

# 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 launching 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 protection of target organs. Table 1 shows the organs most 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 the target organs. Unfortunately few products in the global market have a proven efficacy on the main target organs affected by the mycotoxins against which they are tested.

For the last 2 years 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 target organs. 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) which must be repeated every two years, to demonstrate the product maintains its efficacy. As a result of this novel approach by the Brazilian government, companies are obliged to test their products at LAMIC which now has become one of the top reference laboratories in the world.

If a company claims in his marketing campaign that any of his products has been tested by LAMIC, it does not mean that the adsorbent has been approved. Sometimes the results obtained show an improvement in performance, but it is not necessarily related to the protection of the target organs. If any product indicates or suggests a LAMIC approval, it is highly recommendable that you ask for the original study and look at the end of it for a written statement in Portuguese indicating that the product is approved for a 2 - year period.

## TARGET ORGAN

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



For additional information and a complete list of references please contact us.

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# TARGET ORGANS



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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 MYCO-AD and MYCO-AD A-Z by independent Universities and Research Centers around the world.

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

Lamic = Laboratorio de Analisis Micotoxicologico, Brazil .(UFSM)



Trilogy = Trilogy Analytical Lab, USA.



IIIA = International Animal Research Institute, Mexico.

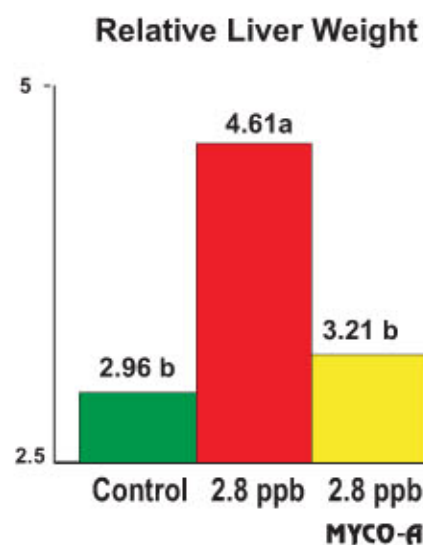
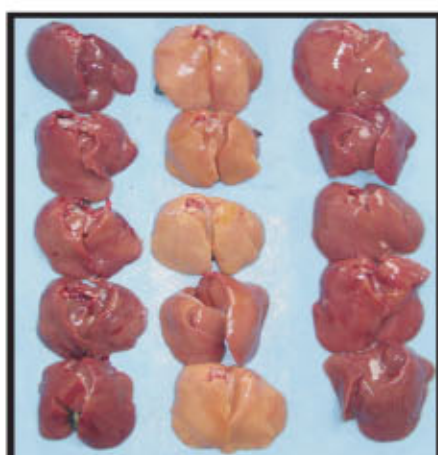


VMI = Veterinary Medicine Institute, Hungary.

## AFLATOXIN

MYCO-AD effect on liver and size of broilers fed 2.8 ppm of Aflatoxin.

Ref.  Laboratorio de Analisis Micotoxicologico, Brazil.



2.8 ppm Aflatoxin MYCO-AD      2.8 ppm Aflatoxin

## OCHRATOXIN

MYCO-AD 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 MYCO-AD ®	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 MYCO-AD ® + 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

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

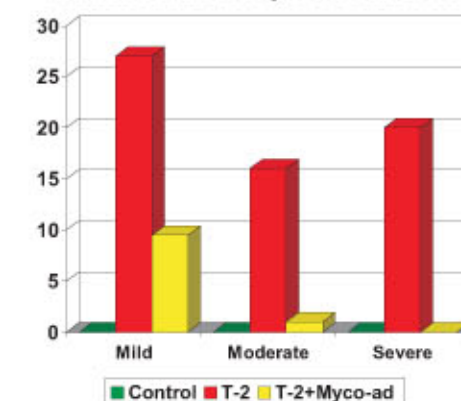
Ref. **VMI** Veterinary Medicine Institute, Hungary.


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	0 a	0.30 a	932 a	0 a	0.45 a	1446 a	0 a
T-2 (1 ppm)	463 b	1.84 b	0.20 b	788 b	1.63 b	0.20 b	1148 b	0.96 b
2.5 kg MYCO-AD + T-2 (1ppm)	543 a	0.36 a	0.28 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)



Incidence and Severity of the Oral Lesions



MYCO-AD has been tested and approved by  for the control of Aflatoxin