Occurrence of Pyrrolizidine Alkaloids in Food

Area of research interest: Chemical hazards in food and feed
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Background

Pyrrolizidine alkaloids (PAs) are naturally occurring toxins found in a wide variety of plant species. PAs are produced as a defence mechanism against insect herbivores by plants. More than 660 PAs have been identified in over 6000 plant species. Ingestion of 1,2 unsaturated PAs can be damaging to the liver; they are genotoxic and may act as carcinogens in humans. Exposure to PAs needs to be minimised because of the health risks associated with them.

Food can contain PAs as a result of contamination with PA containing plants. Potential sources of exposure are honey and pollen dietary supplements (if bees harvest pollen of PA-plants), salad crops and cereals (if contaminated with PA-weeds), herbal products, supplements and teas (prepared from, or contaminated by PA-containing plants) and products of animal origin (meat/milk/eggs - if food producing-animals graze on PA-plants or feed contaminated with them).

Objective and Approach

In November 2011, following a request from the European Commission, The European Food Safety Authority (EFSA) panel on Contaminants in the Food Chain (CONTAM Panel) delivered a scientific opinion on PAs in food and feed. The panel's recommendations included that 'ongoing efforts should be made to collect analytical data on occurrence of PAs in relevant food and feed commodities' in order to inform future safety evaluations. This research was conducted in response to this recommendation to gather data on the UK market and to inform risk management discussions.

In total, 224 samples of herbs, tea and honey have been analysed using LCMS-MS. This allows for a wide quantitative screen of many PAs. Samples were analysed for 19 pyrrolizidine alkaloids for which analytical standards were commercially available at the time of the survey.

Results

The samples used in this report were collected in early 2014 and should no longer be considered representative of what is available on the market now. The findings of this report have led to positive changes in agricultural practices and recent industry results continue to show a reduction in PA levels. The results have been fed into the EFSA dataset and have been used in discussions on managing the risks associated with the presence of PAs in food and feed at European level.

The EU legislation which is expected to be adopted in 2020 will set maximum levels for PAs to ensure the industry continues to work to get levels as low as reasonably achievable. The FSA will continue to work closely with the industry to monitor levels of PAs and drive improvements where necessary.

Research report
PDF
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