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☐ Mycotoxins

The word is derived from Greek *μύκης* (*mykes, mukos*) meaning "fungus" and Latin *toxicum* meaning "poison". Mycotoxins, a naturally-occurring toxic substance, grow on a wide range of foodstuffs including cereal grains, coffee beans and fruit. In the presence of specific conditions, some grow during storage of food. Most of the thousands of known mycotoxins are harmless to man and beast. A few are hazardous to humans and animals at low concentrations, and lethal at high concentrations.

☐ Increasing Awareness

Food safety implications of mycotoxins have come to light for three reasons: advances in the ability of analytical chemistry to identify and quantify toxins in food commodities; improved bioassays employed in toxicology studies have now confirmed negative health outcomes where previously none were found; constant monitoring and access to efficient and affordable routine testing has revealed larger numbers of contaminations.

☐ Ochratoxin A

The scientific community, and regulators in several jurisdictions, have drilled down to one particular mycotoxin - Ochratoxin A (OTA) - for three reasons: i) Peer-reviewed toxicology studies have concluded that OTA is hazardous to human and animal health; ii) OTA can intensify on cereal crops during storage, in the presence of specific pH, moisture and temperature; iii) OTA presence on green coffee beans has global health implications.

☐ OTA Regulations

In 2002, the European Commission regulated OTA limits in dried vine fruit (i.e. raisins), cereals, cereal-based food, and, infant and toddler food; in 2006, roasted coffee beans, ground coffee, grape juice and wine were added. In 2009, Health Canada proposed similar limits on raw cereals, cereal derivatives (i.e. bran, flour), direct consumer grains (i.e. rice, oats), breakfast cereals, grape juice and related products (wine), dried vine fruit, and cereal-based infant and toddler food. The USA's FDA has not (yet) set any OTA advisory limits or action levels.

☐ OTA Control Strategies

Most livestock will reject highly-contaminated feed, an important, early clue which spawned and spurred scientific investigation into OTA.

OTA grows in the field. Growth can begin during transportation and storage when the acidity, temperature, and moreover, moisture levels of the grains nourish the fungus and toxins.

Pre-harvest measures include optimum crop management, such as soil testing, crop rotation, irrigation and antifungal treatments. Insect and weed prevention can reduce lacerations which render the plant vulnerable to OTA infestation. Breeding studies to introduce OTA resistance into crops, involving both traditional and genetic modification techniques, remain experimental.

Post-harvest measures focus on reduction of moisture levels, for example, through massive drying instruments, and, maintaining dry and fungus-free storage and transportation vehicles. HACCP plans have been employed to reduce the incidence of OTA post-harvest. The coffee industry applies Operating Characteristic Curves to control OTA.

In 2007, the UK Food Standards Agency released a UK Code to Reduce OTA in Cereals. Last month, the Canadian Grain Commission released a comprehensive Guideline to Reduce Ochratoxin A During Storage.

☐ OTA Monitoring

A UK four-year survey of legislated mycotoxin levels in food recently released year-one results, showing only seven of the 220 foods sampled to be in violation, one of which contained excessive OTA. Non-compliant products were removed from commerce. To prepare for potential future legislation, the FDA monitors domestic and imported foodstuffs for several mycotoxins, including OTA. The University of California at Berkeley carries out an OTA Carcinogenic Potency Project. The University of Guelph Food Safety Network has published an OTA Fact Sheet. **FF**