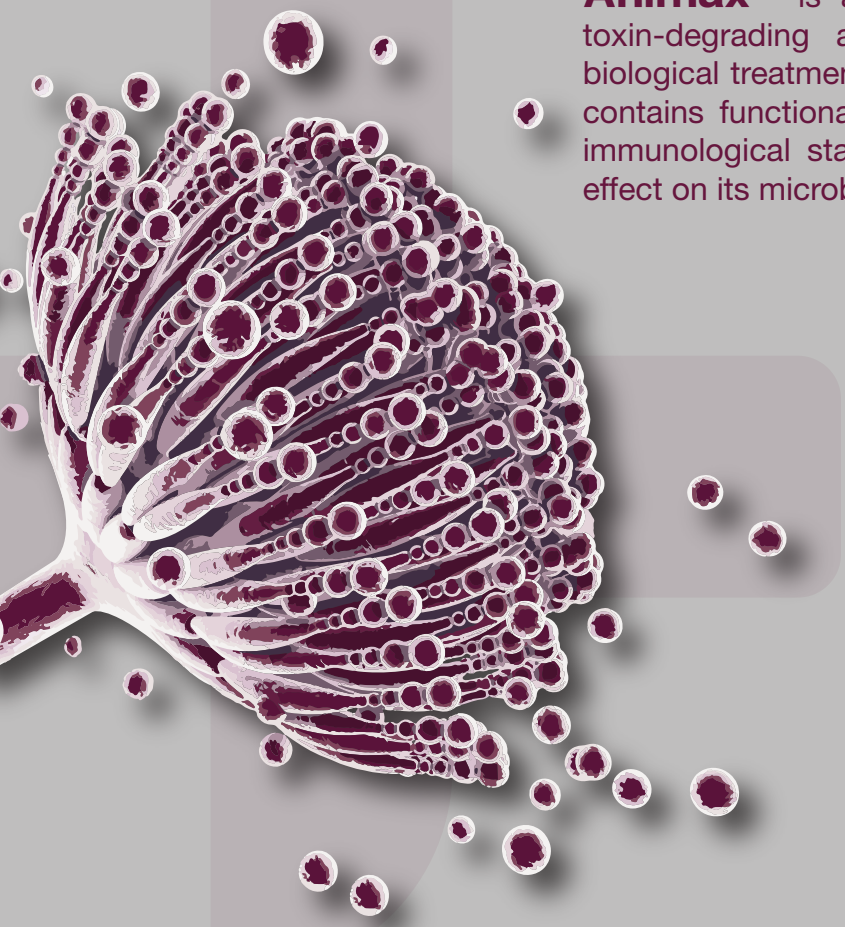
MIC ANIMAX++



Animax++ is a natural broad-spectrum toxin binder with toxin-degrading activities that combines the physical and biological treatment against the major six mycotoxins. Animax++ contains functional components that will enhance/activate the immunological status of the animal in addition to its positive effect on its microbiota.

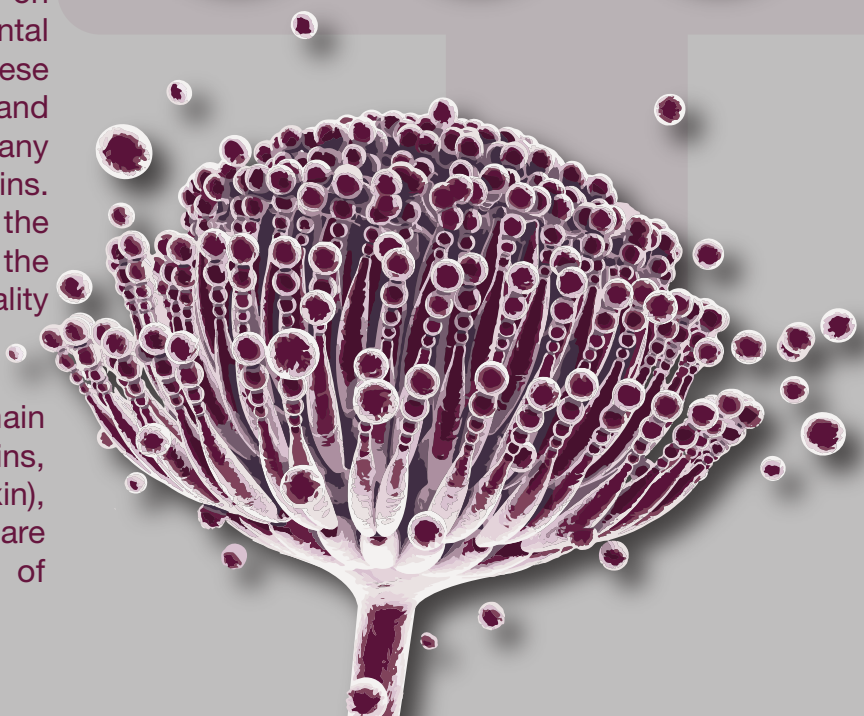
Introduction:

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 crop and during harvesting, transporting, and storage.



The type of mycotoxin produced depends on the fungus type and the environmental conditions that facilitate its production. These toxins create big threats to animals' and humans' health when they consume any feed/food that is polluted with these toxins. Globally, massive economic losses on the animal/aquaculture producers due to the reduction in animal performance, and the quality of its products.



Six major mycotoxins have the main effect on animals: Aflatoxins, Ochratoxins, trichothecenes (deoxynivalenol, T-2 toxin), Fumonisins, and Zearalenone. These toxins are produced mainly by different variates of *Aspergillus*, *Fusarium*, and *Penicillium*.

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Aflatoxins are a group of mycotoxins primarily produced by *Aspergillus* that induce oxidative stress, adversely affect the hepatic cells, and increase the mortality rate during infection in poultry, especially broiler chickens.

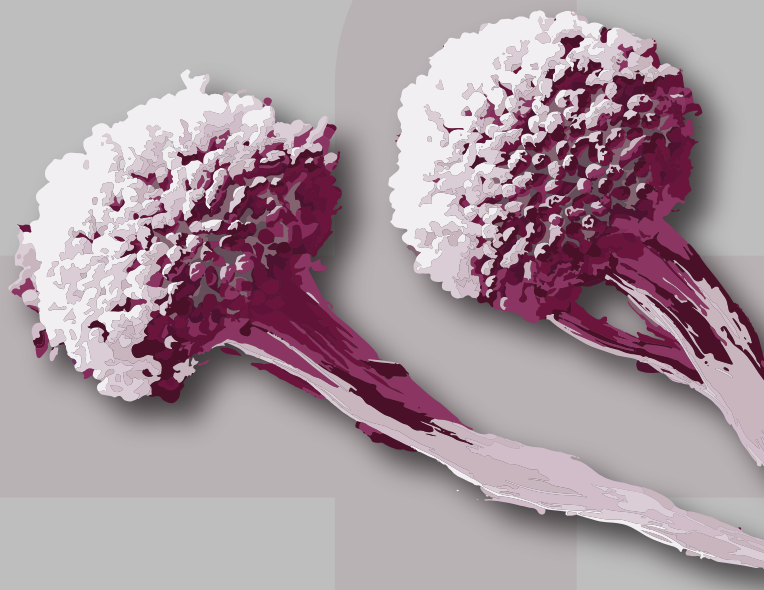
Ochratoxins are secondary metabolites of fungi produced by the *Aspergillus* and *Penicillium* genera. It causes an increase in mortality, reduces growth rate, and feed intake, and adversely affects the health of the kidneys

Zearalenone (ZEA) is a myco-estrogen with non-steroidal chemical structure toxins that are produced mainly by *Fusarium graminearum*. In addition to its estrogenic effect zearalenone is highly toxic and enhances other mycotoxins' harm during co-contamination making ZEN-contaminated feed a severe threat to poultry health. ZEA has a big effect on the reproduction efficiency of mammals due to its estrogenic effect on the reproduction organs of males and females.

T-2 toxin toxin is one of the type-A trichothecenes that's mainly produced by *Fusarium* causing necrosis of the proventricular mucosa and gizzard erosion in broiler chicken.

Deoxynivalenol is a type B trichothecene that is mainly produced by *Fusarium graminearum* and *F. Culmorum*, it causes oxidative stress and extensively affects the high protein turnover tissue, especially the intestinal and immune cells.

Fumonisins are mycotoxins produced by *Fusarium*, and due to low absorbability in the poultry intestine, they will affect the intestinal epithelial cells. The intestine will be more susceptible to necrotic enteritis and coccidiosis.



Tackling mycotoxin contamination to avoid its effect is a key challenge to maintaining the health and productivity of farm animals. Many strategies are done pre-harvesting through good agricultural practices, and during storage by avoiding the environmental conditions that facilitate fungi growth and preventing additional mycotoxin production.

Mycotoxin Adsorbent is added to the feed to bind mycotoxins in its pores and prevent them from being absorbed and metabolized in the animal's body. **The Yeast Cell Wall** is used to bind many types of toxins and to activate the immune system in the intestines of animals. In addition to that, intestinal microbes can produce **Specific Enzymes** that can degrade particular mycotoxins.

Animax++ is a product developed in the Manaseer Industrial Complex that combines physical and biological solutions to guarantee the best detoxification for single or combined mycotoxin challenges in the feed.

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Animax++ Mode of Action:

Outside the body:

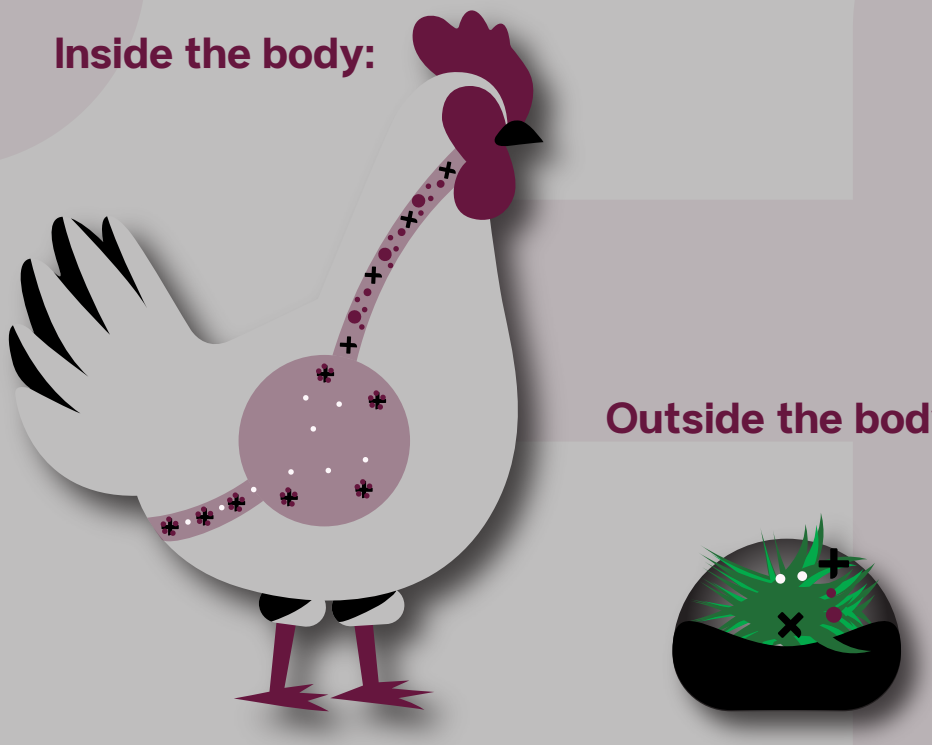
Under appropriate environmental conditions, **Animax++ Enzymes (A.E.)** start breaking down toxins.

Inside the body:

Adsorbing Agents (A.A.): Functions in various pH levels to efficiently adsorb mycotoxins, preventing them from being absorbed in the animal's gastrointestinal tract (GIT).

Animax++ Enzymes (A.E.): Degrades non-adsorbed mycotoxins, reducing free mycotoxins, preventing them from affecting the animal.

Yeast Cell Wall (Y.C.W.): Provides a natural source (MOS) to bind nonpolar toxins, nourishes enzyme-producing bacteria, and acts as an immune modulator.



Mycotoxins

Animax++

Degraded Mycotoxins Fragments

Deactivated Adsorbed Mycotoxins

MIC ANIMAX++

Animax++ was verified by Trilogy Analytical Laboratory that specialized in testing the toxin levels and the efficiency of any product against any level of different mycotoxins. Animax++ was challenged against separate mycotoxins at 0.5 kg and 1 kg inclusion rates, and at multiple mycotoxin mixtures at 1.5 kg.

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. Box 141414 Amman 11814
, Jordan

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

Date Received: 02/13/2024
Date Reported: 03/22/2024
Certificate No: S02132024-29318 V.8
Trilogy ID: S240441119-168432

Comments:

	Aflatoxin B1	Deoxynivalenol	Fumonisin B1	Ochratoxin A	T-2 Toxin	Zearalenone
% Adsorption	99.8	53.2	96.5	98.3	95.0	99.2
	99.9	57.9	98.8	98.6	96.4	99.2
	99.7	51.4	96.8	98.5	95.3	99.3
% Adsorption Average	99.8	54.2	97.4	98.5	95.6	99.2
% Desorption	0.2	11.6	13.9	6.4	2.6	0.7
	0.1	11.4	7.8	5.9	3.1	0.8
	0.1	11.6	10.8	7.5	3.6	0.6
% Desorption Average	0.1	11.5	10.8	6.6	3.1	0.7
Calculated % Efficiency:	99.7	42.7	86.6	91.9	92.5	98.5
Inclusion Rate:	0.5 kg/mt	0.5 kg/mt	0.5 kg/mt	0.5 kg/mt	0.5 kg/mt	0.5 kg/mt
Toxin Concentration:	50 ppb	150 ppb	500 ppb	25 ppb	100 ppb	150 ppb
Adsorption pH:	3.0	3.0	3.0	3.0	3.0	3.0
Desorption pH:	6.5	6.5	6.5	6.5	6.5	6.5

Method Reference: Internal SOP-12-149

Results Approved by:

Julie Brunkhorst, Vice President of the Technical Division

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ilac-MRA ANAB ACCREDITED TESTING LABORATORY

MIC ANIMAX ++

Certificate of Analysis

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

Date Received: 02/13/2024
Date Reported: 03/22/2024
Certificate No: S02132024-29318 V.9
Trilogy ID: S240441119-168432

Comments:

	Aflatoxin B1	Deoxynivalenol	Fumonisin B1	Ochratoxin A	T-2 Toxin	Zearalenone
% Adsorption	99.9	70.4	99.1	99.5	97.6	99.7
	100.0	68.4	99.0	99.2	97.0	99.7
	99.9	69.3	98.3	99.3	98.2	99.7
% Adsorption Average	99.9	69.4	98.8	99.3	97.6	99.7
% Desorption	0.1	10.5	11.2	3.9	2.0	0.3
	0.1	10.7	10.5	4.0	2.6	0.3
	0.1	10.5	11.7	4.2	2.1	0.3
% Desorption Average	0.1	10.6	11.1	4.0	2.2	0.3
Calculated % Efficiency:	99.8	58.8	87.7	95.3	95.4	99.4
Inclusion Rate:	1 kg/mt	1 kg/mt	1 kg/mt	1 kg/mt	1 kg/mt	1 kg/mt
Toxin Concentration:	100 ppb	300 ppb	1500 ppb	50 ppb	100 ppb	300 ppb
Adsorption pH:	3.0	3.0	3.0	3.0	3.0	3.0
Desorption pH:	6.5	6.5	6.5	6.5	6.5	6.5

Method Reference: Internal SOP-12-149

Results Approved by:

Julie Brunkhorst, Vice President of the Technical Division

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MIC ANIMAX ++

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

Date Received: 02/13/2024
Date Reported: 03/12/2024
Certificate No: S02132024-29318 V.4
Trilogy ID: S240441119-168432

Comments:

	Aflatoxin B1	Deoxynivalenol	Fumonisin B1	Ochratoxin A	T-2 Toxin	Zearalenone
% Adsorption	100.0	70.4	99.7	99.7	98.7	100.0
	99.9	71.0	100.0	99.7	98.8	99.9
	99.9	73.3	99.6	99.7	99.4	99.9
% Adsorption Average	99.9	71.6	99.8	99.7	99.0	99.9
% Desorption	0.0	6.1	7.6	1.4	0.6	0.0
	0.1	5.9	7.8	1.4	1.5	0.2
	0.4	5.5	7.0	1.2	1.1	0.1
% Desorption Average	0.2	5.8	7.5	1.3	1.1	0.1
Calculated % Efficiency:	99.7	65.8	92.3	98.4	97.9	99.8
Inclusion Rate:	1.5 kg/mt	1.5 kg/mt	1.5 kg/mt	1.5 kg/mt	1.5 kg/mt	1.5 kg/mt
Toxin Concentration:	100 ppb	150 ppb	500 ppb	50 ppb	100 ppb	100 ppb
Adsorption pH:	3.0	3.0	3.0	3.0	3.0	3.0
Desorption pH:	6.5	6.5	6.5	6.5	6.5	6.5

Method Reference: Internal SOP 12-149 with Multi-Mycotoxin Mixture adaption

Results Approved by:

Julie Brunkhorst VP of the Technical Division

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The Alleviating Effect of Animax++ on the Symptoms of Mycotoxin Poisoning in Layers during the Late Stage of Egg Production

For measuring the efficiency of Animax++. **A trial was conducted in TANGSHAN FINELY ANIMAL CARE CO.,LTD** on Two hundred (54-week-old) layers with the same age, normal feeding, similar egg production rate, similar weight, and health, and randomly divided them into 4 treatments, with 5 replicates in each treatment and 10 layers in each replicate. The feed was naturally molded to reach toxicity levels as shown in table (1). The feed and drinking water were open and all treatments had the same environmental conditions.

Table (1) experimental design and mycotoxin levels.

No.	Treatment	Mycotoxin content (μg/kg)					
		AFB_1	ZEN	DON	OTA	T-2	FUM
C0	Normal diet	0.32	15.23	47.19	8.56	18.12	405.03
M0	Moldy diet	4.56	268.48	858.74	60.39	129.54	6986.28
T1	Normal diet±1000g/T Animax ++	0.32	15.23	47.19	8.56	18.12	405.03
T2	Moldy diet±1000g/T Animax ++	4.56	268.48	858.74	60.39	129.54	6986.28

Result and discussion:

The Reduction Effect of Animax++ on mycotoxin challenge on layers performance and residual toxins in the eggs:

Main benefits:

Animax++ significantly ($P<0.05$) **ameliorated the effects of mycotoxins** of the molded group and maintained the laying rate and hen day egg production to be insignificant to the group that takes a normal diet. In addition to that Animax++ significantly preserved the feed conversion ratio when it was added to the molded feed to be as the non-molded one as shown in Table (2). Animax++ captures and breaks down mycotoxins and prevents them from being absorbed through the gastrointestinal tract and keeps the birds away from the toxic effect either by adsorption or breakdown of the mycotoxins.

Adding 1kg Animax++/ Mt to the normal or molded diet of layers **reduced the level of residual toxins** in the produced eggs as shown in Table (3). These results showed the efficiency of Animax++ in the reduction of mycotoxin absorption. The produced eggs will have very low levels of mycotoxin which will be reflected on the health of its consumers.

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Tabel (2): the effect of Animax++ on layers performance.

Indicators	C0	M0	T1	T2
Laying rate,%	82.39±3.84^{a}	80.54±3.05^{b}	83.03±4.39^{a}	82.48±2.96^{ab}
Daily feed intake, g	115.14±6.18	115.02±5.28	115.03±6.04	115.22±3.10
Daily egg production,g	52.30±4.16^{a}	50.61±4.11^{b}	52.78±3.64^{a}	52.33±2.95^{a}
Feed to egg ratio	2.20±0.23^{b}	2.28±0.16^{a}	2.18±0.11^{b}	2.20±0.16^{b}
Average egg weight,g	63.48±4.47	62.84±2.08	63.57±3.73	63.44±4.08
Egg breaking rate,%	0.82±0.02	0.85±0.03	0.79±0.03	0.81±0.02
Mortality rate,%	1.18±0.12	2.47±0.16	0.64±0.02	1.01±0.09

Note: Different letters of the shoulder label in the same column indicate significant differences (P<0.05), while the same or no letters indicate no significant differences (P>0.05); The following table is the same.

Table (3) Effect of Animax++ on the levels of mycotoxins in the produced eggs

Mycotoxin	C0	M0	T1	T2
Aflatoxin B_1,ng/g	1.11	6.06	0.32	3.92
Vomiting toxin,ng/g	3.51	15.94	0.62	9.25
Zearalenone,ng/g	1.11	7.53	0.23	3.09
Ochratoxin,ng/g	1.08	7.39	0.35	4.12

Functional befits:

Effect of Animax^{++} on egg quality

The inclusion of Animax^{++} to the molded and normal diet of layers significantly improved eggshell strength. The elevation in the eggshell strength will reduce the breakable percentage and enhance the marketable amount of the produced eggs. Animax^{++} may affect the absorbability of Ca, and P due to its positive effect on the intestinal environment. Feeding Animax^{++} with the normal diet significantly enhanced the egg albumen and enhanced Haugh unit level as shown in Table (4). The enhancement in egg marketing parameters will increase the ROI, especially during the late-stage production period of layers.

Table (4): The effect of Animax^{++} on egg quality.

Indicators	C0	M0	T1	T2
Eggshell thickness,mm	0.33±0.02	0.32±0.02	0.34±0.01	0.33±0.01
Eggshell strength, (kg/m^2)	4.06±0.32^b	3.82±0.32^c	4.30±0.30^a	4.25±0.24^a
Hasselblad unit	80.04±0.61^b	78.15±0.52^c	84.19±0.53^a	83.38±0.36^a
Yolk color	6.90±0.06	6.80±0.03	7.00±0.12	6.90±0.11
Egg white height, mm	6.92±0.29^b	6.85±0.32^b	7.11±0.36^a	7.03±0.41^b

Effect of Animax $^{++}$ Antioxidant parameters

Animax^{++} enhanced the immunological status of the normal and molded groups through the enhancement of the antioxidant parameters as shown in Table (5). Animax^{++} elevated the superoxide dismutase which reflects the reduction of the free radicals in the blood such as Malondialdehyde level which is an indication on the efficiency of Animax^{++} on the reduction of the oxidative stress on the birds.

Table (5): the effect of Animax^{++} on the antioxidant parameters.

Indicators	C0	M0	T1	T2
T-SOD(U/mL)	252.00^c±3.28	226.00^b±6.65	283.00^a±5.62	276.00^a±2.10
GSH-Px(U/mL)	2412.00^b±100.29	2368.21^b±89.64	2806.00^a±96.53	2720.00^a±115.32
CAT(U/mL)	3.77±0.43	3.64±0.31	3.92±0.37	3.84±0.37
MDA(nmol/mL)	6.36^b±0.09	6.82^a±0.22	5.62^{bc}±0.12	5.78^{bc}±0.13
T-AOC(U/mL)	7.88±0.20^{ab}	6.54±0.16^b	8.89±0.31^a	8.53±0.22^a

SOD: Superoxide dismutase. GSH: Glutathione enzyme. CAT: Catalase. MDA: Malondialdehyde. T-AOC: Total antioxidant capacity.

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Effect of Animax++ on the intestinal microbial count.

Animax++ has a positive significant effect on the intestinal microbiota. Feeding **Animax++** with a normal or molded diet significantly reduced the levels of E-Coli and salmonella and enhanced the lactic acid bacterial count as shown in Table (6). These effects were related to the yeast cell wall content of the **Animax++** which naturally activates the intestinal immune system and works as an antibacterial component affecting pathogenic bacteria and enhancing the level of lactic acid-producing one.

Table (6): The effect of Animax++ on the bacterial count (lg CFU/g).

Microbial flora	C0	M0	T1	T2
Escherichia coli	7.12 ± 0.09^{b}	8.26 ± 0.12^{a}	6.43 ± 0.28^{c}	6.78 ± 0.21^{c}
Salmonella	5.98 ± 0.42^{b}	6.53 ± 0.20^{a}	5.30 ± 0.26^{c}	5.59 ± 0.34^{c}
Lactic acid bacteria	6.51 ± 0.16^{b}	5.28 ± 0.22^{c}	7.15 ± 0.23^{a}	6.92 ± 0.32^{a}

Conclusion:

Adding an appropriate dosage of Animax++ to the diet can alleviate stress, reduce intestinal damage, and improve production performance.

Animax++ Prevents:

Farm animals from being affected by mycotoxins when they consume polluted feed.

Animax++ Enhances:

Beneficial intestinal microbes.
Antioxidant parameters.
Immunity.

MIC ANIMAX ++

TANGSHAN FINELY ANIMAL CARE CO.,LTD
ADD: 21st FLOOR, RONGTONG BUILDING, LUBEI DISTRICT, TANGSHAN, HEBEI, CHINA.
www.finelyanimalcare.com

The Alleviating Effect of Animax++ on the Symptoms of Mycotoxin Poisoning in Layers during the Late Stage of Egg Production

Abstract:

The experiment aims is to check the alleviating effect of Animax++ on the symptoms of mycotoxin poisoning in layers during the later stage of egg production, and their effects on the production performance, egg quality, gut microbiota, antioxidant indicators, and residual mycotoxin in eggs. Select 200 54-week-old Hailan brown layers and randomly divide them into 4 treatments, with 5 replicates in each treatment and 10 layers in each replicate. The control group was fed with normal feed, while the negative control group was fed with moldy feed. Experiment group T1 added 0.1% Animax++ into the normal feed, while Experiment group T2 added 0.1% Animax++ into the moldy feed. The pre-feeding period was 3 days, and the experimental period was 35 days. The results showed that adding 0.1% of the Animax++ to both moldy and normal diets can improve egg production performance, egg quality, and antioxidant indicators. It can also improve the structure of gut microbiota, reduce the residue of mycotoxins in eggs, and improve the health of layers flocks.

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Animax++ Components:

Ingredient	Percentage
Minerals Clay (Kaolinite) SiO_2 ≥ 25% Al_2O_3 ≥ 8%	52%
Yeast Cell Wall From *Saccharomyces cerevisiae,* *Kluyeromices fragilis.*	≥ 13 %
Probiotic Aerobic bacteria (cfu/g) ≥ $2.3*10^8$ *Bacillus subtilis* Anerobic Bacteria (cfu/g) ≥ $8.5*10^8$ *Bacillus licheniformis*	15%
Carrier	≥ 20%

Dosage:

0.5-1 kg/mt finished feed and according to technical advice.

Shelf Life:

Prefer to Use before 18 Months from Production date.

Storage:

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