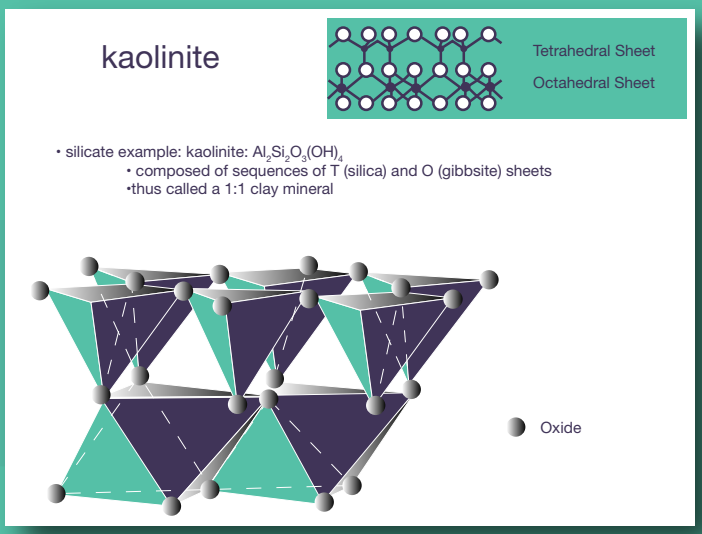
MIC ANIMAX+

Animax+ is a natural Aflatoxin adsorbent agent, consisting of activated black kaolinite (Aluminum silicate), below acceptable limits of heavy metals and dioxins. It can adsorb high levels of aflatoxin with a low inclusion rate without any negative effect on animals.

Introduction:

The animal production sector is one side of the food security for humanity, in addition to its main products such as milk, meat, and eggs this sector provides natural fertilizers and many other products that are useful in life needs. The productivity of the farm animal depends on its genetic potential and all surrounding environments. Feed is the main source of all needed nutrients, and its quality will affect its nutrient content. The anti-nutritional factors that influence feed quality may come from the same plant or from a natural fungus that produces mycotoxins affecting the plant and its product from the field to reach the animal as a feed component.



Mycotoxins are natural components produced by multiple fungi in the field and during the process of harvesting, transporting, and storage. Mycotoxins create a big threat to animals' and humans' health when they consume any feed/food. Globally, massive economic losses on the animal/aquaculture producers due to reduction in its productivity. Aflatoxins are a group of mycotoxins primarily produced by Aspergillus that induce stress, reduce feed intake, and increase the mortality rate during infection in poultry. Aflatoxin B1 is the most prevalent and toxic.

In dairy cattle, Aflatoxin B1 has been reported to impair liver function, reduce milk yield and quality, impair immune response, and increase susceptibility to infectious diseases. Aflatoxin B1 is metabolized in the liver to aflatoxin M1, which can then be excreted in milk, posing significant health risks to humans. The presence of aflatoxin M1 in milk is of particular concern, as it is carcinogenic and strictly regulated by food safety authorities worldwide. Therefore, minimizing aflatoxin levels in dairy products is a priority for producers.

Ducklings followed by turkey poults, broilers, and laying hens are the most sensitive species to the aflatoxins as these showed 100% mortality at 1 mg/kg of aflatoxin B1. According to the side of infection, aflatoxin will cause hepatocarcinogenic effects, and/or respiratory tumors if it is inhaled from infected feed.



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The black kaolinite Animax+ is a natural layered silicate mineral that is processed to be a high aflatoxin adsorbent **-keep the toxin between its layers, or inside its pores-** feed additive to prevent a high level of aflatoxins from being absorbed through the gastrointestinal tract to the animal body by capturing these toxins in its pore and its layers keeping them until they released out of the body. Animax+ has no desorption rate at (pH 6.5) reflecting its efficiency as an adsorbent agent. Animax+ has a low inclusion rate (0.5 - 1 kg/Mt complete feed). The low particle size of Animax+ (45 microns) allows it to be distributed in all particles of the feed.

The adsorption efficiency of Animax+ was tested in one of Global labs - Trilogy Analytical Laboratory - aganist a high level of Aflatoxin at different inclusion rate of Animax+, as shown in Figure (1).

Figure (1): The adsorption efficiency of Animax+ at a high level of aflatoxin with different inclusion rate.

Certificate of Analysis

TRILOGY

Trilogy Analytical Laboratory
office: 636.239.1521
toll free: 855.256.8244
fax: 636.239.1531
870 Vossbrink Drive,
Washington, MO 63090 USA

Manaseer Industrial Complex Company

P.O. Number:
Client Sample ID: Animax +
Matrix: Clay

Date Received: 11/28/2022
Date Reported: 12/19/2022
Certificate No: S11282022-19105 V.1
Trilogy ID: S223321038-102845

Comments:

	Aflatoxin B1	Aflatoxin B1	Aflatoxin B1	Aflatoxin B1	Aflatoxin B1
% Adsorption	99.9	100.0	100.0	100.0	100.0
	99.9	100.0	100.0	100.0	100.0
	99.9	99.9	100.0	100.0	100.0
% Adsorption Average	99.9	100.0	100.0	100.0	100.0
% Desorption	0.0	0.0	0.0	0.0	0.0
	0.0	0.1	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0
% Desorption Average	0.0	0.0	0.0	0.0	0.0
Calculated % Efficiency:	99.9	100.0	100.0	100.0	100.0
Inclusion Rate:	0.5 kg/ton	1 kg/ton	1.5 kg/ton	2 kg/ton	2.5 kg/ton
Toxin Concentration:	100 ppb	100 ppb	100 ppb	100 ppb	100 ppb
Adsorption pH:	3.0	3.0	3.0	3.0	3.0
Desorption pH:	6.5	6.5	6.5	6.5	6.5

Method Reference: Internal SOP-12-149

MIC ANIMAX+

Effect of supplementing Animax+ on Aflatoxin M1 in dairy cow milk

An experiment was conducted in the Jordan University- Research Center to measure the effect of Animax+ on levels of aflatoxin M1 for dairy cows that have high natural levels of aflatoxin B1. The level of aflatoxin B1 reached up to 17 ppb/kg in the complete feed. The results showed that adding 1 Kg of Animax+ / Mt feed will significantly reduced Aflatoxin M1 level in dairy cattle milk without affecting its components as shown in figure (2) and table (1). In addition to that Animax+ tends to enhance the milk yield in the last 2 weeks of the experiment as shown in figure (3). Aflatoxin B1 has an enormous effect on cellulosic bacteria by inhibiting its ability to degrade cellulose and reduce volatile fatty acid production. Animax+ adsorb aflatoxin B1 allows the bacteria to be more efficient in degrading fibers which will result in enhanced energy and microbial protein levels. Animax+ maintains liver functionality by reducing the hepatotoxic effect of aflatoxin. All the energy and proteins that will be used as immunity will be towed to cow productivity. These effects were shown by the insignificant enhancement in the milk components of the dairy milk.

Table (1): The effect of Animax+ on milk components.

Item	Treatment		SEM	*P*-value		
	CON	Animax+		Treatment	Week	Treatment × week
Milk yield (kg/d)	16.4	20.1	1.6	0.14	<0.01	0.06
Milk variables						
Fat (%)	3.57	3.90	0.22	0.31	0.04	0.96
Protein (%)	2.60	2.64	0.06	0.69	0.04	0.93
Solid non-fat (%)	7.96	8.03	0.12	0.66	0.16	0.55
Lactose (%)	3.75	3.76	0.08	0.93	0.15	0.31

[1]CON = control diet; Animax+ = control diet supplemented with Animax+ (1 g/kg) (Animax+, Manaseer Industrial Complex, Jordan).

Figure (2) The Effect of Animax+ on Dairy Milk Aflatoxin M1 Levels.

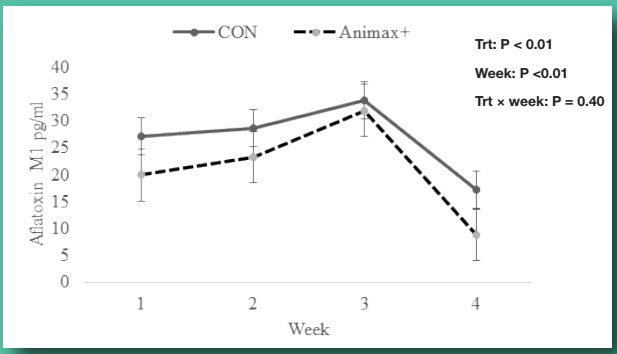
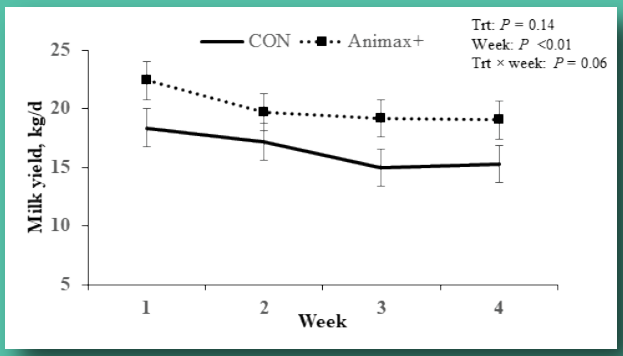


Figure (3) The Effect of Animax+ on Dairy Milk Yield.



MIC ANIMAX+

Effects of supplementing Animax+ on aflatoxin M_1 levels in dairy cow milk

Abstract

Aflatoxins can adversely affect milk production, milk quality, and cow health. Besides, it poses a significant risk to human health. Hence, identifying nutritional approaches aimed at mitigating the aflatoxin levels in dairy products is warranted. The objective of this study was to evaluate the effects of toxin binder (Animax+) on cow productivity and the levels of aflatoxin M_1 in milk in lactating dairy cows. Ten lactating Holstein cows (564 ± 19 kg of BW; 110 ± 22 days in milk; 2.7 ± 0.4 parity) were used in an experiment. Cows were randomly assigned to 1 of 2 diets: a control diet (CON; n = 5) or the control diet supplemented with 1 g/kg of Animax+ (n = 5). Cows were fed their respective diets for 14 days. After this pre-feeding phase, they entered a 4-week experimental period. Milk yield was recorded daily. Milk samples were obtained once weekly. Data were analyzed using MIXED procedure of SAS. Milk production tended to increase in Animax-fed cows relative to CON cows (26%; $P = 0.10$) in weeks 3 and 4. Milk composition was unaltered by dietary treatments ($P \geq 0.31$). Feeding Animax+ reduced aflatoxin M1 levels (22%; $P < 0.01$). In summary, supplementing with 1 g/kg of Animax+ tended to increase milk yield and reduced aflatoxin M1 levels.



MIC ANIMAX+

Conclusion:

• Feeding Animax+ as a natural solution that will ameliorate the effect of aflatoxin on ruminants and poultry.
• Feeding Animax+ as a natural solution will maintain the liver functionality and prevent it from being affected by Aflatoxin which will make it more metabolically functional.
• Feeding Animax+ as a natural solution to ruminants will reduce aflatoxin residual in the milk and keep its consumers away from being affected by this toxin.

Additional References:

• Moussa AI, Sobeih AMK, Al-Hawary II, Elkassas WM and Barakat R, 2020. **Efficacy of kaolin and bentonite clay to reduce aflatoxin M1 content in contaminated milk and effects on milk quality.** Pak Vet J, 40(2): 181-186. http://dx.doi.org/10.29261/pakvetj/2020.001.

• Teleb, H.M.; Hegazy, A.A.; Hussein, Y.A. 2004. **Efficiency of kaolin and activated charcoal to reduce the toxicity of low level of aflatoxin in broilers.** Scientific Journal of King Faisal University Basic and Applied Sciences 5(1): 145-160.

Animax+ Components:

PARAMETER	SPECIFICATION
Total Silica (SiO_2)	≥ 50 %
Aluminum Oxide (Al_2O_3)	≥ 17 %

Dosage:

• Dosage poultry and ruminant 0.5-1 kg/ MT Feed – based on technical advice.

Shelf Life:

3 years.

Storage:

Store in original packaging in a cool and dry environment; avoid direct exposure to sunlight.