



Aflatoxins in pistachios

New reference materials for food-safety testing



What are mycotoxins?

Mycotoxins are naturally-occurring substances produced by fungi growing on food and animal feed. Aflatoxins are the most toxic group of mycotoxins, and they are produced by two species of the *Aspergillus*, a fungus which is especially found in areas with hot and humid climates. Since aflatoxins are known to be genotoxic and carcinogenic, exposure through food should be kept as low as possible.

Health concerns

- Aflatoxin contamination is a frequent risk, particular in warmer regions. In the last years, there have been frequent outbreaks of **acute intoxication** through food contaminated with aflatoxins, which led to several mortalities in Kenya.
- The EU has set **maximum legal limits** for the aflatoxin content in food and feed, to protect consumer and animal health in Commission Regulation (EC) No. 1881/2006. Those mycotoxins for which there are currently specific maximum levels include aflatoxins, ochratoxin A, patulin and the *Fusarium* toxins including deoxynivalenol, zearalenone and fumonisins.
- Special conditions governing certain foodstuffs **imported from specified countries outside the EU**, due to the risks of aflatoxin contamination of these products, are laid down in Regulation (EC) 1152/2009. The Regulation currently includes peanuts and peanut products from China and Egypt, pistachios and pistachio products from Iran, dried figs, hazelnuts, pistachios and derived products from Turkey, peanuts and unshelled Brazil nuts from Brazil and almonds from the USA.
- The European Food Safety Authority (EFSA) launched a project in July 2009 to predict the **effect of climate change** on aflatoxin B₁ in cereals. The project will build predictive models, define scenarios and create maps to highlight potential future contamination of cereal crops in the EU due to climate change.



Reported violations

The Rapid Alert System for Food and Feed (RASFF) of the European Union is a tool to inform Member States about detected risks related to food and feed. In 2009, it reported 638 violations of the maximum level of aflatoxins. Aflatoxins caused around 20% of all reported violations, and 136 violations were caused by aflatoxin-contaminated pistachios (http://ec.europa.eu/food/food/rapidalert/index_en.htm).

The EU has the authority to implement restrictive measures on the import of pistachios. In 1997, Decision 97/613/EC temporarily suspended imports of Iranian pistachios. The ban was repealed by Decision 97/830/EC, but several conditions were then imposed to imports of pistachios from Iran, including the need for imported consignments had to be accompanied by the results of official sampling and analysis.



Selected production statistics for pistachio for 2003 (Source: FAOSTAT)

	Iran	Turkey	USA	Syria	China	Greece
Production (MT)	310,000	85,000	52,620	50,000	28,000	8,500
% of world production	57%	16%	9.7%	9.2%	5.2%	1.6%



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Fungal contamination and production of aflatoxin can occur in the field, at harvest, during post-harvest operations and in storage. The shells of most pistachio nuts split naturally in the orchard prior to harvest. Sometimes the hull is attached to the shell so that it splits with the shell, exposing the kernel to mould and insects. This is called an “early split”. Besides splitting, hull rupture may occur from very late harvesting, bird damage and cracking. The navel orange worm (*Amyelois transitella*) commonly infests nuts with ruptured hulls and has been associated with very high levels of aflatoxins.



Reference materials for accurate testing of foodstuffs

The JRC’s Institute for Reference Materials and Measurements (IRMM) produces a range of certified reference materials for mycotoxins. These reference materials are distributed to analytical laboratories all over the world. They are used to calibrate equipment and develop and validate reliable methods of measurement.

JRC-IRMM supplies high-quality reference materials for a number of mycotoxin/matrix combinations e.g. aflatoxin M1 in milk powder, aflatoxins B and G in peanut products, deoxynivalenol in flour, ochratoxin A in wheat and zearalenone in maize. There are over 14 certified reference materials for aflatoxins alone. It is currently developing a new set of reference materials for aflatoxins in pistachios.

Summary

- Consumers are protected via a system of controls involving analytical measurements which require accuracy and reliability.
- The JRC’s Institute for Reference Materials and Measurements (IRMM) is a leading provider of certified reference materials for food safety applications.
- The JRC-IRMM’s reference material, coming from an independent European body, are accepted and used in laboratories worldwide as benchmarks.