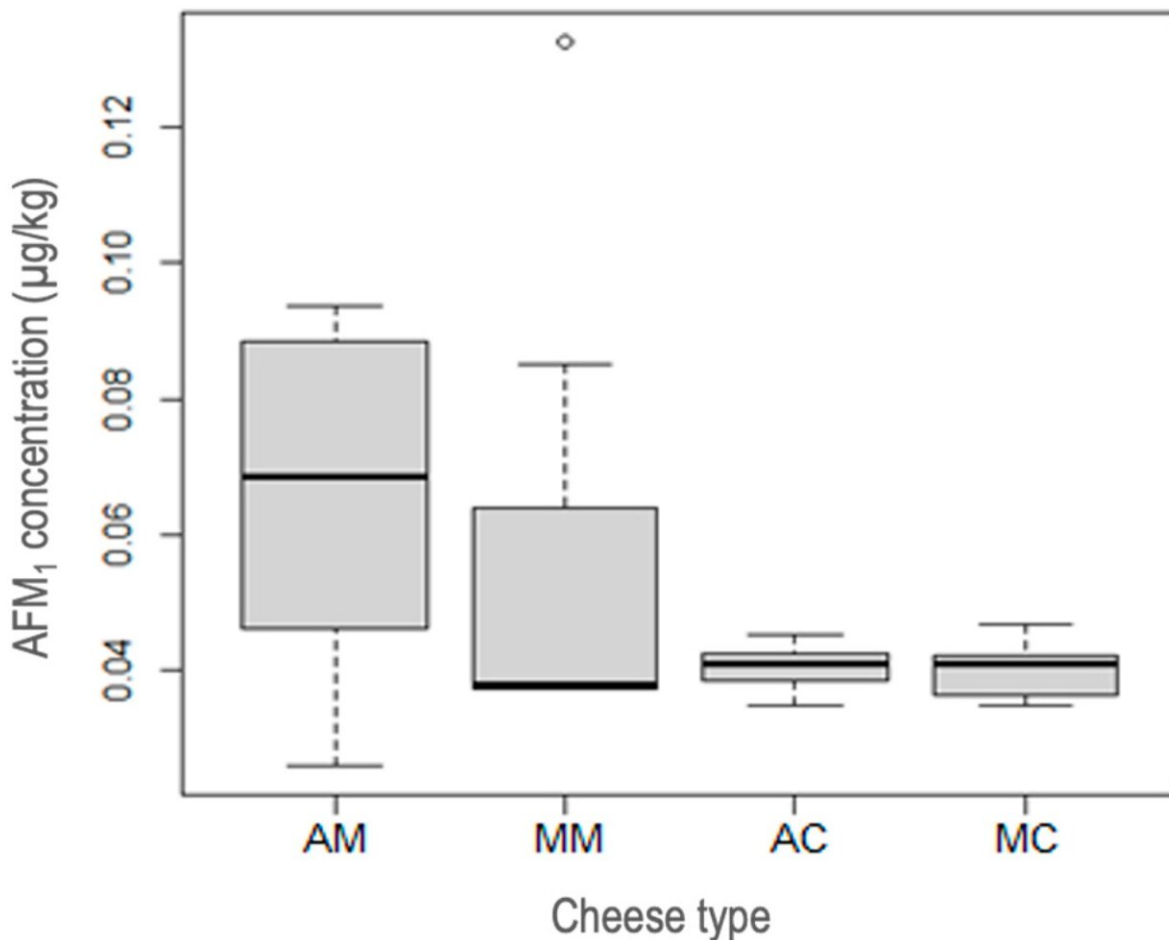


Study: Toxins detected in samples of curd cheese and artisan mozzarella in Brazil

May 25 2023, by Mônica Tarantino



Box plots representing statistical comparison of AFM₁ level in artisanal mozzarella (AM, n = 7), manufactured mozzarella (MM, n = 7), artisanal coalho (AC, n = 7), and manufactured coalho (MC, n = 7) cheeses. The black line inside each box, represents median. Credit: *Toxins* (2023). DOI: 10.3390/toxins15030182

Strictly speaking, cheese should be completely free of aflatoxins, a class of toxic compounds that are produced by certain molds found in food, and can cause liver damage and cancer. In practice, however, the technology used to produce milk and cheese is unable to guarantee the total absence of aflatoxins, as demonstrated by research performed in several countries. In the latest study conducted in Brazil on this subject, a team of researchers analyzed 28 samples of curd cheese and mozzarella produced in Araripe, a subhumid area within the semi-arid region of Pernambuco State (Northeast Brazil). The samples were collected between March and May 2022.

The results are reported in an article published in the journal *Toxins*. The analysis revealed the presence of aflatoxins in all samples. The highest levels were found in artisan mozzarella, but none had more than 0.25 $\mu\text{g}/\text{kg}$ (micrograms per kilogram). This is the [upper limit](#) permitted by the European Union and was chosen by the researchers as their parameter as well.

In Brazil, the limit for AFM1 is 2.5 $\mu\text{g}/\text{kg}$, ten times the maximum acceptable level in the EU.

"If this study had been conducted three decades ago, it would probably have found aflatoxins in less than half of the samples. Technological progress has lowered the detection threshold, so we were able to be more rigorous," said Carlos Augusto Fernandes de Oliveira, last author of the article. His research interests include the study of mycotoxin contamination, and he is a professor at the University of São Paulo's School of Animal Science and Food Engineering (FZEA-USP) in Pirassununga.

The institution has one of Brazil's most advanced laboratories in this

field and was able to analyze the samples using high-performance liquid chromatography (HPLC), an analytical chemistry technique used to separate, identify and quantify each component in a mixture. Aflatoxins become fluorescent when exposed to ultraviolet radiation.

According to the authors, although the samples complied with the applicable legislation in Brazil, and the cheeses in question can be regularly sold and consumed, the findings should ring alarm bells. "The presence of [aflatoxin](#) M1 in all of the samples shows that each stage of the production chain needs to be improved, from the milking of cows to product finishing. The [dairy industry](#) has developed significantly in the last 20 years and has worked hard in this direction, but society needs to demand [best practices](#) in agriculture, dairy farming and cheese production," Oliveira said.

The scientists are concerned because aflatoxins are a health hazard. They are monitored by the Ministry of Agriculture in Brazil. Aflatoxin B1 may be present in milk if [cattle feed](#) or forage is contaminated by fungi such as *Aspergillus flavus* and *A. parasiticus* (particularly abundant in the tropics), as can happen if storage conditions are improper.

If ingested in feed, the substance is processed by the liver and converted into equally harmful aflatoxin M1, which is soluble in water and finds its way into cow's milk. It is resilient and is not eliminated by heat or cold during pasteurization and other processing steps.

Aflatoxin M1 does not bind to tissue or internal organs. "If a person doesn't ingest any other contaminated matter, in about 72 hours there will be none of it left in the organism," Oliveira said.

According to the International Agency for Research on Cancer (IARC), which is part of the World Health Organization (WHO), aflatoxin M1 increases the risk of alterations in DNA and is classified as carcinogenic.

"It can affect our genes in theory, but it can also be excreted without causing problems. The FAO [Food and Agriculture Organization] recommends that countries set the lowest limit technologically possible for aflatoxins," Oliveira said. This helps understand why the Brazilian limit is higher than the EU's.

Oliveira believes studies like this should not discourage consumers who, like him, love cheese. "My advice is to choose products from trustworthy sources that undertake to follow the Brazilian Health Ministry's recommendations," he said.

In response to our inquiries, the Brazilian Cheese Industry Association (ABIQ) said it had no knowledge to date of any mention of aflatoxins in Brazilian cheese and would discuss the matter at its next meeting, as well as requesting inclusion of curd cheese in the regulatory legislation. It also said it does not represent artisan [cheese](#) makers.

More information: Isabela Maria de Moura Silva et al, Incidence and Levels of Aflatoxin M1 in Artisanal and Manufactured Cheese in Pernambuco State, Brazil, *Toxins* (2023). [DOI: 10.3390/toxins15030182](https://doi.org/10.3390/toxins15030182)

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