iMIS Food - Mycotoxins Hazards Table

Mycotoxin (toxin from Fungi)	Fungus	Agricultural raw materials and food products	ADI of AWI (ug/kg body weight)	Effects	Legislative Regulations	Comments
Aflatoxin (five species: B1, B2, G1, G2; MI occurs in milk and comes from B1) and M2 (MI and M2 are conversion products of Aflatoxin B1, B2 into lactating mammals	Asperqillus flavus Asperqillus parasiticus	Cereals, buckwheat, maize and maize products, cottonseed, peanuts, other types of nuts (pistachio-nuts, walnuts), spices, dried figs, milk (products), sesame seed soy and soy products.		Acute toxicity; degradation of liver and kidneys. Chronic: carcinogenic (cancer forming) especially in the liver.	Maximum levels according to Regulation (EC) 2023/915	Aflatoxin B 1 is the most common a In milk (products) is the most comm formed after B 1 is broken down. Ar processed in milk to M 1. M 1 is not a carcinogenic as B 1. Next to M 1 are products of B 1 present in milk, Fun during transport and storage in the characterised by high temperature range 8-37) and or high humidity (: countries (VS) are aflatoxins mainly difficult growth seasons (growth st
Ochratoxin A and B	Aspergillus Penicillium species	Barley, rye, wheat, rice, maize, peanuts, Brazilian nuts, peppers, Cotton seed, and Cheese.	AWI of toxin A: 0,112 (JECFA, 1990) limit: 10 ug/kg food product. LD 50 (rat, oral) of toxin A: 20 mg/kg		Maximum levels according to Regulation (EC) 2023/915	Toxin A is more toxic than B. In the low amounts found that the risk is g and therefore is there no norm. Gro possible in a temperate climate. To: at > 221 °C
Sterigmatocystine	Aspergillus versicolor; Aspergillus ruber; Aspergillus flavus; Penicillium luteum; Aspergillus nidulans, Bipolaris.	Grain, buckwheat, wheat, rice, peanut, soy, cheese, cheese crust, green coffee beans and melting cheese.	No ADI	Acute: Damage to liver, teratogenic. Chronic: mutagenic and carcinogenic.	Maximum levels according to Regulation (EC) 2023/915	In the Netherlands research was co presence of toxins in grain, buckwh products. Toxins were not found an control is considered unnecessary.
Patulin	Apergillus clavatus; Penicillium roqueforti; Penicillium expansum; Penicillium patulum	Apples, apple juice, molded fruits, grains, cheese and sausage	AWI: 7 (JECFA, 1989)	Acute toxicity: (damaging of lungs, brains, liver and kidneys); carcinogenic effects are not found (IARC, 1985).	Maximum levels according to Regulation (EC) 2023/915	During the fermentation of apple ju C destruction takes place. The Patu an indication for the handling of GM establish that rotten apples are not
Ergot alkaloids	Claviceps purpurea; Claviceps paspali	Rye (mainly), wheat, barley, oats.	ADI: 0,001 mg/kg (Human). Medicinal: 0,125 mg/kg	Hallucinations, gangrene. Carcinogenicity is not proved yet.	Maximum levels according to Regulation (EC) 2023/915	Europe : last human case was in 195 was it a common disease (St. Anth encapsulated by stiff purple granul takes already place at the agricultu
Deoxynivalenol (DON)	Fusarium spp., Fusarium graminearum	Wheat, barley, maize, oats, rye, rice, grain flakes and bran.	ADI Adults: 3 ADI, children: 1,5 (NRC, Canada 1985)	Acute toxic: several effects (such as vomiting and degradation of immunity). Possible tetragene. Carcinogenicity is not proven.	Maximum levels according to Regulation (EC) 2023/915	The interactions and toxicity are re more research is preferred. Fusariu grains in temperate climates and its produced at the agricultural level.
Nivalenol (NIV)	Fusarium tricinctum	Wheat, barley, maize, oats, rye, rice, cereal flakes and bran.		Possible carcinogenic for esophagus and liver.	Maximum levels according to Regulation (EC) 2023/915	Mostly found next to DON and toxi mainly on the agricultural level.
Fumonisin B1, B2 and B3	Fusarium moniliforme	Maize and maize products			Maximum levels according to Regulation (EC) 2023/915	
T2-toxin	Fusarium spp.	Millet, wheat, oats, barley, rye, buckwheat, peanuts, maize and sorghum.		Acute toxicity: alimentary toxic aleukia (ATA) → 80% dies. Possible also mutagenic and teratogenic.	Maximum levels according to Regulation (EC) 2023/915	The growth of the fungus is stimula temperatures, especially around th Hibernating grains on the field is no The inactivation of toxins happens a higher than 200 °C.
Zearalenone (ZEN)	Fusarium spp., among others: Fusarium graminaerum Fusarium roseum, Fusarium culmorum, Fusarium moniliforme	Maize, sorghum, wheat, barley.		Negative estrogenic effects on fertility. Probably mutagenic, teratogenic and carcinogenic.	Maximum levels according to Regulation (EC) 2023/915	Forming of toxins is stimulated by t long time around the freezing point changes from low to moderate. Fun happens mainly on the field but it is during storage. Inactivation of the t temperatures higher than 165 °C.
Rubratoxine A and B	Penicillium rubrum	Ground, peanuts, legumes, maize, and sunflower seeds.		Acute toxicity	Maximum levels according to Regulation (EC) 2023/915	Diseases are often found in animals contaminated animal feed. Inactiva happens at temperatures higher th B at temperatures higher than 170 '
Yellow-rice-toxins (o.a. citrinin, citreo- viridin)	Penicillium spp. sometimes Aspergillus spp. Penicillium citrinum and Penicillium veridicatum.	Rice, wheat, barley and peanuts.		Citrinin: LD 50 b for rats, oral = 50 mg/kg.	Maximum levels according to Regulation (EC) 2023/915	Citrinin gets inactivated around t than 172 °C; citreoviridin at temper 110 °C. <i>P.Citrinum</i> produces (excep yellowish pigment that becomes fi light.
Fycotoxins		Algae, and fish products (as a consequence of the food supply) especially shellfish naturally in plants.		Toxic and or unfavourable for the bioavailability of nutrients.	Maximum levels according to Regulation (EC) 2023/915	Heat resistant during normal prepa occurring toxins; solanum-alkaloids glucosinolates in cabbage species a mushrooms.



a and toxic carcinogen. mmon aflatoxin M 1 Around 1-3% B 1 is t as poisonous and re other break-down ungus mostly grows he tropics, mostly res (optimum 25 °C: (>83%). In developed nly caused during stress).

he Netherlands, such s perceived as very low irowth fungus is Toxin A is inactivated

conducted on the /heat, and soy and therefore the

juice to cider, vitamin atulin content can be GMP guidelines (to iot used).

951. In the middle ages honiusvuur). Toxins are µles. Toxin forming tural level.

relatively unknown; ium spp. is found on its toxins are

kins are produced

lated by low the freezing point. not recommended. s at temperatures

y temperatures for a int and temperature ungal growth t is also possible e toxins happens at

Ils that consumed ration of toxin A han 214 °C and toxin) °C.

d temperatures higher eratures higher than ept citrinin) also a fluorescent under UV

paration treatments, ds in potatoes, s and agaritine in