

Aflatoxins in dairy cattle

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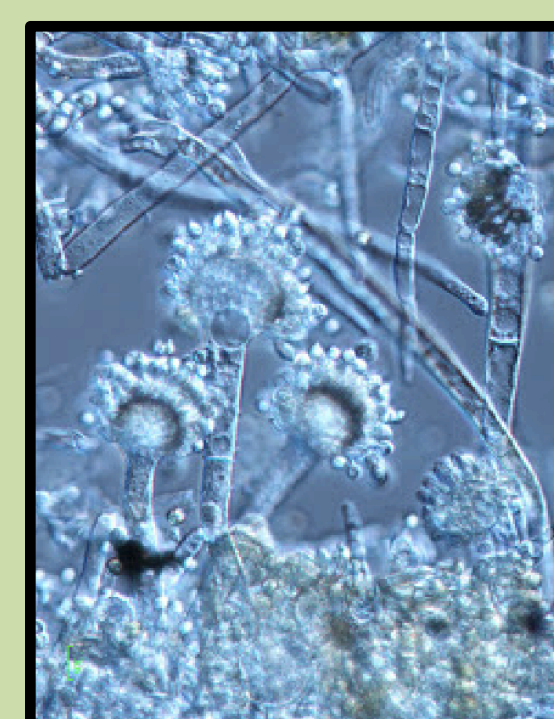
OBJECTIVES

- ✧ Effects of Aflatoxins on dairy cattle and Aflatoxin transmission in milk.
- ✧ Aflatoxin effects in humans.
- ✧ **Methods to avoid the presence of Aflatoxins in milk.**

AFLATOXINS

Produced by *Aspergillus flavus* and *Aspergillus parasiticus*, particularly during storage of raw materials and compost food.

★ Especially in **warm** and **dry** conditions.



Aspergillus parasiticus.
Jéssica Gil Séma.

TYPES OF AFLATOXINS

| NATURAL FORMS | OXIDATIVE FORMS IN MILK |
|--------------------------|--|
| AFB₁ ★ | AFM₁ ★ |
| AFB ₂ | AFM ₂ |
| AFG ₁ | 80% of the natural ones are AFB ₁ |
| AFG ₂ | |

★ Most common, carcinogenic and toxigenic form.

★ Most common form in milk. Less carcinogenic and hepatotoxic than AFB₁.

AFLATOXICOSIS

There is acute and chronic intoxication, **chronic intoxication** being the most common.

DNA alteration → carcinogenic and hepatotoxic effects.

Subclinical effects, such as more susceptibility to illnesses and decrease of production parameters.

MILK AFLATOXINS EXCRETION

- ✧ Involves intercellular filtration, passive diffusion across membranes or active transport via secretion vesicles.
- ✧ **95%** of Aflatoxins in milk are **AFM₁**.
- ✧ Other forms present in milk are AFM₂, AFL, AFM₄ and AFQ₁.

★ **Transfer rate** ranges from **0.3** to **6%**.

REDUCE AFLATOXINS IN MILK

Preventing the formation of Aflatoxins is very important, but once Aflatoxins are present in food, other strategies ought to be used in order to reduce their concentration in milk. These strategies consists of the use of **inorganic** and **organic adsorbents** and **mycotoxin modifiers**.

INORGANIC ADSORBENTS

Aluminosilicate

Activated carbon

The most important group are aluminosilicates. Within this group, the most extensively studied molecule is **Calcium Montmorillonite clay**, a bentonite.

| Calcium Montmorillonite clay | | |
|--------------------------------|------------------------|---------------------------------|
| AFB ₁ (µg/kg MS) | Adsorbent (g/kg MS) | ↓ Transfer range in milk (%) |
| 112 | 5.6 | 47 |
| 121 | 6 | 55.3 |
| | 12.1 | 70.2 |
| 117 | 5,8 | 51,4 |
| | 11,7 | 70,09 |

ORGANIC ADSORBENTS

Yeast cell wall components

Lactic acid bacteria

Micronized fibers

CONCLUSIONS

1. Big economic impact: on human and animal health and on food production.
2. Adsorbents act in a dose-dependent manner.
3. It will be interesting to study the synergic effects of different adsorbents in order to reduce Aflatoxins contamination.
4. When fighting Mycotoxicosis, we have to remember that we usually find co-contamination.
5. To counteract Aflatoxicosis, we have to combine good agricultural practice and different detoxifying agents.