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Toxicities & chemical health hazards III

Which toxicological effects should be considered?

The most common implication for a chemical hazard is the likelihood of it causing cancer. Other adverse health effects include: photosensitisation, neurological disorders, congenital defects and dermatological, genetic, teratogenic, immunological and reproductive disorders.

When characterising risks arising from hazardous chemicals one should be careful not to phrase statements on safety in terms of only one outcome as these are often viewed with scepticism.

How to define dose response characteristics

The traditional way of defining dose response characteristics is the 'no observed adverse effect level' (NOAEL) method in which the maximum amount of substance that shows no effect is measured.

'Acceptable daily intake' (ADI) or safe level of intake can be modified to the term 'tolerable daily intake' if one includes contaminants and other exogenous chemicals.

In determining 'maximum residue level' (MRL) one needs to be able to estimate consumption levels of various feedstuffs. 'Health based guidance values' (HBGVs), such as ADI, for some chemicals associated with chronic toxicity are expressed as tolerable weekly (or month) intakes to reflect the long-term nature of their effects.

ADIs and MRLs play an important role in establishing withholding times for drugs used in the treatment of food-producing animals.

Although we will not consider them here, other terms likely to be encountered include:

- As low as reasonably achievable (ALARA)
- Margin of exposure (MOE)
- Estimated daily intake (EDI)
- Benchmark dose (BMD)
- Reference dose (RfD)