *et al.* describes a sensitive immunoassay method for chloramphenicol in animal tissues and shows that, two weeks after administration of the drug, the levels had declined to below the limit of detection (LOD) which is given as 0.1 ng/ml. Ideally the MRL should be close to the LOD or limit of quantitation (LOQ).

Editor-in-Chief