

## ADVANTAGES OF DINAMUNE

Please see our publication "Improving growth performance and health status of aquaculture stocks through the use of Dinamune®"

Dinamune® is a mannan oligosaccharide derived from the outer cell wall of a specific strain of *Saccharomyces cerevisiae* using a proprietary process developed by Dinattec Inc. Its use in terrestrial animals is well documented, however it is only recently that its effectiveness in aquaculture has been established. Improvements in the performance and health status of several species of fish are being seen. The referenced paper documents recent trial work carried out with trout, carp, catfish, tilapia, sea bass, sea bream, sole and salmon. The interactions among intestinal microflora, gut morphology, the immune system and nutrient uptake has a major influence on animal health and performance. Non-specific enhancement of disease resistance is particularly relevant in farmed fish as they are vulnerable to ubiquitous opportunistic bacterial pathogens that can take advantage of fish stocks when stressed. The results discussed in this paper clearly demonstrate the association of improved growth and performance, gut health, immune status and resistance to disease in fish fed Dinamune®. Improved hepatocyte condition may well be an indicator of better utilization of dietary nutrients; and this in association with improved gut morphology may suggest reasons for better growth and performance.

## RECOMMENDED DOSE

Add Dinamune at the rate of 500-4000 grams per metric ton of feed either with your premix, (can be used as base), or directly in feed mixer. Dinamune can also be top dressed if so desired.

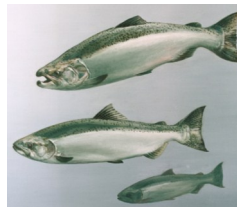
## PRESENTATION

25 kg., paper bag or 25 kg plastic pail.

## STORAGE

Store in dry cool environment. Keep partially opened bags closed while stored and away from direct sunlight.

Improved immune status and disease resistance to cohabitant and inoculative challenge tests with the pathogen *Vibrio alginolyticus* were observed in the sea bass juvenile trials at ULPGC. The phagocytic index was monitored at day 36 of the trial and increased ( $P < 0.05$ ) with the inclusion of 0.4% Dinamune®. The phagocytic activity of the head kidney macrophages reached 32.4% in the 0.4% Dinamune® treatment and 26.9% in the 0.2% ® treatment compared with 23.8% in controls (Figure 5). Respiratory burst activities of circulating neutrophils were greater ( $P < 0.05$ ) in the fish fed Dinamune® at 0.2% and 0.4% inclusion rates.



## DINATEC

**Diversified Nutri-Agri Technologies Inc.,**  
3292 Thompson Bridge Rd. #208, Gainesville, Georgia 30506  
E-Mail [info@dinattec.com](mailto:info@dinattec.com), Visit our web site at <http://www.dinattec.com>;  
Phone 770-531-1309, FAX # 678-608-2770;  
**We Deliver Optimum Profitability and Performance**  
Visit our web site at [www.dinattec.com](http://www.dinattec.com)



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**For use in aquatic species.**

# DINAMUNE

## Advanced Immunology Enhancing Technology

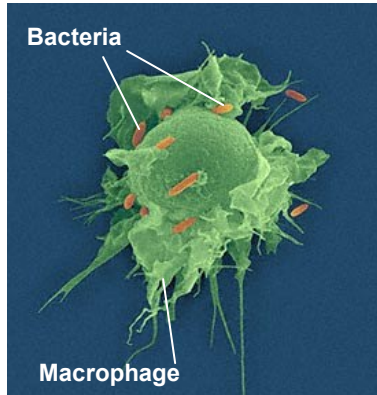
**Authorized Distributor:**

*" A Dynamic Approach to Nutri-Agri Product  
Research and Technology Development "*

## What is DINAMUNE?

- Dinamune is a highly purified form of combined food and feed grade active ingredients. There are no intermediate carriers to add additional labor, packaging, process and freight costs.
- With Dinamune you get only what you pay for at the highest possible concentration of active materials consistent with safe handling guidelines.
- Dinamune is the trade name for a highly purified yeast extract chemically known as beta 1-3-D - glucan.
- The active ingredients found in Dinamune are **Generally Recognized As Safe (GRAS)** according to the FDA), and therefore not considered a drug.
- Dinamune has no toxicity or adverse side effects. It is 100% natural.
- Dinamune is a polysaccharide molecule with a glucose construction, a simple saccharide cell that transforms to energy as adeno triphosphate (ATP) and can then be stored in muscle, liver and other tissues in its modified glycogen form.
- The beta 1-3-D- genesis of Dinamune is different from energy-storing glucose containing polysaccharides because the structural links between the glucose units are different. More specifically, it is the beta 1-3-linkage which makes Dinamune highly effective in eliciting an immune cascade reaction.

### Phagocytosis



## How does it work?

The activated macrophage is a veritable powerhouse in terms of activity. Not only can a macrophage recognize pathogenic and tumor cells nonspecifically as cited earlier, as well as removing foreign debris, but it can produce a number of essential cytokines that are able to stimulate the immune system in general and boost the amount of bone marrow produced in higher animals.

Individuals, human or animal, by reason of age or other factors, such as chronic infection or inadequate nutrition, may over a period of time develop a diminished immune system. It was in the late 1980's that Dr. Joyce Czop, at Harvard University, described the mode of action of Beta

Glucans in stimulating the immune system: He surmises the information by stating that there are highly specialized receptors on the surface of certain of the larger immune system cells called macrophages that can be activated also by beta 1-3-D-glucan.

Since the macrophage is evidently unable to distinguish the 1-3 Beta Glucan from a primary pathogen at specific receptor sites it triggers and activates a "cascade" of immune events in much the same manner as if an actual pathogenic challenge existed.



## DINAMUNE's Developmental History

The 1,3-D-glucan found in Dinamune has a long trajectory of scientific research and scrutiny and a copious reference list. The initial research originated in the 1940's when Pilfer and his colleagues described what amounted to be a crude yeast cell wall preparation. Even at this early developmental stage these researchers came to the conclusion that they had been able to stimulate nonspecific immunity responses by utilizing the yeast extract.

It was unknown at the time which element of this composition, containing a relatively crude mixture of proteins, lipids and polysaccharides, was responsible for the activation of the immune response. The answer came later in the 60's when the late Dr. Nicholas DiLuzio at Tulane University experimented with several glucans and discovered that beta 1-3 - D - glucan configuration isolated from the cell wall of yeast was primarily responsible for the enhanced immune response that had been previously observed by other researchers.

## Immune System Problems:

**The following problems are frequently induced by a diminished immune response:**

- Reduced cicatrization capacity (decreased fibrin response).
- Reduced bone marrow proliferation with resulting lowered white cell counts and resulting anemia.
- Increased incidents of all kinds of viral, fungal and bacterial infection.