

# PHYTOGENICS & PROBIOTICS

## TO PROMOTE POULTRY PERFORMANCE

# VANNIX™ C4



**VANNIX C4** CAN BE USED AS A  
**NATURAL ALTERNATIVE TO ANTIBIOTICS**  
TO IMPROVE GUT HEALTH.

### NATURAL GUT HEALTH AND PERFORMANCE SUPPORT

VANNIX™ C4 is a proprietary blend of tannic acid extract, phytogetic molecules, beta glucans and a probiotic (*Bacillus subtilis*, PB6) used to minimize the impact of enteric challenges on poultry performance. During its development, numerous plant extracts and direct-fed active microbial combinations were evaluated, and synergies were identified. This research resulted in a novel phytogetic feed additive that reduces the impact of pathogens — like *Eimeria* and *Clostridium perfringens* —

on poultry intestinal integrity and supports optimal performance. VANNIX C4 also helps coccidiosis-vaccinated poultry maintain performance.

**VANNIX C4 offers four levels of protection** — tannic acid extract for intestinal barrier integrity; *B. subtilis*, PB6, a probiotic for maintenance of a balanced microbiota; beta glucans to boost the immune system; and phytogetic molecules from oregano and yucca for antimicrobial and antioxidant qualities.

#### TANNIC ACID EXTRACT (TAE)

Hydrolysable tannins from gallnuts, like tannic acid, provide specific activity versus other tannins.

Tannic acid is processed to **improve the bioactivity towards poultry pathogens.**

Tannic acid extract has been shown to consistently **support intestinal barrier integrity.**

#### *B. SUBTILIS*, PB6

Patented, spore-forming strain was isolated from chickens that had survived a high exposure to *Clostridium perfringens* in the environment.

*B. subtilis*, PB6 secretes biocidal proteins that **disrupt the membrane of pathogenic bacteria, like *C. perfringens***, killing it without harming beneficial gut microflora.

PB6 can also **reduce the prevalence of pathogenic bacteria** to maintain a healthy and balanced microbiota.

#### BETA GLUCANS

Highly bioavailable 1,3-beta glucans are **the most effective beta glucans for protective immunity.**

Beta glucans **help prime the immune system** to respond to pathogen challenges.

#### PHYTOGENIC MOLECULES

Oregano essential oil from the patented Kemlin high-carvacrol oregano line **provides consistent antimicrobial and antioxidant activities.**

Saponins from yucca extract **support nutrient absorption and provide antimicrobial activities.**

1

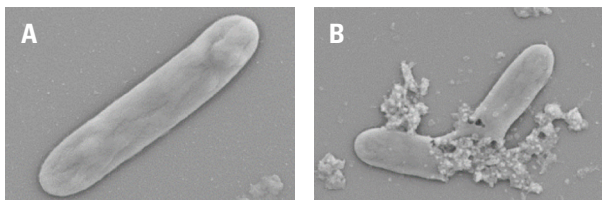
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## TANNIC ACID EXTRACT MODE OF ACTION

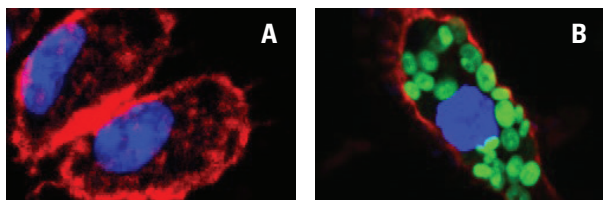
Tannic acid extract may exert anti-parasitic effects by inhibiting parasite growth or disrupting the parasite cell membrane (Figure 1). Tannic acid extract also supports intestinal barrier integrity by contracting the mucus membrane and capillaries in the small intestine to prevent leakage.



**Figure 1:** Disruption of the membrane of *E. tenella* sporozoites, reducing their viability. A: no TAE. B: with TAE.

## BETA GLUCAN MODE OF ACTION

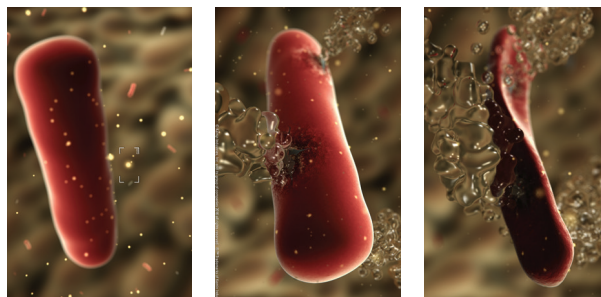
Beta glucans are recognized and ingested by immune cells — like macrophages — which triggers the release of cytokine signaling molecules that activate other immune cells (Figure 3). Active immune cells target and destroy foreign cells and disease-causing organisms.



**Figure 3:** Beta glucans (green) are phagocytosed by mouse macrophages. A: no beta glucan. B: with beta glucan.

## PB6 MODE OF ACTION

PB6 is a unique, naturally occurring, spore-forming microorganism that breaks into the bacteria's cell wall, causing it to release its cytosol and resulting in death of the microorganism (Figure 2).



**Figure 2:** PB6 impact on *C. perfringens* cell wall structure

## PHYTOGENIC MOLECULES MODE OF ACTION

Carvacrol in oregano essential oil alters the permeability of bacterial membranes, resulting in ion leakage. Saponins in yucca can inhibit cholesterol synthesis which disrupts bacterial cell membrane organization. Alterations to bacterial cell membrane functionality by phytogetic molecules eventually lead to bacterial cell death.

### REFERENCES:

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- Tonda, R. M., J. K. Rubach, B. S. Lumpkins, G. F. Mathis, M. J. Poss. 2018. Effects of tannic acid extract on performance and intestinal health of broiler chickens following coccidiosis vaccination and/or a mixed-species *Eimeria* challenge. *Poultry Science*. 97(9):3031-3042.
- Teo, A.Y.L., H.M. Tan. 2005. Inhibition of *Clostridium perfringens* by a Novel Strain of *Bacillus subtilis* Isolated from the Gastrointestinal Tracts of Healthy Chickens. *Applied and Environmental Microbiology*. DOI: 10.1128/AEM.71.8.4185-4190.2005



The Kemin Gut Health Triple Check program helps establish intestinal integrity and protection. Kemin offers products that **CLEAN UP** contaminants in feed and water prior to animal exposure, **BUILD UP** intestinal strength to reduce leaky gut and **KNOCK OUT** harmful pathogens for healthier poultry.

VANNIX C4 was developed for the **KNOCK OUT** category by supporting intestinal balance to inhibit or eliminate harmful pathogens from infiltrating the body.