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Aflatoxin: Toxicity to Dairy Animals and Harmful Effect of milk to Human

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Introduction

Milk and dairy products from animals that have eaten contaminated feed may contain aflatoxin M1, which is a metabolite of aflatoxin B1 (AFB1). Even though AFM1 is less potent than AFB1, it can still have a detrimental impact on health and cause financial losses while also being harmful to people, animals, and crops. According to the United Nations Food and Agricultural Organization, at least 25% of the world's food crops contain mycotoxins, including AFM1, which can jeopardize the safety and purity of dairy products. Consequently, it is essential to confirm the inclusion of AFM1 in these goods and protect customers of all ages from any possible risks. Due to AFM1's high toxicity and carcinogenic potential, it is crucial to keep milk and dairy products of a high caliber and to prevent AFB1 from contaminating animal feed by using efficient food preparation methods that can lower the risk of contamination.

Occurrence Of Aflatoxin in Feeds of Dairy Cattle

When it comes to feed contamination, environmental variables that have an impact on crops before they are harvested are also very important. When crops are subjected to dryness, close planting, weed rivalry, less fertilizer, and other plant-stressing circumstances, aflatoxins contamination of the crops in the field is more frequent. Cows rely heavily on cottonseed as a source of protein, but like maize, this crop is very prone to aflatoxin contamination. High ambient temperature, high relative humidity, and mechanical damage to the stems or plants before drying are the main contributors to the aflatoxin contamination of cotton in the field. Aflatoxin contamination may also be widely distributed as a result of watering crops and severe boll-worm infestation.

Responses of Dairy Cows to Ingested Aflatoxin

Volatile fatty acids are essential for calves' ability to produce milk and energy. Aflatoxin may have interfered with rumen microbial activity, resulting in a decrease in the production of volatile fatty acids, which may have contributed to the decrease in milk output seen in dairy calves after consuming the toxin.

Aflatoxin intake by dairy cows can have a number of negative consequences, including

1. Wastefulness
2. lethargic behaviour, and anorexia
3. Other signs of aflatoxin exposure in calves include normal or below-normal body temperatures.
4. Skin that is flaky and dry on the nose
5. rectocele rupture,
6. Liver harm
7. Increased blood cholesterol values
8. Glutamic oxaloacetic transaminase and bilirubinedema in the abdominal cavity.

Determination of Aflatoxins in Milk and Milk Products

Flatoxins are a particular class of food toxin that are typically detected at concentrations lower than 20 parts per billion. (ppb). Aflatoxin M1 is one type of aflatoxin that is usually found in concentrations between 0.1 and 5 ppb.

Aflatoxin levels are primarily measured using two distinct types of tests: biological and physicochemical. Bio-assays are semi-quantitative studies that show how the test substance affects a tissue or an organism. (Such as mortality, lesions, etc.). However, using biological methods to measure aflatoxins in dairy products is rare.

In physicochemical studies, the test compound's physical or chemical characteristics are used to estimate its concentration. Fluorescence, ultraviolet light absorption, and color shifts brought on by chemical reactions are a few examples of these characteristics. To measure aflatoxins, thin-layer chromatographic techniques can use either a visual or an instrumental way of quantifying fluorescence. Another method for analyzing AFM is high-performance liquid chromatography, which relies either on fluorescence or UV light absorption.

Treatment Or Stability of Aflatoxin in Milk

Aflatoxin M1 is known to have reduced stability in raw milk, with a significant reduction of approximately 40% observed after 4 days and about 80% after 6 days of storage at 0°C. Even at 5°C,

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the amount of AFM1 was reduced by 11 to 25% after being stored for only 1-3 days. However, naturally contaminated milk showed a more rapid decline in AFM1 compared to artificially infected milk.

To prevent the direct contamination of milk with AFM1 and AFM2, it is important to implement good farm management practices, proper storage, and suitable processing, shipping, and handling techniques. Antifungal agents can also be used when necessary.

One effective method of reducing the amount of AFM1 in milk is through pasteurization. The amount of inactivated aflatoxin increases with increasing temperature, with a 32% reduction achieved through bulk pasteurization at 62°C for 30 minutes. High-temperature, short-time (HTST) procedures at 72 ºC and 80 ºC for 45 seconds resulted in a 45% and 64% decrease in AFM1 content, respectively.

References

Prandini A, Tansini G, Sigolo S, Filippi L, Laporta M, and Piva G. (2009). On the occurrence of aflatoxin M1 in milk and dairy products. Food Chem Toxicol 47, 984-91.

Ardic M, Karakaya Y, Atasever M, and Adiguzel G. (2009). Aflatoxin M1 levels of Turkish white brined cheese. Food Control 20, 196-9.

Hussain I, and Anwar J. (2008). A study on contamination of aflatoxin M1 in raw milk in the Punjab province of Pakistan. Food Control 19, 393-5.