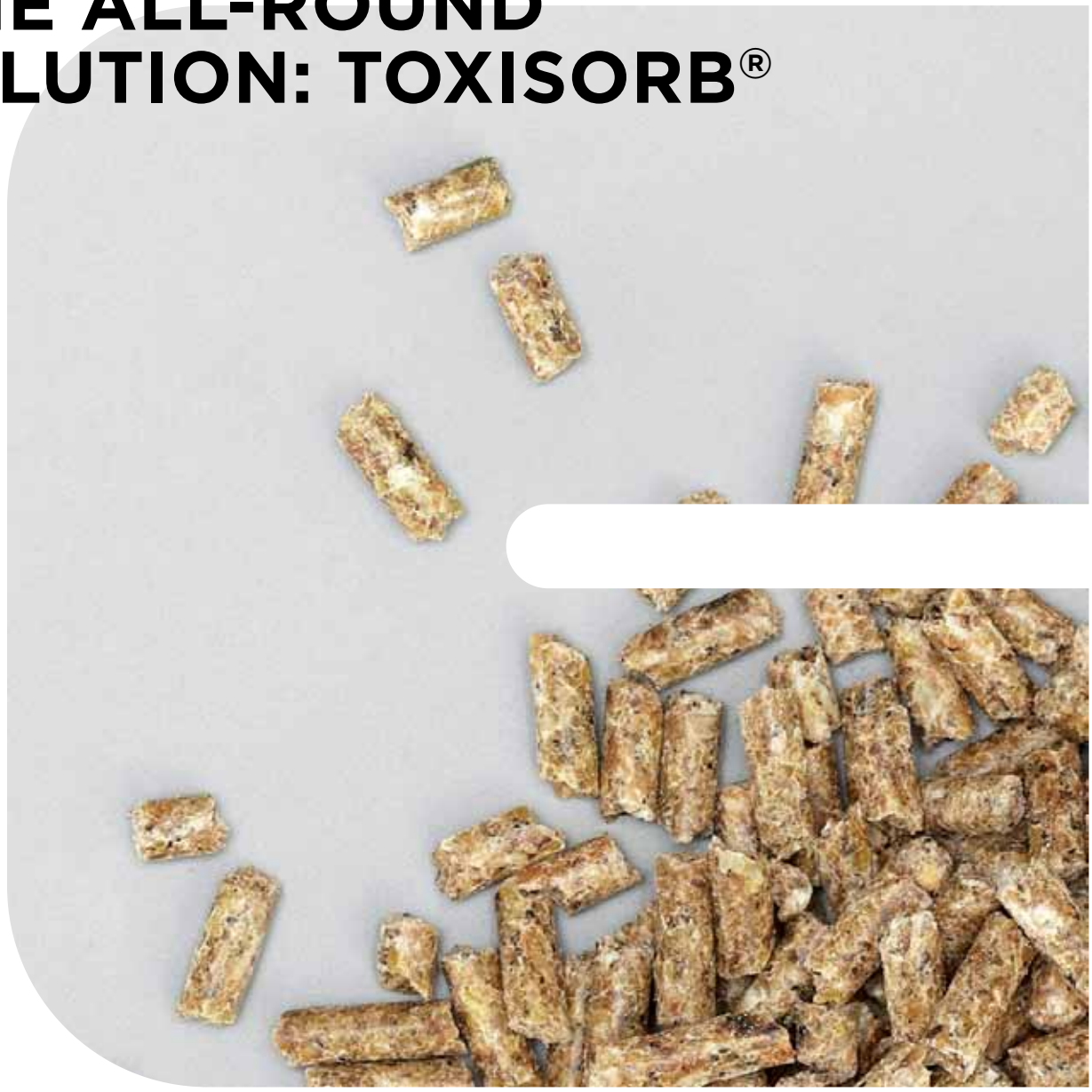
CLARIANT

Naturally detoxified feedstuff, shaped by

ONE ALL-ROUND SOLUTION: TOXISORB®



what is precious to you?

FAMI-QS
THE STANDARD FOR QUALITY AND SAFETY IN FEED

Approved by

FAMIQS

Our TOXISORB® product range has a 100% natural and mineral origin.
With over a hundred years of expertise in processing bentonite, Clariant is one of the world's leading companies in the clay-based additives business.
From the mining pit to the packaging department, every production step is permanently monitored to ensure product quality and safety.
This production process and the corresponding quality and safety management are covered by HACCP and FAMI-QS certification.
This certification is renewed every three years and is controlled by an independent auditor on an annual basis.

A highly qualified and interdisciplinary team is responsible for:

- Selection of the right raw materials
- Processing the raw materials with attention to hygiene and quality
- Controlling raw materials and finished products based on predefined parameters
- Documentation of the entire process and measures taken to assure the desired quality
- Ongoing development of the self control system

Research and Development Competence
PERFORMANCE TO ENSURE QUALITY

Latest technology and highly qualified laboratory staff for quality assurance and the further development of our TOXISORB® product range

R&D and technical laboratories

- Mycotoxin adsorption performance
- Product development
- Quality assurance

Goals

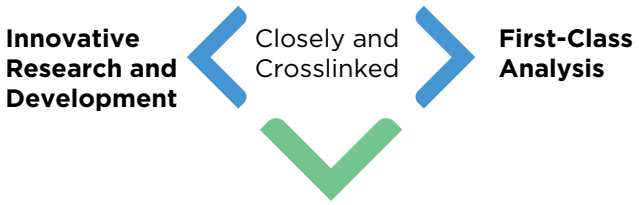
- Continuous optimization of TOXISORB® product performance
- Development of new feed additive products
- Detection of Endo- and Enterotoxin Adsorption capabilities
- Assuring product stability and innocuousness in the animals gastrointestinal tract via trials simulating real-life conditions

Analytical laboratories

- Ensuring quality and safety
- Detecting chemical structures and compositions
- Quantitative analysis of substances

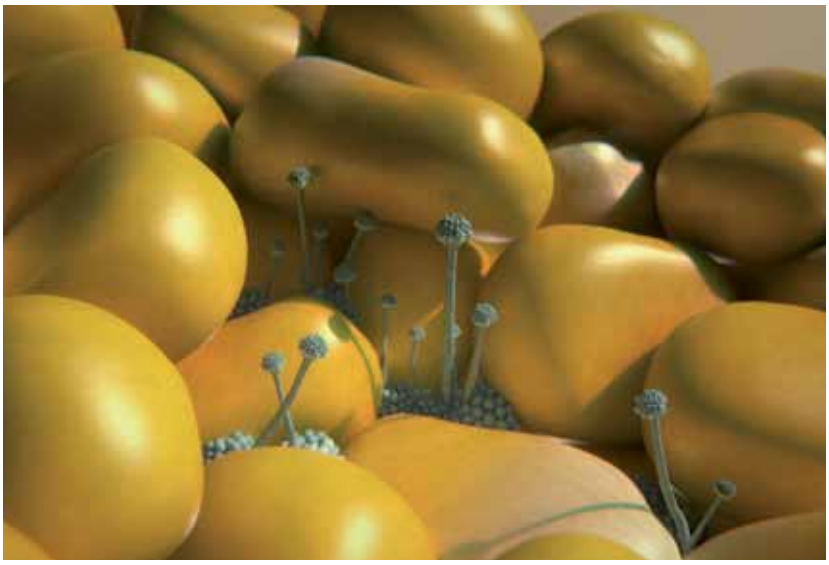
Analytical methods

- High Performance Liquid Chromatography
- X-Ray Diffraction
- Particle Size Distribution
- Pore Volume and Surface Area
- Gas Chromatography-Mass Spectrometry
- Inductively coupled plasma optical emission spectrometry
- Ion exchange capacity
- Elementary analysis



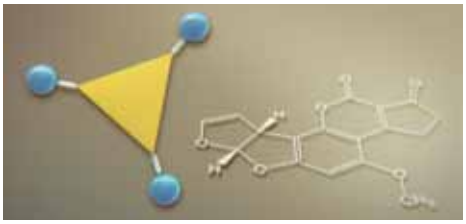
High quality and customer-relevant feed additive products

Mycotoxins – **SERIOUS THREAT OF GLOBAL IMPORTANCE**

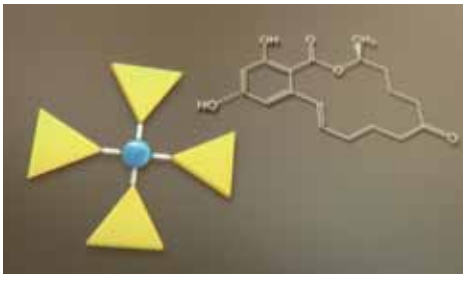


Mycotoxins are poisonous compounds formed by various fungi. The structure, polarity and toxicity vary from toxin to toxin. Each toxin causes specific symptoms in the animal.
The presence of different fungi species enlarges the risk of the occurrence of multi-contaminated feed. For example, often Deoxynivalenol contaminations occur with a Zearalenone or T-2 Toxin presence. This multiplies the potential for harm to the animal due to synergistic effects.
According to the Food and Agriculture Organization of the United Nations (FAO), almost 25% of feed materials worldwide are contaminated with different mycotoxins.

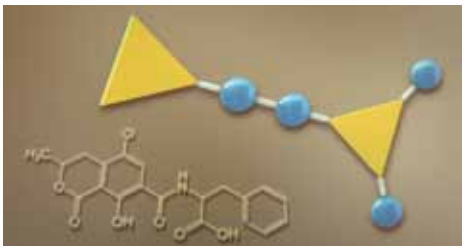
AFLATOXIN	Aflatoxin B_1 (AFB1) most toxic and most prevalent
Mold fungi	Aspergillus flavus, Aspergillus parasiticus
Properties	Toxic, cancerogenic, hepatotoxic
Animal Sensitivity	**High:** Poultry, Swine, Ruminants
Typical Symptoms	Growth reduction, low immunity, increased mortality



ZEARALENONE	Zearalenone (ZEA) is a typical Fusarium toxin
Mold fungi	Fusarium graminearum, Fusarium culmorum
Properties	Estrogenic
Animal Sensitivity	**Moderate:** Poultry **Medium:** Ruminant **High:** Swine
Typical Symptoms	Decreased fertility, enlarged uterus, abortion



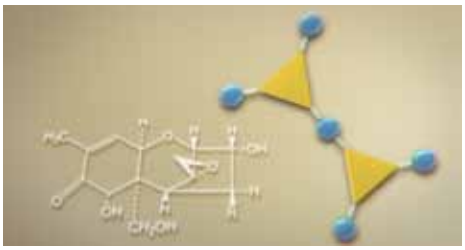
OCHRATOXIN	Ochratoxin A (OTA) most prevalent
Mold fungi	Aspergillus ochraceus, Penicillium verrucosum
Properties	Toxic, cancerogenic, nephrotoxic
Animal Sensitivity	**Moderate:** Ruminants **Medium:** Poultry, Swine
Typical Symptoms	Reduced growth, feed refusal, liver and kidney damages



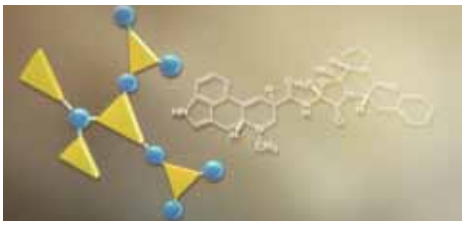
T-2 TOXIN	T-2 Toxin is a Type A Trichotecene
Mold fungi	Fusarium culmorum, Fusarium tricinctum
Properties	Toxic
Animal Sensitivity	**Medium:** Swine, Ruminant **High:** Poultry
Typical Symptoms	Digestive disorders, diarrhea

FUMONISIN	Fumonisin B_1 (FUN) most prevalent
Mold fungi	Fusarium proliferatum, Fusarium verticilloides
Properties	Cancerogenic
Animal Sensitivity	**Moderate:** Poultry, Ruminant **Medium:** Swine
Typical Symptoms	Feed refusal, pulmonary edema

DEOXYNIVALENOL	Deoxynivalenol (DON) is a Type B Trichotecene
Mold fungi	Fusarium graminearum, Fusarium culmorum
Properties	Toxic
Animal Sensitivity	**Moderate:** Poultry **High:** Swine, Ruminant
Typical Symptoms	Vomiting, feed refusal, weight loss



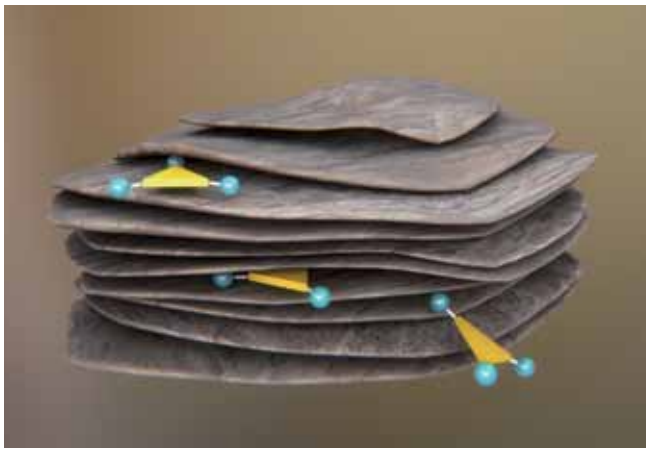
ERGOT	Ergotamin (Ergot Alkaloid) most prevalent
Mold fungi	Claviceps purpurea
Properties	Harmful
Animal Sensitivity	**Moderate:** Poultry, Swine, Ruminant
Typical Symptoms	Agalactia, feed refusal, reduced weight gain



Clariant - High Performance Adsorbers
NATURAL MULTI-TALENTS AGAINST MYCOTOXINS

TOXISORB® Classic – the Aflatoxin Allrounder
Aflatoxin is the most harmful fungal toxin and can be fatal even in very small doses. It can enter the animal's blood stream through the digestive tract and is ingested by humans via the consumption of meat, milk and eggs.

With its layered structure and extremely large surface area TOXISORB® Classic can bind the toxin molecules permanently before they can harm the animal's organism. The immobilized toxins are removed from the animal's gut with the excrement and no longer remain in the food chain.



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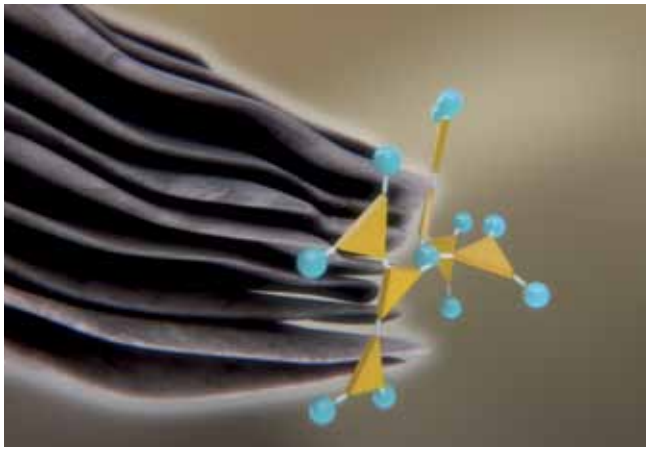
Polar and planar mycotoxin molecules such as Aflatoxin can be easily adsorbed by TOXISORB® Classic.



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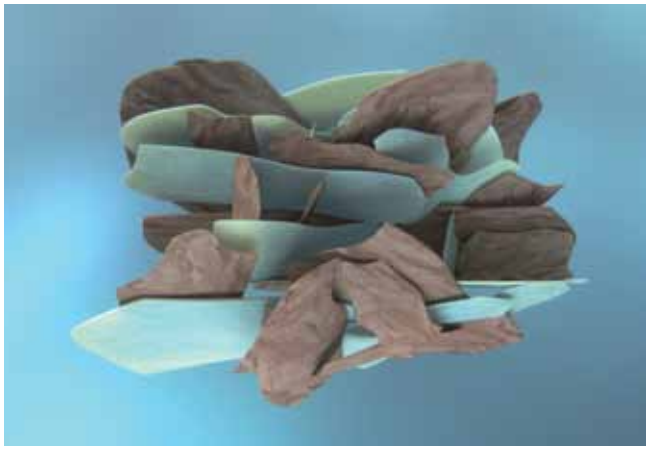
Bulky and nonpolar molecules cannot enter the layered structure or be bound by electrostatic attraction.

TOXISORB® Premium – the broadband toxin binder
Due to its open spatial structure and a combination of hydrophilic and hydrophobic surface properties, almost 90 % of all known toxins can be adsorbed by TOXISORB® Premium.

Even the large Endotoxin and Enterotoxin molecules that are produced by bacteria in the digestive tract can be removed. These outstanding properties of TOXISORB® Premium are caused by a unique composition of natural minerals and a sophisticated production process.



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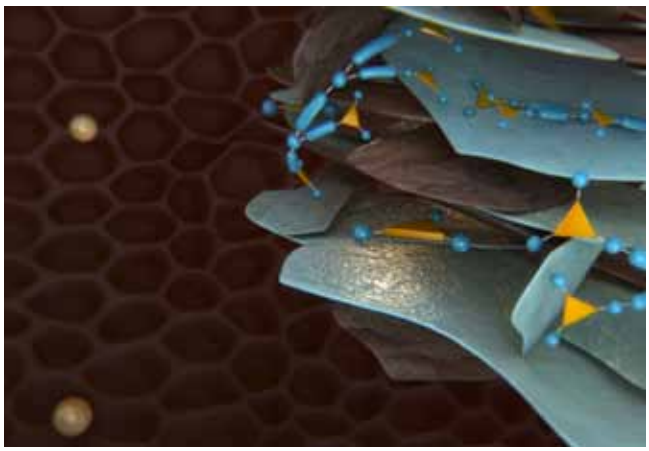
With its open-pored and multilayered structure TOXISORB® Premium offers hydrophilic as well as hydrophobic surface properties.



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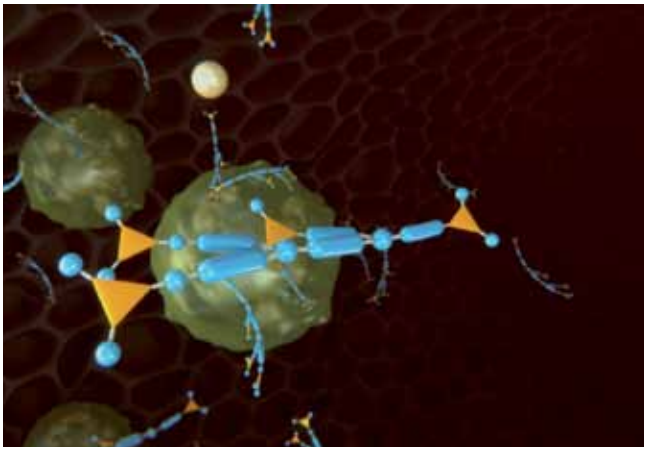
Huge mycotoxin molecules without charge can enter the structure and thus can be bound effectively.



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Even the huge Endo- and Enterotoxin molecules which are produced by bacteria in the gastrointestinal tract can be removed efficiently.

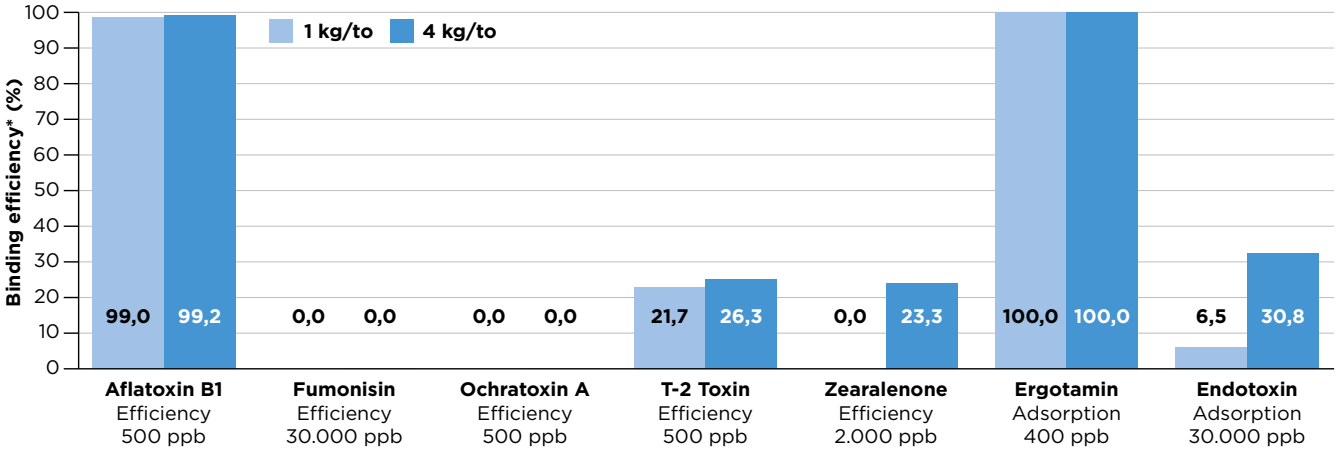
TOXISORB® Classic
THE AFLATOXIN ALLROUNDER

- Protects against dangerous Aflatoxins and Ergot alkaloids
- Renders these poisonous substances innoxious and avoids economic losses
- High-quality product with proven, consistent quality in a continuous product improvement process
- Easy application and gentle handling
- No influence on the animal's metabolism and no residues of mycotoxin metabolites
- A cost-efficient product focused on the mycotoxin issue provides the solution for different species

Product Performance - InVitro

TOXIN CONCENTRATIONS RELATED TO MARKET RELEVANT CONTAMINATION

The in-Vitro trials show that the especially dangerous and carcinogenic Aflatoxin is very efficiently adsorbed by TOXISORB® Classic. The binding efficiency considers the adsorption at acid pH comparable to stomach conditions and the pH shift to neutral when entering the gastrointestinal tract.



In-Vitro-Tests Aflatoxin, Fumonisin, Ochratoxin A, T-2 Toxin, Zearalenone done by TRILOGY Analytical Laboratory, Missouri, USA
In-Vitro-Tests Ergotamin done by Technische Universität München, Lehrstuhl für Tierhygiene, Freising, Germany
In-Vitro-Tests Endotoxin done by Hyglos GmbH, Bernried am Starnberger See, Germany
* Binding efficiency = % Adsorption – % Desorption

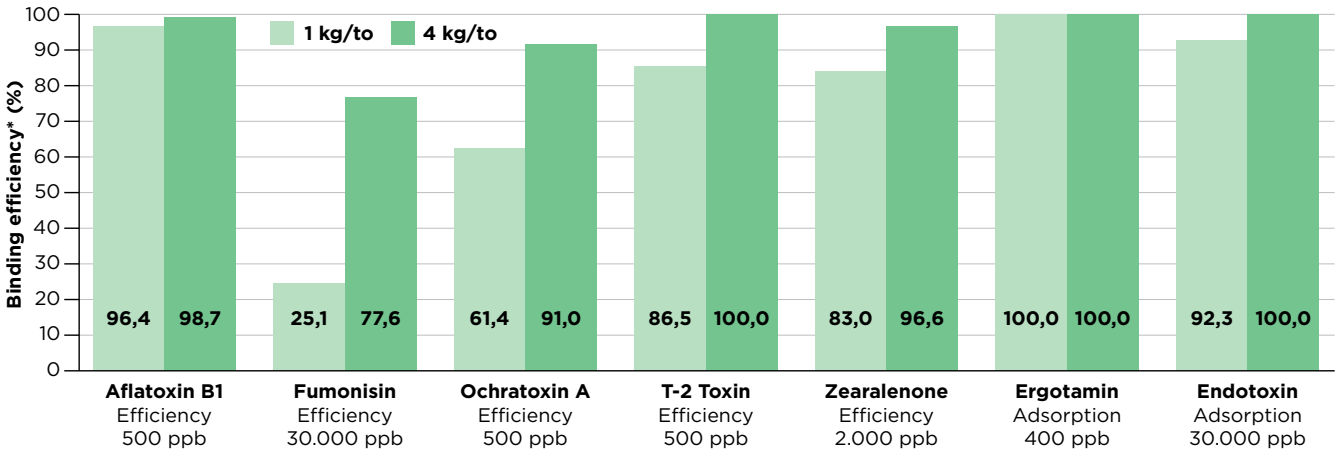
TOXISORB® Premium
THE BROADBAND TOXIN BINDER

- Protects against dangerous mycotoxins – also against Fumonisin and T-2 – and prevents organ disease
- Adsorbs poisonous Endo- and Enterotoxins and avoids economic losses
- Optimizes the shelf life of the feed and ensures yield
- Easy application and gentle handling
- No influence on the animal's metabolism and no residues of mycotoxin metabolites
- A cost-efficient product focused on the mycotoxin issue provides the solution for a variety of species

Product Performance - InVitro

TOXIN CONCENTRATIONS RELATED TO MARKET RELEVANT CONTAMINATION

The in-Vitro trials show that various mycotoxins in the feed are effectively fixed to the surface of TOXISORB® Premium. The binding efficiency considers the adsorption at acid pH comparable to stomach conditions and the pH shift to neutral when entering the gastrointestinal tract.



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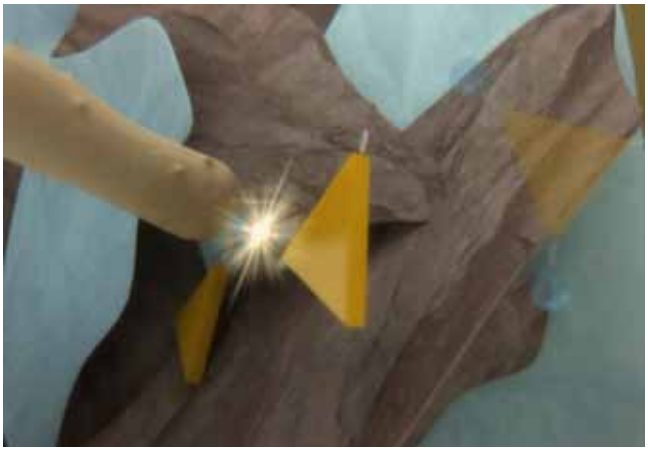
* Binding efficiency = % Adsorption – % Desorption

TOXISORB® Classic and Premium
COMBINING PERFORMANCE WITH SUSTAINABILITY

Firmly bound to the clay particles the toxins end up in the dung of the animals which is distributed on the fields. There the toxins are decomposed and metabolized by natural soil bacteria. The remaining clay particles act as a soil conditioner, „enhancing“ the nutrient level of the soil and contributing to more sustainable farming.

-
Disposal of the bound toxins in the dung.



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Biological degradation by soil bacteria.

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Increased fertility of the soil.

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Healthy animals – due to TOXISORB®.

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Note: No mycotoxin claims are made in the USA, the EU or Canada

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