PATENT CO.®

360° SECURITY
TOTAL MYCOTOXINS PROTECTION

—mycotoxins

Mycotoxicosis is the group of diseases and disorders in animals and humans caused by toxic secondary metabolites (mycotoxins). Mycotoxins are produced by various fungal species. Mycotoxins can be divided into groups based on the source of origin:

—presence

1. Presence of moulds doesn't necessarily imply presence of mycotoxins.

2. On the other hand, mycotoxins can be present even without visual presence of moulds.

3. At a certain stage in plant development, moulds can produce mycotoxins which persist even when the moulds are destroyed due to unfavourable conditions for development.

—MINAZEL prevents negative effects of Ammonia:

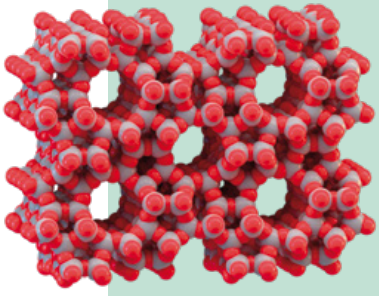
- pulmonary irritation
- increase the susceptibility to respiratory diseases
- eye, mouth, and nose irritation
- reduce growth performance

—flow

field / storage moulds > mycotoxins > feed > animals > animal products > food

MINAZEL® is patented name for eco-friendly, clinoptilolite based product that has positive impacts on animal health and productivity. These facts are supported by several PhD thesis, more than 10 master thesis and numerous papers published in scientific and professional journals.

This Clinoptilolite is hydrated mineral of a volcanic or sedimentary origin. It belongs to Tectosilicates, or "framework silicates within family of zeolites.



Due to Three-dimensional Network of SiO 4 and AlO 4 , Clinoptilolite looks like honey comb.

PATENT CO.®

Why MINAZEL® should be used every day in animal nutrition?

1 mycotoxins

- **MINAZEL® improves health and productivity of farm animal by effective adsorbing of mycotoxins**

Mycotoxin adsorbtion by MINAZEL:

		% ADSORPTION			% DESORPTION	
		AB1	FB1		AB1	FB1
MINAZEL (201707266003257)	pH 3	99.4	72.2	pH 6.5	0.2	4.5

2 ammonia

- **MINAZEL® Controls level of ammonia in animal metabolism as well as in the environment**

Ammonia adsorption report

The aim of this analysis is to determine adsorption of ammonia by products MINAZEL (PATENT CO. DOO).

Method for determination of ammonia was standard method recommended by International Zeolite Association (IZA).

Ammonia adsorbtion by MINAZEL

SAMPLE	CEC, mmol NH_4^+/100 g zeolite	Ammonia adsorbtion mg NH_4^+/kg
MINAZEL	**193.4**	**27089.0**

3 heavy metals

- **MINAZEL® detoxicates animal organism due to high sorption affinity towards heavy metals (Pb, Cd, Ni, Hg), radionucleids, (Cs134, Cs137), endotoxins, viruses, biogene amines, etc.**

82 Lead	48 Cadmium	28 Nickel	80 Mercury
Pb	Cd	Ni	Hg
207.2	112.411	58.6934	200.59

4 other

- **MINAZEL® enhances immune defense by increasing absorption of immunoglobulins G in small intestine, preservation of energy and antioxidant property**

- **MINAZEL® facilitates feed manufacturing process by prevention of caking and retention of water**

- **MINAZEL® makes stable an eco-friendly and safe environment due to ability to reduce odor, ammonia and humidity as well as moisture of bedding**

MINAZEL does not adsorb

1. amino acids and fat soluble vitamins

(Tomasevic-Canovic et al. 1996.)

2. copper, zinc, manganese and cobalt

(Dumic et al. 1996.)

3. micronutrients

(Tomasevic-Canovic et al. 2001.)

MINAZEL short datasheet

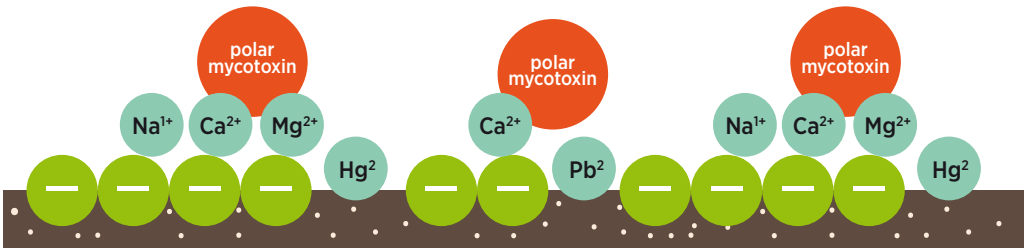
description	dosage	application
		
Product based on clinoptilolite E568*	**0,1 - 0,5%****	**for all animal species*****

* According to the European Food Safety Authority-EFSA, clinoptilolite used in the proposed conditions, does not have an adverse effect on animal health.

** (EC) No. 651/2013 - maximum allowed content of 10,000 mg/kg (complete feedingstuff with a moisture content of 12%).

*** Under Commission Implementing Regulation (EC) No. 651/2013, amending Regulation (EC) No. 1810/2005, Clinoptilolite of sedimentary origin has been granted authorisation for all animal species.

MINAZEL mode of action



natural clinoptilolite surface
(negative surface is caused by substitution of Si^{4+} with Al^{3+} or Fe^{3+})

- **Due to the presence of aluminia, clinoptilolite exhibit a negatively charged framework counter - balanced by positive cations, resulting in a strong electrostatic field on the internal surface.**
- **The phenomenon of displacing cations by other substances is known as cation exchange capacity (CEC)**
- **The size of its pores allows for selective ion exchange**

(Boranic 2000, Melenova et al. 2003, Mashacek et al. 2010)

Case Study: Use of MINAZEL during Aflatoxin outbreak at a local Serbian farm

CONCENTRATION OF AFLATOXIN M1 (ug/kg) IN MILK COLLECTION FROM 3 SERBIAN LOCAL FARMS

	First farm, AFM1 (µg/kg)	Second farm AFM1 (µg/kg)	Third farm AFM1 (µg/kg)
March 06, 2012 - Mz	0,0334	0,240	0,670
MINAZEL addition to diet	+	+	+
April 3, 2012 + Mz	0,008	0,068	0,340
April 18, + Mz	0,007	0,065	0,017

Referent concentration of aflatoxin in milk is max 0,05 µg/kg
(Serbian Ordinance -Official Gazette No. 28/11 and 20/13 and Law- Official Gazette No. 41/09)

Conclusions

***IN VIVO* trial has confirmed positive effect of MINAZEL on:**

1. **Milk gains**
2. **Proteins in milk**
3. **Decreasing aflatoxin in milk**

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ABOUT US

PATENT CO. is a multinational company established in 1990 in the heart of Europe, in Serbia. Today we operate on 5 continents.

PATENT CO. strives to be an innovative and internationally-oriented company that is always one step ahead in introducing new technologies in animal nutrition.

RESEARCH AND DEVELOPMENT

Every year, **PATENT CO.** invests significant resources in research and development programmes in laboratories, research centres and farms. This programme facilitates the development of new products, with a view to finding optimal animal feed production solutions.

QUALITY AND SAFETY

PATENT CO. invests in state-of-the-art equipment for the production of animal feed additives and premixtures, allowing us to achieve final products of a consistently high quality. This process ensures full traceability, from the reception of raw materials to delivery of the product to the customer.

PATENT CO.®

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