

Advice on Vextra booster feed

EWOS research on fish feeds containing Biogenic Performance Enhancer (BPE):

OVER the past decade, there has been increasing interest within the aquaculture industry in the potentiation of the non-specific immune capacity of fish by immunostimulants to provide a possible supplement to other existing health measures such as vaccination against specific disease organisms. Whilst products such as β -glucans from yeast cell walls have been shown to be useful when injected into fish, the focus of EWOS research has been immunostimulants which can be given orally by incorporation in the feed. This approach has the major advantages of avoiding additional labour on the part of the farmer and handling of the fish resulting in subsequent stress-induced immune suppression.

One major disadvantage of the widely used β -glucans is that over-dosage or prolonged administration can exert a suppressive effect on non-specific immune responses. Commercial use of β -glucans in fish feeds therefore requires fairly accurate anticipation of possible stress periods and close adherence to recommended feeding regimes.

A product has been researched by Ewos, which does not require

CHARLES BURRELLS of Ewos explains the advantages of the new VEXTRA Booster feed.

such rigid application management and is effective in enhancing other elements of the immune system such as lymphocyte activation, cytokine expression and immunoglobulin synthesis.

The product has also been shown to improve growth and benefit may other biological processes. It is not marketed as an immune stimulant, but as a growth enhancer in non-fish species and is termed by the manufacturers as a Biogenic Performance Enhancer (BPE).

The nature of BPE

BPE is composed of nucleotides, purines, pyrimidines and RNAs. These substances are required for the normal DNA replication and protein synthesis required by actively dividing cells.

However, at certain times of stress, vaccination, invasion by microbial pathogens etc, there may be a shortfall of available nucleotides for that purpose.

Effects of BPE in non-fish species: Beneficial effects on performance and production have been demonstrated in pigs and poultry fed diets containing

BPE. In these species BPE in feeds has also led to improvements in health aspects, particularly immune responsiveness and disease resistance.

Effects of BPE in fish

- At an incorporation rate of 2.5 kg per tonne BPE in Rainbow trout diets led to a 10.5% increase in growth, giving an elevated specific growth rate (SGR) of 13%. Flesh protein levels were improved by 12.1% and fat content was reduced by 45%.
- In European catfish, feed consumption was 27.9% lower for the same weight gain.

- Tilapia fed diets containing BPE and vaccinated against *Aeromonas hydrophila* either intramuscularly or by direct immersion showed significantly higher antibody responses 70 days afterwards than similarly vaccinated fish fed normal diet.

Other cellular immune parameters were also elevated. When these fish were infected with the bacterium, mortalities in the BPE-fed groups were markedly reduced.

- When Nile tilapia, Common carp, Silver carp and Mugil species were fed diets containing BPE for 135 days significant increases in growth red blood cell counts, white blood cell counts, packed cell volumes and haemoglobin levels were observed.

Ewos research on dietary inclusion of BPE (VEXTRA Booster feed)

VEXTRA Booster feed and fish health

- Atlantic salmon fed for three weeks with BPE-containing diet (VEXTRA Booster feed) prior to infestation with sea-lice had almost 40% less attached lice than fish given normal diet.

- When fish were fed VEXTRA Booster feed 3 weeks

prior to experimental challenge with *Vibrio anguillarum*, a reduction in mortalities (31%) compared with those fed normal diet (49%) was achieved (Relative Percent Survival: RPS = 37%).

Mortalities in groups of fish infected with *Vibrio anguillarum* after being fed control diet or EWOS VEXTRA booster feed. (See graph 1)

- Similar results have been obtained in Atlantic salmon exposed to experimental infection with Infectious Salmon Anaemia (ISA) virus. Fish fed the BPE-containing diet suffered less mortalities than fish given normal diet at all times following challenge and after 6 1/2 weeks total deaths were 35.7% compared with 48.0% (RPS = 25.6%).

- Enhancement of the protective effects of vaccination have been demonstrated in Atlantic salmon immunised with furunculosis vaccine.

- The ability of BPE to enhance the resistance of fish to the stress of fresh-salt water transfer has been indicated by plasma chloride levels 3 weeks post transfer of fish fed VEXTRA Booster feed 3 weeks prior to transfer.

VEXTRA Booster feed and growth

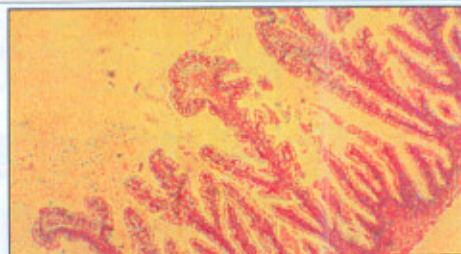
- Enhanced growth rates have also been noted in EWOS trials. After 3 weeks feeding with VEXTRA Booster feed fish were already 5.4% larger than those fed normal diet. This advantage rose to 14.9% five weeks after vaccination and was 8.7% at the end of the trial.

The drop in growth rate commonly experienced following stressors such as handling and vaccination was almost eliminated and the weight advantage gained carried on through this freshwater phase.

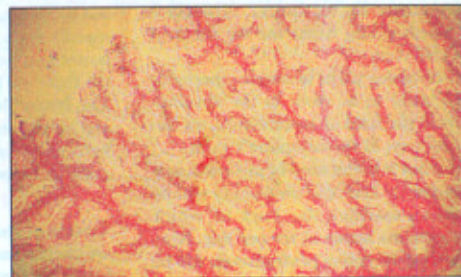
Weights of groups of fish fed control diet and Ewos VEXTRA Booster feed three weeks before and five weeks after vaccination

- BPE is known to accelerate intestinal cell differentiation and increase total gut mucosal surface area in rats by extending the villus heights. The intestines of fish fed a diet containing the BPE showed similar increases after three weeks feeding (See photos above right).

The increases in length (+18.0% - 21.4%) and enhanced branching of the villi were evident in all areas throughout the length of the gut and could provide a larger surface area for absorption of nutrients and immunogenic proteins. At this time these fish were 9.2% heavier 242.3 grams than the fish fed normal diet (221.3



Villi from fish fed normal EWOS diet

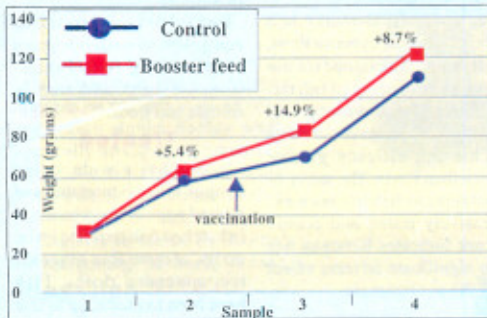


Villi from fish fed diet + BPE (VEXTRA booster feed)

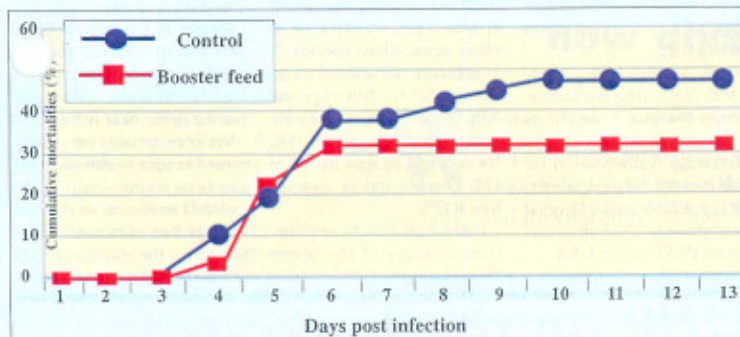
grams).

- In one trial Atlantic salmon fry fed VEXTRA Booster feed from first feeding showed a greater rate of weight gain than fry fed a competitor diet at five sample times after starting feeding. The % weight advantage was maintained throughout.
- In another growth study

with Atlantic salmon fry performance resulting from feed VEXTRA Booster feed compared with 3 other competitor diets. Fish fed continuous feed containing BPE v performing 7.0% better than nearest competitor diet at eight weeks.



Weights of group of fish fed control diet and EWOS VEXTRA Booster feed 3 weeks before and 5 weeks after vaccination



Mortalities in groups of fish infected with *Vibrio anguillarum* after being fed control diet or EWOS VEXTRA booster feed