

Unique combination, matchlessly broad spectrum, your choice:

Anta[®]Ox Aqua, excellent by nature.

Anta[®]Ox Aqua is a unique plant-based feed additive. It contains a carefully composed combination of valuable flavonoids, developed to face the challenges in modern aquaculture - in a natural way. Extensive research has impressively documented the effectiveness in different species: in the laboratory and in the field: in tanks and in huge ponds. The application of this innovative formula in aquaculture and especially in shrimp farming is new, and absolutely promising.

To date, one of the biggest challenges in the aquaculture production is the early mortality syndrome (EMS) in shrimps which is feared by shrimp farmers throughout the world. This disease causes devastating production losses of up to 42% in the affected countries (particularly in China, Vietnam, Malaysia, Thailand and Mexico). EMS is an infectious disease caused by the bacterium *Vibrio parahaemolyticus*. EMS experts know that classical approaches like antibiotics and chemical disinfection alone are no solution to this problem. Shrimp farmers throughout the world are waiting for a breakthrough in combating EMS and maintaining the profitability of shrimp production.

Economic boost for shrimp production by Anta[®]Ox Aqua

With Anta[®]Ox Aqua (product group **health**), Dr. Eckel provides a product that is capable to directly decrease the bacterial infection and highly increase the survival rate in shrimp suffering from EMS: *in vivo* under farm conditions. Trials conducted in cooperation with the renowned Kasetsart University in Thailand showed excellent results under laboratory conditions (challenge trial with *Vibrio* spp.) as well as in large pond trials under farm conditions. Not only traditional parameters like growth and feed conversion ratio (1.35:1 vs. 1.55:1 in the control group) of Pacific White Shrimp were positively affected by feeding Anta[®]Ox Aqua. Using modern laboratory techniques like Real-time PCR and histomorphological studies, a direct influence of the active ingredients of Anta[®]Ox Aqua at the cellular level (Gessner et al. 2012, 2013; Fiesel et al. 2014; Niyamosatha et al. 2015) was measured. In subsequent laboratory analysis significant reduction of bacterial loads were detected (Tab. 1): Total bacterial load -90%, total *Vibrio* counts -87% and *Vibrio parahaemolyticus* counts -90% lower compared to control group. EMS is known to cause necrotic cells in the hepatopancreas of shrimp. Due to the reduced pathogen load with Anta[®]Ox Aqua, the hepatopancreas of the shrimps showed no signs of atrophy and bacterial infection and appeared to be healthy and normal. In contrast, in samples of the control group

without Anta[®]Ox Aqua 20-80% hepatopancreatic cells were damaged. Furthermore, the lower bacterial infection in Anta[®]Ox Aqua-fed shrimps accounted for better survival rate (91% vs. 63% in the control group), which in turn, increased total biomass production in the Anta[®]Ox Aqua group. In addition to the higher financial return, a lower mortality generates less waste in terms of animals and feed and enables farmers to plan annual production volumes more reliably.

Tab. 1: The number of bacteria (10^5 CFU/g) in the hepatopancreas of Pacific white shrimp after feeding with different diets for 60 days.

| Experimental group | Number of bacteria count | Vibrio spp. count | V. parahaemolyticus count |
|---------------------------|--------------------------------|-------------------------------|-----------------------------|
| Control | 122.31 \pm 71.3 ^b | 11.58 \pm 11.2 ^b | 6.81 \pm 6.8 ^b |
| Anta [®] Ox Aqua | 13.65 \pm 87.1 ^a | 1.48 \pm 1.4 ^a | 0.67 \pm 1.6 ^a |

The data are presented as the mean \pm standard deviation. Means in the same column with different superscripts are significantly different from each other ($p < 0.05$).

The mode of action of Anta[®]Ox Aqua

Inflammation is a reaction to damage of animal tissues (whether visible or invisible) caused by various stimuli. Those stimuli can be physical (e.g. injuries, heat and radiation) chemical (e.g. acids and toxins) and biological (e.g. bacteria, fungi and viruses). Numerous of these factors can be found in aquaculture production, which means that undetected inflammation is likely to be present almost continuously. The inflammatory process is controlled and activated by the transcription factor "Nuclear Factor kappa B" (NF- κ B). After stimulation by various inducers, NF- κ B activates the expression of genes encoding pro-inflammatory proteins or enzymes involved in the inflammatory process. The inflammatory mediators contribute to the disruption of epithelial barriers and activate other immune cells which enhance the inflammation of the digestive system. Inflammation in the digestive system and adjacent organs costs energy, reduces growth performance and impairs feed utilization of aquaculture species.

The active ingredients in Anta[®]Ox Aqua act as natural antiphlogistics *in vivo* by down-regulation the activation of the NF- κ B factor and inhibition of the formation of pro-inflammatory proteins. This reduces negative consequences of inflammation like fever, cell death and tissue damage (Gessner et al., 2012, 2013; Fiesel et al., 2014). Indeed, less necrotic cells were found in the hepatopancreas of shrimp when fed with Anta[®]Ox Aqua, indicating less inflammation in the digestive system. From classic antibiotic growth promoters (AGPs) is known that their anti-inflammatory activity is responsible for their growth-promoting

effect (Niewold 2007). Therefore, we assume that the growth enhancing effects of Anta[®]Ox Aqua are the result of the anti-inflammatory property of Anta[®]Ox Aqua. Not only growth but also feed conversion ratio was improved, indicating that the less energy from feed had to be used for inflammation processes.

What is the advantage of Anta[®]Ox Aqua over existing products?

Anta[®]Ox Aqua proved its effectiveness in numerous international feeding trials and under commercial farm conditions *in vivo* – demonstrating a breakthrough for the profitability of shrimp farms throughout the world. Compared with other feed additives for aquaculture feed, Anta[®]Ox Aqua offers a number of advantages. Anta[®]Ox Aqua is cost-effective even under very competitive market conditions in South-East Asia and Latin America. It is highly concentrated and works at low dosages – leaving enough space in the feed formula for maximum energy and nutrient density. Anta[®]Ox Aqua perfectly complements other efforts at farm level to keep fish and shrimp healthy. It does not interfere with medications and water treatments. Anta[®]Ox Aqua offers a natural solution meeting exactly the demand for a healthy and efficient fish and shrimp production — perfectly in line with today's consumer perceptions in regard to food safety and animal welfare.

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