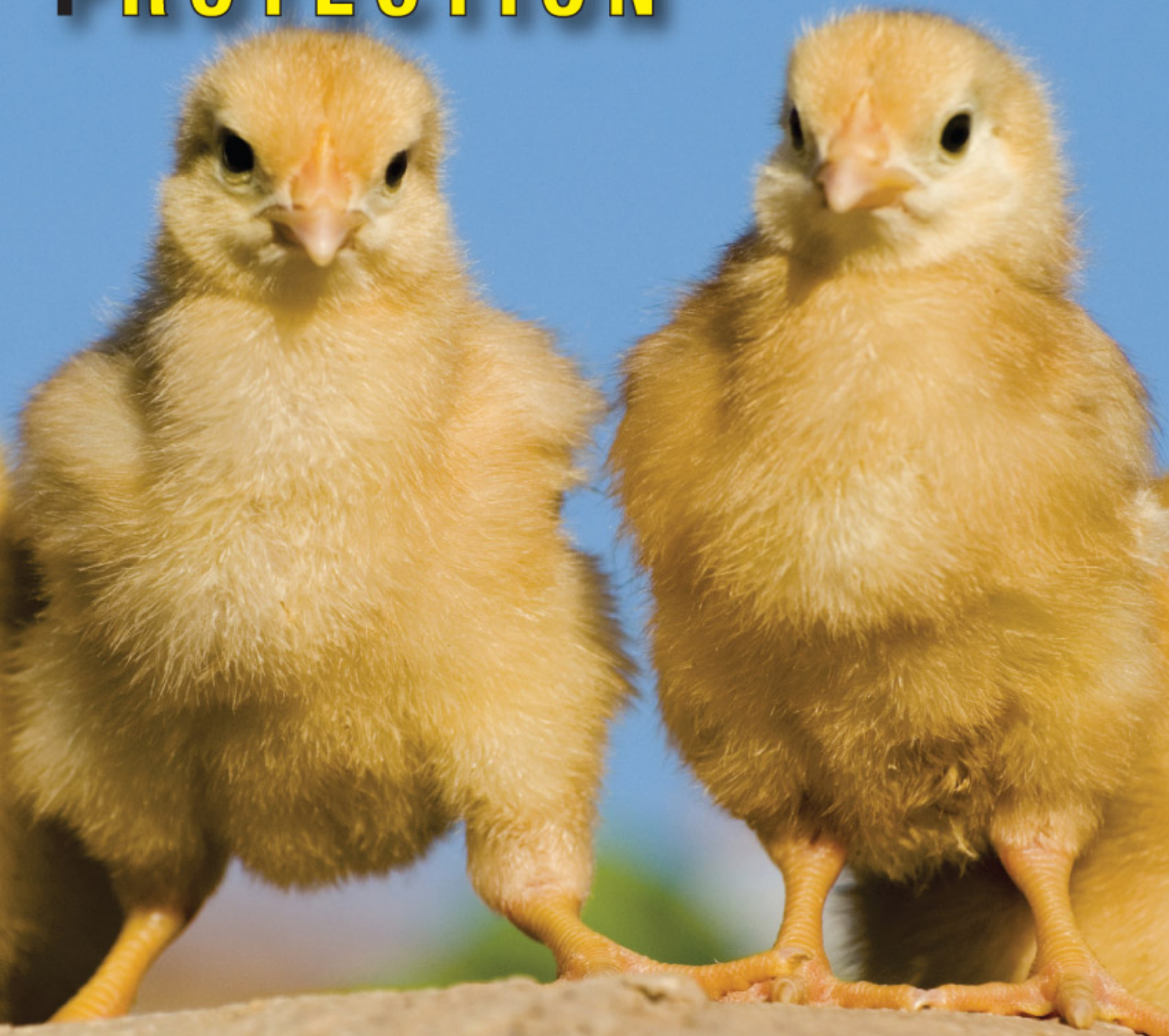


TARGET ORGAN PROTECTION



TOP: The key to an effective
Anti-Mycotoxin Additive

Target Organ Protection (TOP)

The key to an effective mycotoxins adsorbent

Poultry, swine and dairy producers admit today that the presence of mycotoxins in the feed is one of the main factors affecting animal production. As a result of the higher prices of feed ingredients, their quality is getting worse, with some grains showing higher levels of mycotoxins. High contamination levels can also be found in distillers grains, an ingredient in increasing supply, originated from the use of corn in ethanol production in the US

Some producers consider that mycotoxins are becoming as important as bacterial and viral diseases. This attitude represents a completely different approach to the importance given to mycotoxins in 1987 when we worked with the group that launched the first mycotoxins adsorbent into the global market. At that time most growers considered that mycotoxins did not represent a serious problem.

We should point out that nowadays there are still some producers that confuse mycotoxicosis with viral and bacterial diseases. Part of this problem is due to the lack of access to good diagnostic techniques like histopathology, an excellent tool for the confirmation of the diagnosis. It is important to emphasize that as part of the evaluation of the first adsorbents, a key factor in that evaluation was to demonstrate Target Organ Protection (TOP). Table 1 shows the organs affected by different mycotoxins.

In today's market there has been an influx of products claiming to be effective in controlling the deleterious effects caused by mycotoxins. Some of these products base its effectiveness on marketing campaigns without showing in vitro and/or in vivo results to backup their claims. Some base their efficacy only on in vitro tests or on a positive effect on performance (often without any statistical significant differences) and others on some improvement of the immune response.

Sometimes these positive effects are obtained because of the presence of yeast, beneficial bacteria, enzymes and/or immuno-modulators that are added to the mycotoxins adsorbents. These ingredients act to alleviate the secondary effects caused by mycotoxins but have little or no effect on TOP. Unfortunately few products in the global market have TOP efficacy.

Since 2005 the Brazilian government has taken a scientific approach on the approval of mycotoxin binders by evaluating the presence or absence of a statistically significant effect on TOP. LAMIC (Laboratorio de Analisis Micotoxicologicos), under the direction of Dr. Carlos Mallmann, is one key laboratory in charge of this type of tests. So far, few products have passed this strict test (most for aflatoxin).

Some companies claim that their products have been tested by LAMIC. Tested in vitro or in vivo by Lamic does not mean that it has been approval because product may have only show an improvement in performance, but it is not necessarily related to TOP, there for a have not obtain approval. To verify approval for Special Nutrients product go to: <http://www.lamic.ufsm.br/aameng/index.html>, login: Mycotoxin, password: Specialist.

MYCOTOXIN	TARGET ORGAN	DAMAGE CAUSED
Aflatoxin	Liver (Poultry & Swine)	Yellow, pale, enlarged and friable
Ochratoxin	Kidney (Poultry)	Urate deposits
T-2/DAS	Mouth (Poultry) Gizzard (Poultry)	Ulcers Erosion
Zearalenone	Uterus, Ovary (Swine) Vulva (Swine)	Enlargement, inflammation Enlargement, inflammation
Vomitoxin (DON)	Liver (Swine)	Size reduction
Fumonisin	Lungs (Swine) Heart (Swine)	Enlargement Enlargement

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For additional information and a complete list of references please contact us.
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Few products have scientific trials showing a positive effect on target organsto support their claims. The following table shows a list of the scientific trials performed with **CO-BIND** and **CO-BIND A-Z** by independent Universities and Research Centers around the world.

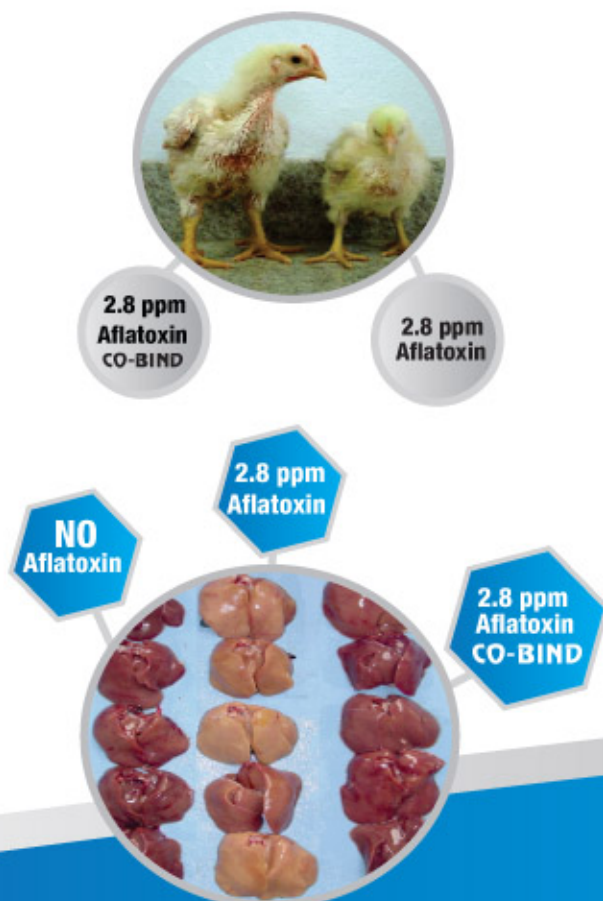
MYCOTOXIN	PRODUCT	STUDIES PER SPECIE	INSTITUTIONS
Aflatoxin	CO-BIND	2 in poultry 1 in swine	IIIA – Lamic Lamic
Ochratoxin	CO-BIND	1 in poultry	IIIA
T-2 / DAS	CO-BIND	2 in poultry	IIIA – VMI
	CO-BIND A-Z	1 in poultry	IIIA
Zearalenone	CO-BIND A-Z	3 in piglets	Lamic – Trilogy
Vomitoxin (DON)	CO-BIND A-Z	1 in piglets	Trilogy
Fumonisin	CO-BIND A-Z	1 in piglets	Lamic
		2 in finishing pigs	Lamic

Lamic = Laboratório de Análise Micotoxicológica, Brazil. (UFMS)
Trilogy = Trilogy Analytical Lab, USA.

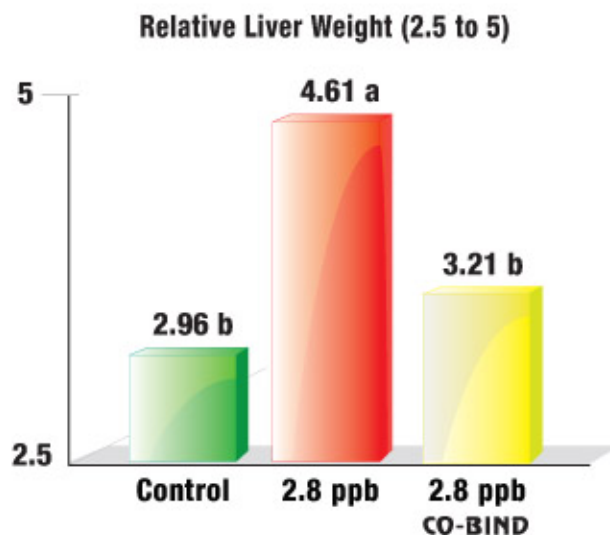
IIIA = International Animal Research Institute, Mexico.
VMI = Veterinary Medicine Institute, Hungary.

AFLATOXIN

CO-BIND effect on liver and size of broilers fed 2.8 ppm of Aflatoxin.



Ref. Laboratório de Análise Micotoxicológica, Brazil



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OCHRATOXIN

CO-BIND effect on liver and kidney size, and presence of lesions in 28 day-old broilers fed 2 ppm of Ochratoxin.



Ref. International Animal Research Institute, Mexico.

TREATMENT	Liver weight/100g BW	Liver gross lesions	Kidneys weight/100g BW	Kidneys gross lesions
Control	4.90	Negative	1.09 a	Negative
2.5 Kg CO-BIND	4.96	Negative	1.19 a	Negative
Ochratoxin (2.0 ppm)	4.89	19% mild 63% moderate 18% severe	1.37 b	6% mild 6% moderate 88% severe
2.5 Kg CO-BIND + Ochratoxin (2.0 ppm)	4.81	44% negative 19% mild 31% moderate 6% severe	1.33 b	62% negative 19% mild 6% moderate 13% severe

a, b, Values within one column with different letters are significantly different (P < 0.05)

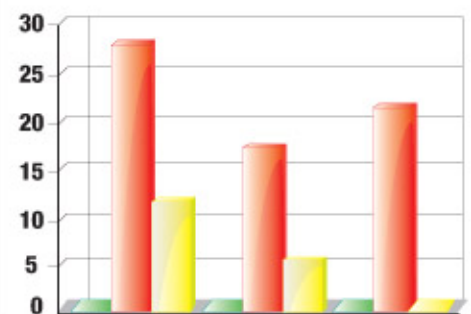
T-2 TOXIN

CO-BIND effect on body weight, oral lesions and bursa weight of broilers fed 1 ppm of T-2 toxin at different ages

Ref. VMI Veterinary Medicine Institute, Hungary

TREATMENT	21 Days			28 Days			35 Days	
	B.W. g	Oral Lesion score	Bursal weight / 100g B.W.	B.W. g	Oral Lesion score	Bursal weight / 100g B.W.	B.W. g	Oral Lesion score
Control	538 a	538 a	538 a	932 a	0 a	0.45 a	1446 a	0 a
T-2 (1 ppm)	463 b	463 b	463 b	788 b	1.63 b	0.20 b	1148 b	0.96 b
2.5 Kg CO-BIND + T-2 (1 ppm)	543 a	543 a	543 a	938 a	0.21 a	0.40 a	1451 a	0.04 a

a, b, Values within one column with different letters are significantly different (P < 0.05)



Control T-2 T-2 + MycoAD

CO-BIND

has been tested and approved by
for the control Aflatoxin

