

SURVEY OF AFLATOXINS AND OCHRATOXIN IN NUTS AND DRIED FRUIT AND STERIGMATOCYSTIN IN PEANUTS Q&A

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BACKGROUND

Aflatoxins

Q1. What are aflatoxins?

A1. Aflatoxins are a group of toxins formed by certain moulds which may grow on a number of food commodities particularly in the tropics and sub-tropics. The formation of aflatoxins depends on temperature and humidity and on the commodity on which the moulds grow.

Q2. Why are aflatoxins of concern?

A2. Aflatoxins have been shown to be mutagenic (ie damage DNA) and can cause cancer in a number of animal species. In addition, there is evidence to suggest they may cause liver cancer in humans.

Q3. What foods does aflatoxin occur in?

A3. Contamination is usually associated with edible nuts, dried figs and spices but some cereals, especially maize imported from some countries, can also be contaminated. Milk and milk products may also be contaminated due to the consumption by ruminants of feed contaminated with aflatoxins.

Q4. Are there any UK regulations setting limits for aflatoxins in food?

A4. Yes, these are the Contaminants in Food (Amendment) Regulations 1999 (SI [1999] No. 1603), which were made under sections of the Food Safety Act 1990. They set limits for aflatoxins in groundnuts, nuts, dried fruit, cereals and a limit on aflatoxin M₁ in milk. A higher limit is provided for groundnuts, nuts and dried fruit intended for further processing before human consumption.

Q5. Why aren't the limits set at zero?

A5. The limits are low and were set on the basis that they represent the lowest technologically achievable consistent with meeting food safety objectives. The higher limit for unprocessed commodities recognises that processing and sorting can reduce the levels of aflatoxin contamination in consignments below that of the lower limit.

Q6. Why are only certain products regulated?

A6. The Regulations are targeted at those products which surveillance has indicated may be most highly or most frequently contaminated with aflatoxin. These make the highest contributions to consumer exposure and controls targeted at these products is the most effective way of reducing exposure.

Q7. What testing is being done?

A7. Regular monitoring is carried out by Port Health Authorities on imports of these commodities and local authorities monitor retail products. Samples are

checked for compliance with the Regulations and appropriate action is taken where any sample exceeds the regulatory limit. For example re-dispatch outside the EU, use other than human consumption or seizure with a view to magistrates ordering destruction. Periodic surveillance is also undertaken by the Food Standards Agency.

Q8. What other surveys of aflatoxins in nuts and dried fruit have been carried out?

A8. Surveys for aflatoxins in nuts and dried fruit, particularly dried figs and dried fig products, have been carried out regularly since 1976. The last survey of aflatoxins in nuts and dried fruit was reported in 1996.

Q9. What did the previous survey show?

A9. Approximately 29% of the nut samples and 23% of the dried figs and fig paste samples taken at import contained unacceptable levels of aflatoxins. These contaminated consignments were refused entry into the UK by the Port Health Authorities. Three samples out of 148 (2%) of the retail samples of nuts, nut products and dried figs contained unacceptable levels of aflatoxins. The products affected were peanuts and peanut butter. Action was taken to ensure that remaining stocks of affected batches of peanut were removed from sale. A recall notice was issued in the press for the batch of peanut butter.

Q10. Have any studies been carried out to assess the exposure of UK consumers to aflatoxins in the diet?

A10. An estimate of the exposure of UK population to aflatoxins in the diet was carried out in 1996 as part of an EC Scientific Co-operation project. The results indicated that the overall exposure was low and that exposure estimates were comparable to or less than those in other EC countries.

Ochratoxin A

Q11. What is ochratoxin A?

Q11. Ochratoxin A is a mycotoxin, a toxic chemical naturally-produced by certain moulds in some foods. The formation of ochratoxin A is affected by moisture and temperature. Storage in warm, damp conditions favours production of ochratoxin A.

Q12. Why is ochratoxin A of concern?

A12. Ochratoxin A has been shown to be mutagenic (ie damage DNA) and to cause cancer and kidney damage in a number of animal species. It has been associated with the development of a kidney disease and the development of cancer in some human populations. However, no definite link has yet been established.

Q13. What foods does ochratoxin A occur in?

A13. Ochratoxin A has been found as a contaminant in a number of cereals and cereal products and dried vine fruits (currants, raisins and sultanas). Other commodities such as coffee, cocoa, wine, grape juice and beer may also be

affected. Ochratoxin A has also been found in food products from non-ruminant animals exposed to ochratoxin A in animal feedingstuffs.

Q14. Are there any UK regulations setting limits for ochratoxin A in food?

A14. Not yet. Harmonised EC Regulations setting maximum levels for ochratoxin A in cereals, cereal products and dried vine fruit currants, raisins and sultanas have been agreed and are due to come into force early in 2002. However, in the meantime the provisions of the 1990 Food Safety Act make it an offence to supply food that is grossly contaminated.

Q15. Why aren't the limits set at zero?

A15. The limits were set on the basis that it represents the lowest technologically achievable, consistent with meeting food safety objectives.

Q16. Why are only certain products regulated?

A16. The proposed Regulation is targeted at those products which surveillance has indicated are most highly or most frequently contaminated with ochratoxin A. These make the highest contributions to consumer exposure and controls targeted at these products is the most effective way of reducing exposure. The Regulation does provide for other products such as coffee, wine etc. to be included at a later date if this appears necessary to protect public health.

Q17. What testing is being done?

A17. Ochratoxin A is found more frequently in dried vine fruit than in nuts and nut products but, currently, dried vine fruit are not routinely monitored by enforcement authorities since there are currently no regulatory limits for this toxin. Nuts and nut products are not routinely tested by enforcement authorities for ochratoxin A since the toxin is not generally a problem with these commodities.

Q18. What other surveys of ochratoxin A in nuts and dried fruit have been undertaken?

A18. No previous surveys for ochratoxin in nuts and nut products have been carried out. Dried dates and dried vine fruits and figs and dried vine fruits were included in surveys carried out in 1996 and 1998 respectively. Details of these surveys are available in Food Surveillance Information Sheets No. 130, November 1997 and No. 185, August 1999. They are also available on the Internet at http://www.food.gov.uk/food_surv.htm.

Q19. Have any studies been carried out to assess the exposure of UK consumers to ochratoxin A in the diet?

A19. Duplicate diets were supplied by 50 volunteers on a weekly basis and were analysed for total ochratoxin A content. Reassuringly, the levels of ochratoxin A in each of the 50 diets indicated that exposure was well within the safe limit recommended by the European Commission's Scientific Committee for Food (<5 nanograms/kg body weight/day).

Sterigmatocystin

Q20. What is sterigmatocystin?

A20. Sterigmatocystin is a mycotoxin, a toxic chemical naturally produced by certain moulds. The formation of sterigmatocystin is affected by moisture and temperature. Storage of food and feed commodities in warm, damp conditions favours production of sterigmatocystin.

Q21. Why is sterigmatocystin of concern?

A21. Sterigmatocystin has been shown to be mutagenic (i.e. damage DNA) and to cause cancer in a number of animal species. It is possible that sterigmatocystin may have similar effects in humans following the ingestion of contaminated foods. However, a definitive link remains to be established.

Q22. What foods does sterigmatocystin occur in?

A22. Reports of sterigmatocystin occurrence in foods are infrequent but it has been found in peanuts, cereals, particularly maize, and cheese.

Q23. Are there UK regulations on sterigmatocystin?

A23. No. However, the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment has advised continued vigilance to ensure that this mycotoxin does not contaminate the food supply.

Q24. Has sterigmatocystin been found previously in foodstuffs in the UK?

A24. Sterigmatocystin was found in a few samples of maize products in a survey reported in 1980. No sterigmatocystin was found in samples of cheese, cereals and maize-based retail products surveyed in 1997/8.

THE SURVEY

Q25. Why was the survey carried out?

A25. The survey was undertaken to check compliance of retail nuts, nut products and dried fruit with the current Regulations on aflatoxins and to determine the incidence and levels of aflatoxins and ochratoxin A in these products and sterigmatocystin in peanuts in order to assess consumer exposure to these toxins.

Q26. Which products were sampled?

A26. Samples of nuts, nut products (cashews, peanuts, peanut butter, pistachios, almonds, pecans, pine nuts, walnuts, chestnuts, hazelnuts and other nut butters) and dried fruit (figs, prunes, dates and apricots) were obtained. These were selected to include a wide range of stores both supermarkets, smaller shops and market stalls. Although the samples were taken to reflect market share a wide range of brands were covered in order to ensure that the survey was as representative as possible of the supply of the products to consumers in the UK.

Q27. Why was an additional survey carried out?

A27. The main survey identified elevated levels of aflatoxins and ochratoxin A in some samples of nuts and nut products. A further short survey was therefore commissioned to assess the situation in more detail and to permit action to be taken in respect of those products repeatedly found to be contaminated.

Q28. How were the samples collected?

A28. For mycotoxin surveys carried out by the Agency a representative retail sample, in this case of 1kg in weight, is taken. Where the product was retailed in packs of less than 1kg, a number of retail packs were purchased ensuring that all came from the same batch, and these were mixed thoroughly before analysis. In a small number of cases the total sample weight was less than 1 kg. However, as this still represented the combination of individual retail packs from a single production batch, these samples were accepted for analysis.

Q29. Was a sampling plan used?

A29. There is an official plan approved sampling plan for official control of nuts at the point of import but this plan is quite specific for bulk commodities and does not easily translate to a retail situation and therefore a representative sample was taken. This is an issue that is discussed in the Agency's Guidance Notes for interpreting aflatoxin regulations (point 17-20).

Q30. What is the Agency doing about devising a retail sampling plan?

A30. The Agency has commissioned a research project on retail sampling; the purpose of which is to identify, for a range of commodities, an optimum number of individual retail packs that are representative of the production batch for a variety of processed foods.

Q31. What products were aflatoxins found in?

A31. Aflatoxins were found in peanuts, peanut butter, other nut butters and pistachios.

Q32. What products were ochratoxin A found in?

A32. Ochratoxin A was found at unusually high levels in 1 sample of pistachios and 1 sample of dried figs in the main survey.

Q33. What products were sterigmatocystin found in?

A33. Sterigmatocystin was not found in any of the peanut samples.

Q34. Which products contained the highest levels of aflatoxins?

A34. The highest levels of aflatoxins were found in peanuts and pistachios.

Q35. Which products contained the highest levels of ochratoxin?

A35. Only 1 sample of dried figs and 1 sample of pistachios in the main survey contained high levels of ochratoxin A. Ochratoxin A does not usually occur in pistachios and no ochratoxin A was found in a sample of the same brand of pistachios analysed in the additional survey.

ACTION TAKEN

Q36. What were the conclusions of the survey?

A36. There is a continuing need for monitoring of these products, both by the Port Health Authorities, when consignments are imported, and by Local Authorities at the retail stage. Manufacturers and importers need to maintain vigilance to ensure that their supplies comply with the requirements of the legislation. The aims of the Agency are to work with industry and enforcement authorities to reduce the incidence of contamination to as low a level as possible.

Q37. If there are UK Regulations on aflatoxins why are there products on sale which contravene these Regulations?

A37. Studies have demonstrated that aflatoxins and other mycotoxins are seldom uniformly distributed throughout most food and feed commodities, their occurrence being uneven and spasmodic. Although manufacturers endeavour to remove contaminated kernels, seeds or dried fruit by sorting or other physical treatment during processing such sorting cannot be guaranteed to be one hundred percent effective. Therefore, it is possible on occasions for such contaminated individual kernels, seeds or dried fruit to finish up in a packet or jar of a product on retail sale.

Q38. What action is industry taking?

A38. Industry is taking steps to improve quality control and quality assurance measures in an effort to further reduce the underlying incidence of mycotoxin contamination.

Q39. What action has the Agency taken?

A39. The Agency has taken the following action:

- When the Food Standards Agency was notified of a sample containing aflatoxins above the legal limit the company with the high result was immediately contacted. Those companies whose products contained levels of concern were asked to undertake a product recall, which was carried out. The Food Standards Agency has met with manufacturers to discuss their quality control and quality assurance measures in an effort to further reduce the underlying incidence of unacceptable levels of aflatoxin contamination.
- The Food Standards Agency has met with manufacturers to discuss their quality control and quality assurance measures in order to further reduce the underlying incidence of unacceptable levels of mycotoxin contamination. All companies with results greater than the UK regulatory limits were contacted.

- For the additional survey those companies whose products contained levels of concern were requested to undertake a product recall. The local authorities for these companies were informed and they undertook to ensure that the product recalls were carried out as effectively as possible. EU Member States were informed *via* the EC's Rapid Alert System for Food.
- The Agency has notified the European Commission that the current restrictions on Iranian Pistachios are clearly not working and has asked it to consider re-imposing the temporary ban on imports.

Q40. What future action is proposed by the Agency?

A40. The following future action is proposed by the Agency:

- The Agency is not content with the level of mycotoxin incidence in retail foods and will be calling a further meeting with industry; manufacturers and importers, to discuss significant improvements to their quality control procedures.
- The Agency will also discuss the matter with enforcement agencies - local authorities and port health officials, to set in place sampling strategies to follow up this work, emphasising imports of non-compliant samples should be rejected or seized with a view to magistrates ordering destruction.
- The Agency will continue to monitor for mycotoxins in these and other foodstuffs. The programme of work will be formally reviewed in 2002. One of the anticipated outcomes is that a new programme of surveys for a range of food commodities susceptible to mycotoxin contamination will be produced.

FUTURE WORK

Q41. What future research/survey work is planned on these toxins?

A41. Current research projects are looking at the effect of low and high input farming systems on the occurrence of mycotoxins in grain. A study is also in progress to develop appropriate sampling plans for obtaining samples for mycotoxin analysis at the retail level. Surveys currently in progress involve maize products and dried vine fruits. The Agency has a programme of surveys which looks at mycotoxin levels in various commodities at regular intervals.

AGENCY ADVICE

Q42. Are nuts, nut products and dried fruit safe to consume?

A42. Consumer exposure to aflatoxins is controlled by EC regulatory limits in certain foods, including nuts, nut products and dried fruit. Sampling is carried out by Port Health Authorities to ensure imports comply. Regular checks are also carried out at manufacturer's premises and at retail level by Trading Standards Officers and Environmental Health Officers. The levels found in the survey were generally low and there is no need for anyone to avoid eating these products.

Q43. Is this problem limited to the UK?

A43. No. Surveys carried out in other EU Member States have shown similar results to the UK.

Q44. What action do consumers need to take?

A44. The levels found in the survey were generally low. Consumers have no need to alter their dietary habits and there is no need for anyone to avoid eating these products. The consumption of a very small amount of a mycotoxin on a single occasion such as consumption of a contaminated packet of nuts or a jar of peanut butter is unlikely to cause any ill effects.