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Editorial

Milk Contamination and Regulatory Updates

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This editorial investigates the crucial role of milk and dairy products in nutrition, the risks posed by contaminants, as well as the latest updates on regulations for Aflatoxin M_1 (AFM_1) in these products.

Milk and dairy products are considered as the cornerstones of a nutritious diet providing essential nutrients to improve overall health. Rich in high-quality proteins, essential amino acids, calcium, phosphorus, and vitamins including B12 and riboflavin, they are proven vital for growth, bone health, and various bodily functions. They are particularly beneficial for groups with specific nutritional needs, such as children, adolescents, pregnant women, and the elderly (Rahimzadeh Barzoki et al., 2023; Heshmati et al., 2020; Kamkar et al., 2014). However, the risk of contamination in milk appears to be a significant concern. During collection and processing, milk may be contaminated with pesticide residues, heavy metals, mycotoxins, hormones, and other harmful substances. These contaminants often originate from the food or medications provided for cows. A particularly dangerous contaminant is AFM_1, a mycotoxin produced by *Aspergillus flavus* and *A. parasiticus* molds present in animal feed. Ingesting contaminated feed can transfer AFM_1 into milk (Rahimzadeh Barzoki et al., 2023; Mozaffari Nejad et al., 2020; Kamkar et al., 2010). The International Agency for Research on Cancer (IARC) classifies AFM_1 as a Group 1 carcinogen, indicating their potential to cause cancer in humans (IARC, 2002).

The regulation of AFM_1 is regarded as a global challenge, with over 80 countries setting limits, however, more harmonization in their standards is demanded. The Iranian National Standards Organization (INSO) updated their guidelines in 2020, providing maximum permitted levels of AFM_1 in raw milk and dairy products (Table 1) (ISIRI, 2020). Similarly, the European Union's recent commission regulation (EU) 2023/915, effective from 25th April 2023, assigns new limits for contaminants in these products, superseding previous regulations (Table 2) (EC, 2023).

Table 1: Maximum tolerance levels of Aflatoxin M_1 (AFM_1) in milk and dairy products in Iran

Food Products	Maximum limit (µg/kg)
Raw milk, heat treated milk (pasteurized milk, sterilized milk, all flavored milks)	0.1
All cheeses	0.25
Powdered milk for children	0.025
Yoghurt, butter, ice cream, cream, butter milk, whey, curd	0.1
Powdered milk, powder whey, all powder milk except children	1

Table 2: Maximum levels for Aflatoxin M_1 (AFM_1) contaminants in milk and dairy products in European Union (EU)

Food Products	Maximum limit (µg/kg)
Raw milk, heat treated milk, and milk for the manufacture of milk-based products	0.050
Infant formulae, follow on formulae and young-child formulae	0.025
Food for special medical purposes intended for infants and young children	0.025

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Through applying these developments, researchers must incorporate these regulatory updates into their studies, maintaining ethical standards and neutrality by avoiding specific brand names. Instead, generic labels including Brand 1, Brand 2, and Brand 3 should be deployed.

This editorial highlights the importance of milk and dairy products, the health risks of contaminants including AFM_1, and the need for up-to-date regulations. This editorial aims to enhance awareness and advocate for rigorous safety measures in the dairy industry.

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