Hungarian Dairy Research Institute Ltd.

MILKCHECK workshop, 11-12 November 2025.
(Ms. Katalin Szabó - HDRI)

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Why Aflatoxin?

Although most of you are already familiar with the general background of aflatoxins, a short overview helps to put our recent findings into context. ☺

- **Aflatoxins** are among the most significant **food safety hazards** influenced by changing climatic conditions.

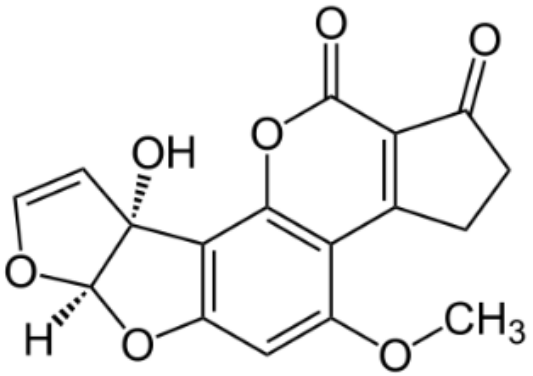
- **Climate change** (higher temperatures, humidity, drought stress) increases the **risk** of fungal **contamination** (Aspergillus flavus) in agricultural products, **foodstuffs** and crops used as **animal feed**.

- Consequently, **aflatoxin** contamination in the food chain poses a **growing risk to** human and animal **health**.

Why Aflatoxin M1?

AFM1 is a hydroxylated derivative of AFB1, appearing **in the milk** of cattle fed with AFB1-contaminated feed.
Although AFM1 is about ten times less toxic than AFB1, it is still **classified as a human carcinogen** (Group 1, IARC).

Milk and dairy products are **key components** of the **human diet**, making AFM1 contamination a relevant public health concern.
AFM1 is heat-stable — pasteurization, UHT, or other dairy processes do not significantly reduce its concentration



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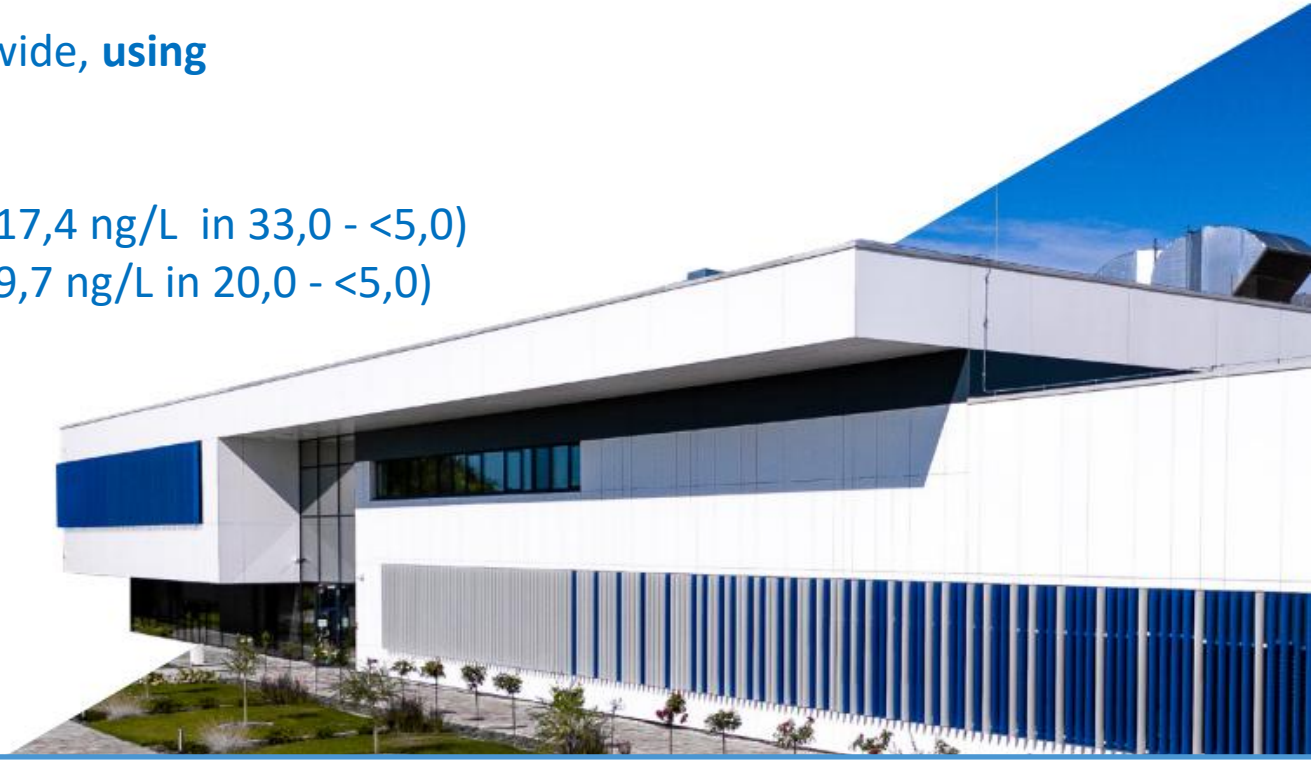
AFM1 Testing at HDRI Ltd.

HDRI Ltd. accredited laboratory has been **testing** AFM1 in milk and dairy products (cheese, milk powder) for **over 10 years**.

In 2025, more than 300 samples analyzed so far nationwide, **using** R-Biopharm **ELISA** R1121 **(accredited method)**.

- Raw milk samples:	270	(average value: 17,4 ng/L in 33,0 - <5,0)
- Consumer milk samples:	30	(average value: 9,7 ng/L in 20,0 - <5,0)

Above-EU-limit results in2025: only 5 row milk samples
(EU limit value: 50 ng/L)



Previous Study, Publication in Journal of Food Composition and Analysis 121, 2023)

Study objective: monitor seasonal variation in AFM1 concentration over one year.
Almost 500 Hungarian samples (raw and consumer milk) **analyzed using ELISA** R1121 (R-Biopharm) across four seasons.

Advantages of ELISA Method

Low detection limit, Simple sample preparation, Reliable and robust, Fast and cost-effective
Suitable for large-scale routine monitoring

Key Findings of the Study

Higher AFM1 concentrations were detected in autumn for both raw and consumer milk samples.
Likely linked to the hot summer period, which may have increased AFB1 levels in feed.
15% of the mesured raw milk samples exceeded the EU limit (50 ng/L).
Almost all measured consumer milk samples remained below the EU limit, except for one.

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Conclusion

Continuous monitoring of AFM1 levels is essential to **ensure food safety** and enable rapid intervention.
Considering the impact of climate change, **early detection** and **regular** nationwide **testing** play a key role in risk management.

Introducing HPLC Method at HDRI

HDRI Ltd.'s laboratory is **planning** in 2025 to implement the AFM1 **HPLC-based testing method**, based on the standard ISO 14501:2021
We intend to adopt this method because HPLC-based analysis offers greater **selectivity, accuracy** and **traceability** compared with ELISA screening alone.

While ELISA is excellent for **routine rapid screening** (low cost, high throughput), **HPLC** serves as a confirmatory method that can reduce false positives/negatives, provide **quantitative precision** and detect lower levels in **complex matrices**. Therefore, by adding the HPLC method we strengthen our analytical capability, improve compliance reliability and reinforce food-safety assurance for milk and dairy products.

Thank you for your attention – MTKI Laboratory

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