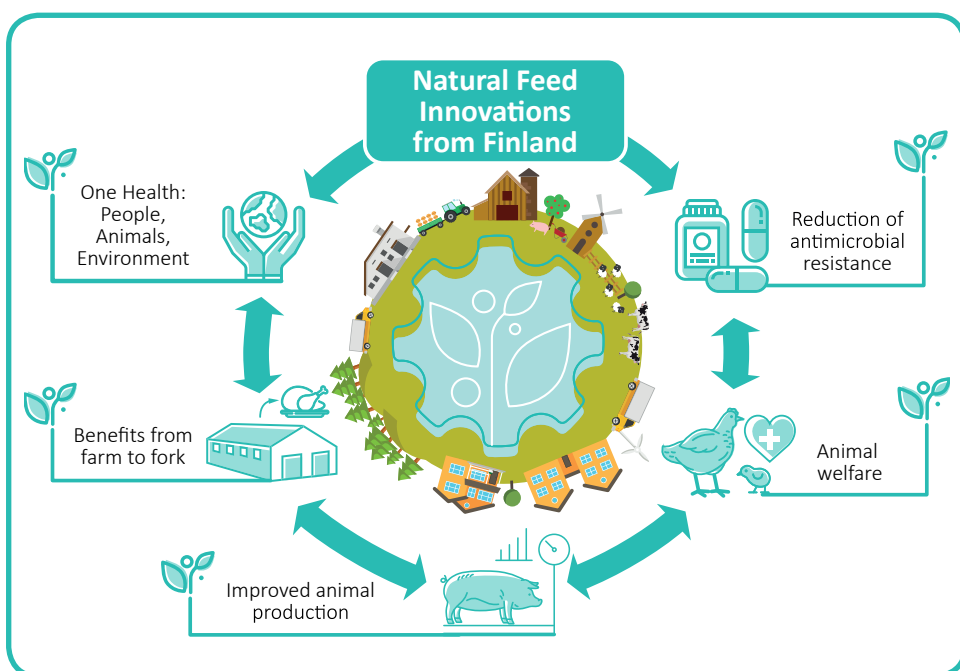




Nature Creates – We Refine



Hankkija FINNISH FEED INNOVATIONS

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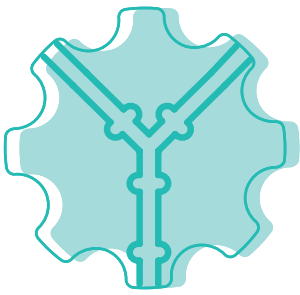
Mode of Action – “3 in 1”

1. Safe Immunity Invoking

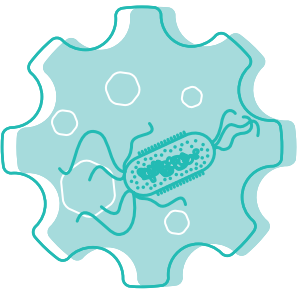
Early development of the adaptive immune system is essential for chickens in all production systems.

Progut® works as a safe sparring companion to the immune system of your birds. It speeds up the development of humoral and cell-mediated arms of the adaptive immune system, thus allowing bird’s natural defenses to be prepared to take the action when needed.

In breeder stock Progut® enhances deposition of immunoglobulins into the egg, for the benefit of the future hatchling. Offspring of Progut®-fed breeders get a safer start.



PROGUT® SUPPORTS THE BODY’S NATURAL DEFENSE FORCES WHENEVER THEY NEED BACK-UP



2. Pathogen Binding

Our hydrolysis process increases the amount of specific poly- and oligosaccharide structures which function as attachment sites for pathogenic bacteria.

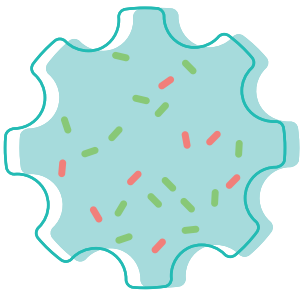
Pathogens adhering to Progut® particles instead of the gut epithelium get washed out of the body.

3. Balancing Gut Microflora

Progut® nurtures the development of beneficial microbiota in young birds, thus improving growth and feed conversion ratio.

In stressful situations, such as transfer of chickens or onset of laying, Progut® helps to maintain intestinal balance.

Progut® has supported and expedited the recovery of the hens in disease outbreaks, such as in chronic E. coli enteritis.



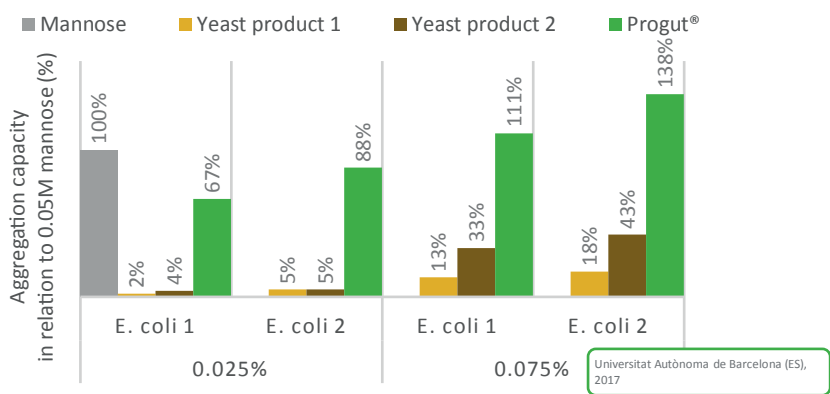
Recommended dosage rates

Broilers and Turkeys	
Starter period	0.5 kg/t of feed
Grower period	0.5 kg/t of feed
Finisher period	0.35 kg/t of feed
Layers and Breeder stock	
Layers: Pre-lay and Phase 1	0.5 kg/t of feed
Breeder stock	0.5 kg/t of feed

Progut® effectively binds pathogens due to soluble mannan structures

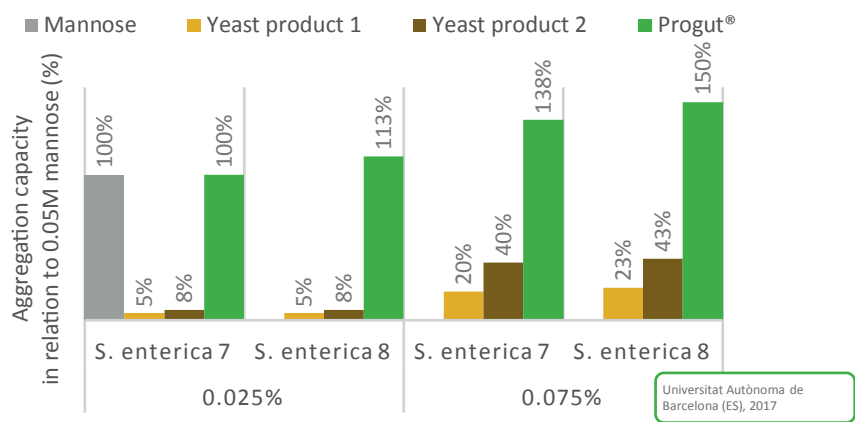
The capacity of Progut® to bind pathogenic bacteria poultry specific pathogenic strains of *E.coli* (ATCC 4154 and ATCC 9637) and *Salmonella enterica* subsp. *enterica* (ATCC 13311 and ATCC 43971) was compared against mannose and two competing yeast products.

Progut® is more effective at binding E. coli



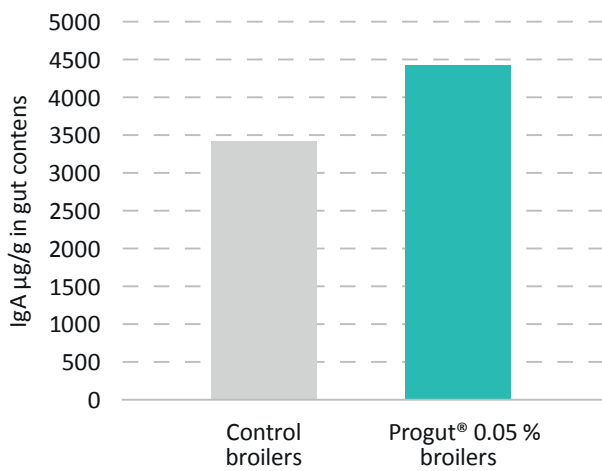
E. coli, with type I fimbriae adhesin FimH, binds to yeast mannans, mannose conjugates, and mannose monosaccharide. Almost all entero-pathogenic bacteria use this adhesion mechanism.

Progut® is more effective at binding Salmonella enterica



Progut® supports intestinal immunity

The intestinal tissue has a central role in immunological regulation of body.

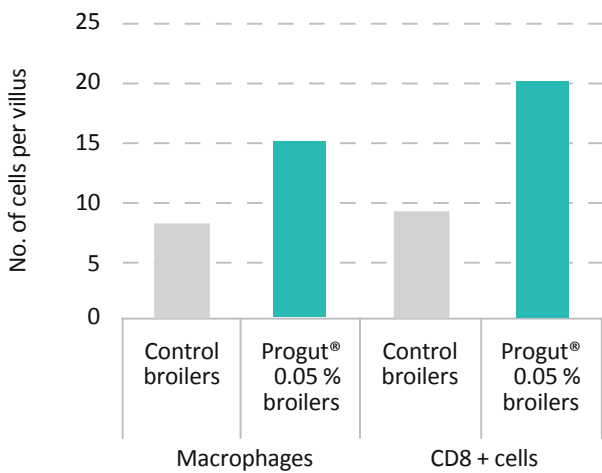


Humoral Adaptive Immune Defense

Immunoglobulin A (IgA) production by B-lymphocytes is an essential part of the humoral adaptive immune defense of the gut.

Increased IgA production reflects improved protection against pathogens and correlates positively with body weight gain.

Cultor Research Centre (Finland)



Cell-mediated immune defense

Macrophages and CD8+ cells (a subset of T-lymphocytes) are key players of the cell-mediated immune defense.

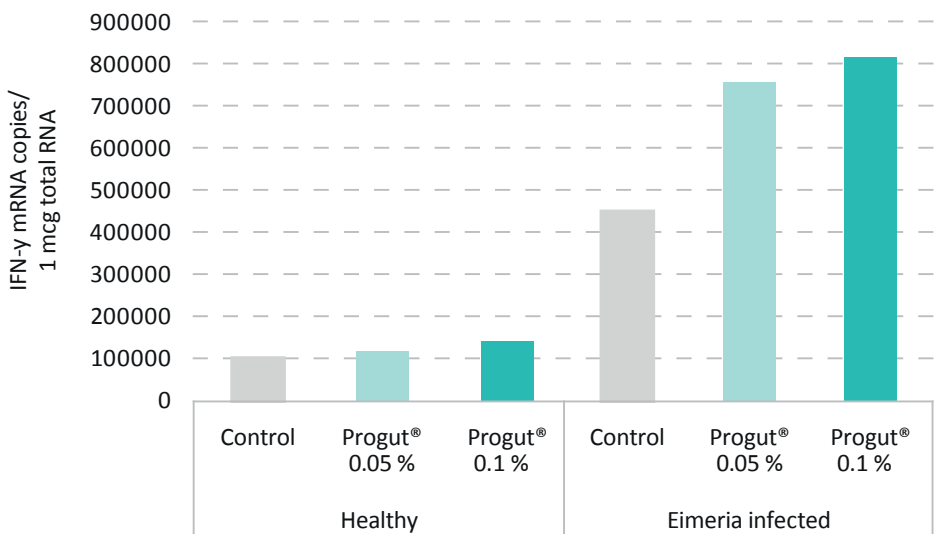
Progut® speeds up the arrival of macrophages and CD8+ T-cells in the ileal epithelium without evoking inflammatory processes.

Cultor Research Centre (Finland)

Optimal protection: Be prepared but act only when needed

Progut® does not initiate expensive inflammatory responses, while it supports cell-mediated clearance of infected cells.

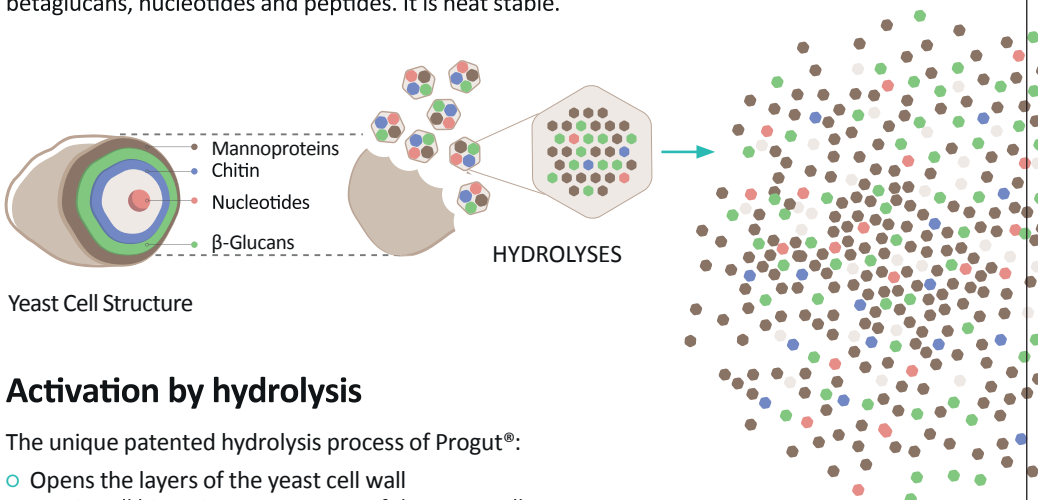
In a trial, Progut® increased the ability of broiler gut to evoke an inflammatory response against *Eimeria* invasion, as measured by IFN-γ expression, while it did not affect the response variable in healthy broilers.



Cultor Research Centre (Finland)

Progut® – Internal Protection for Poultry

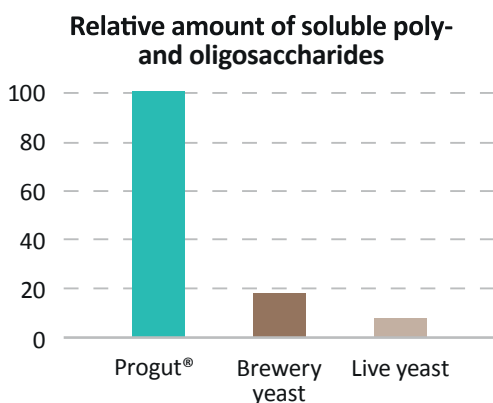
Progut® is a “3 in 1” yeast hydrolysate, which offers a unique set of immunological and performance benefits for all poultry. Yeast cells are hydrolyzed to maximize the efficacy of their bioactive components. Progut® is rich in soluble mannanoligosaccharides, betaglucons, nucleotides and peptides. It is heat stable.



Activation by hydrolysis

The unique patented hydrolysis process of Progut®:

- Opens the layers of the yeast cell wall
- Retains all bioactive components of the yeast cells
- Breaks down the mannoproteins into soluble poly- and oligosaccharides

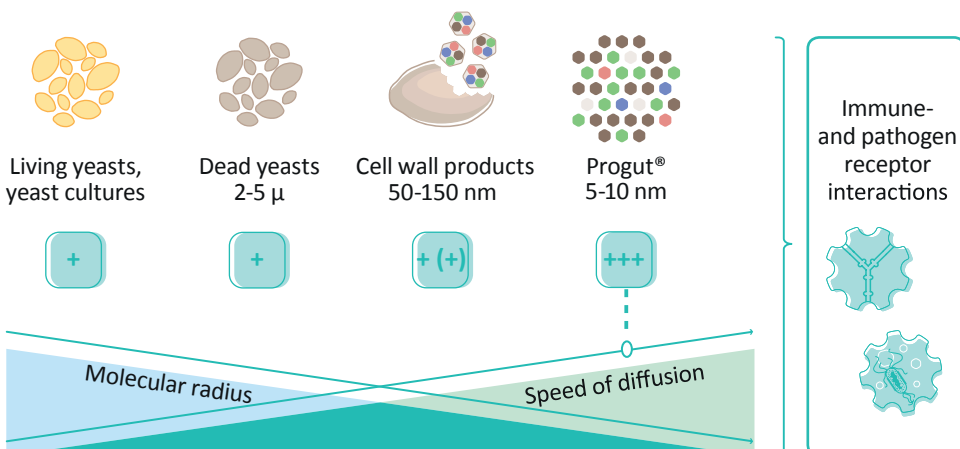


Thanks to our process Progut® contains over 5 times the amount of soluble poly- and oligosaccharides in deactivated brewery yeast and over 10 times the amount in live yeast. (Glycos Ltd Finland, 2008)

Optimized to enhance activity

- Sugar structures in Progut® are of optimal size to maximize its pathogen binding and immune stimulating potential
- As the molecular radius of sugar structures decrease, the speed of diffusion in water increases
- The patented hydrolysis process creates the optimal balance between exposed sugar structures and their water-solubility

Size and water solubility matter



progut[®]



**ACTIVATE
INTERNAL
PROTECTION**