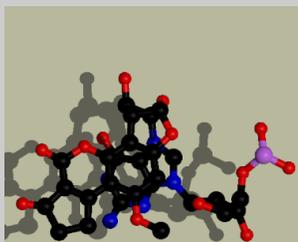


FEED GRADE

POWDER



NUTREX
CURRENT NUTRITION TECHNOLOGY EXPONENTS

GLU

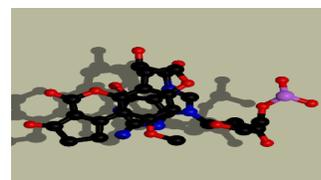
BROAD SPECTRUM LOW INCLUSION RATE MYCOTOXIN BINDER & IMMUNOENHANCER

GLU is a strategic blend of two naturally occurring compounds of proven, highly active mycotoxin sequestering and immunoenhancing ability

GLU is specifically designed and formulated to maximize the complimentary strengths of the two compounds, creating a single product with the **broadest range of mycotoxin binding activity**, from aflatoxins, zearalenones to tricothecenes

GLU is characterized by exceptionally wide surface absorption area/unit weight, providing **pronounced, specific and targeted activity at the lowest possible inclusion rate**, drastically minimizing the incidental binding of vitamins and other nutrients - avoiding the common, undesirable side action of non-specific and high inclusion rate clay binders

GLU components are recognized as active **immunoenhancers**, a property highly beneficial in the induction and maintenance of disease resistance specially in young animals (broilers, piglets) and sow/layers.



Molecular View of Aflatoxin

CONTENTS

Natural **b**-carboccomplexes glucomannan and glucosamine (chitosan), calcium carbonate as carrier q.s.

INDICATION

As Mycotoxin binder in contaminated feed; As an aid in reducing effects of mycotoxin contaminated rations

RECOMMENDED DOSAGE

0.5 to 1 kg/ton of feed

PACKAGING

25 kg bOX

*NUTREX is the Nutritional Line Trademark of:

AGRIaccess, Bothell WA USA

www.agriaccess.com

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TURIN LIVESTOCK AND CROP PROJECTS

San Juan City, Metro Manila

MECHANISM OF ACTION

TYPES OF MYCOTOXIN BINDING

Electrostatic - magnetic attraction between oppositely charged particles (+ with -), unspecific. Mechanism of action of clay binders. Indiscriminate binding with all particles of opposite charge.

Template - as in "lock and key" or "ball and socket", specific and targeted binding character

Hydrogen bond or covalent bonding - also highly specific chemical bond, similar to chelation bonding, involves exchange of ions, commonly in conjunction with template.

CLAYS

Adsorption of mycotoxins by clay binders (i.e. aluminosilicates, diatomaceous earth) is based entirely on electrostatic reaction, such that their range of activity has been limited to polar mycotoxins, such as aflatoxins. **Non-polar mycotoxins, such as zearalenones, tricothecenes (DON and T-2) and ochratoxins, are largely unaffected.** The high inclusion rate nature of such products, along with the non-specific binding mechanism, also tend to reduce availability of vital reactive nutrients like minerals and vitamins.

GLUCANS

Mycotoxin binding by glucans and oligosaccharides is characterized by a variety of interactions, ranging from specific template to dipolar to electrostatic and hydrogen bond combinations. Thus, effective binding activity has been established for both polar and non-polar mycotoxins. Evident specificity and low dosage greatly minimizes impact on other vital nutrients.

Glucomanan, in the naturally acetylated or esterified soluble form, have been found to possess very strong binding affinity to

sterol structured mycotoxins like aflatoxin, tricothecene and fumonisin, but relatively weak on zearalenone and ochratoxins (Aravind, et.al. 2003, Swamy et.al. 2003)

Chitosan, in its deacetylated soluble form, possesses marked binding affinity zearalenone and ochratoxins, T-2 and DON (Choi,et.al.2000; Kumar, MNV 2000, Marquadt, R. 2002).

Combination of soluble glucomanan and chitosan have shown to be more effective than either product alone, both in terms of spectrum width and strength of activity (Gallagher et.al. 2002)

RATED MYCOTOXIN BINDING ACTIVITY

Glucomanan + Chitosan 1mg/kg concentration*

Aflatoxin	>92%
DON	>85%
T-2	>78%
Zearalenone	>74%
Fumonisin	>83%
Ochratoxin	>79%

*Rat Trials, Agriaccess

IMMUNOENHANCING AND ANTIBACTERIAL ACTIVITY

Current findings indicate that functional mannans and oligosaccharides have the intrinsic ability to initiate immunoenhancing reactions. Orally ingested mannans tend to induce proliferation of mononuclear cells. (Ausiello, et.al 1986). Chitosan has also been shown to possess physiologically unique functions such as immunopotentiating and apoptosis induction activities (Nakakuki, T. 2003). Improvement of intestinal microflora based on selective proliferation of beneficial bifidobacteria have also been reported. Oligomannosides stimulate production and release of tumor necrosis factor (TNF - alpha), initiating a cascade of immune reactions (Joualt et.al.1999). The use of chitosan for antibacterial treatments has been

the subject of recent studies and reports. Chitosan oligosaccharides have shown pronounced activity in inhibiting pathogenic E. coli growth in piglets (Choi et.al. 2000). Inhibitory activity against Staph. sp. and Listeria sp. have also been demonstrated (Kumar, 2000). Acidic pH and higher temperatures increase the antibacterial effects of chitosan on pathogenic E. coli (Qujeg, et.al 2002). Chitosan antimicrobial properties are probably connected to the bonding properties of chitosan polycations to bacterial cell walls.

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Agriaccess Data. 2004

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