



First EMS-free cycle in shrimp with 1-monoglycerides

Researchers recently identified the causative agent behind a mysterious disease that has been decimating shrimp farms in Asia over the past two years. Infected shrimp ponds experience extremely high levels of mortality early in their growing cycle - as high as 100% death rates in some cases. FAO is urgently engaging with partners to organise a concerted, inter-regional effort to implement appropriate countermeasures. One solution seems to have been found.

By Devi Hermsen, technical sales manager, Framelco and Anita Dame, head of R&D, Framelco

Very recently the breakthrough in the mystery of the Early Mortality Syndrome (EMS) in shrimp was brought to light by the University of Arizona. The research group led by Dr Lightner confirmed the bacteria strain *Vibrio parahaemolyticus* initiated by a viral phage to be the causative agent of the mysterious disease, also known as Acute Hepatopancreatic Necrosis Syndrome (AHPNS). Knowing the specific pathogen brings treatment and prevention closer.

Earlier the effect of antibiotics on EMS in shrimp has been investigated. Practical trials showed that supplying shrimp with a high dosage of antibiotics results in an EMS-free cycle. However, the use of high dosages of antibiotics is not preferred due to the risk of antibiotic resistant bacteria and the negative effects on international trading possibilities.

Since the beginning of this year Framelco and several research groups have been testing new products to fight

against EMS, in order to find a solution to combat the disease which is causing massive losses in shrimp farming. A specific blend of 1-monoglycerides has been developed to fight both the viral and bacterial causative agents. With success: the first EMS-free cycle on EMS infected farms is a fact.

Effective inhibiting properties

The 1-monoglycerides are well-known for their effective inhibiting properties on different bacteria strains and fat coated viruses. The molecules are produced by linking a fatty acid to the alpha-position of a glycerol molecule by esterification. A joint research with the University of Lisbon showed that the newly developed 1-monoglycerides blend disturbs specific structures within the membranes of bacteria, and destabilise the fat-envelope of viruses. Thereby 1-monoglycerides inhibit multiplication of these pathogens. The molecules are effective during the entire gastrointestinal tract and are also taken up by the blood stream. In agriculture the products have been used for several years now. A wide range of practical trials showed that dietary inclusion of 1-monoglycerides

successfully improved animal health and performance and drastically reduced the use of antibiotics and other medicines in agriculture.

Neutral odour and taste

1-Monoglycerides are very stable with neutral odour and taste, pH independent and heat stable up to at least 160 degrees Celsius. These characteristics make the 1-monoglycerides a very suitable product for processing.

At the moment different trials are running in Vietnam and Thailand to further develop the products in order to adjust them specifically to battle EMS in shrimp.

Since not all factors influencing the treatment are fully investigated, more farms with EMS problems are to test the products. Although curative use showed promising results, preventive use is recommended. Companies willing to test can contact Framelco: d.hermesen@framelco.com **AAF**

Only shrimp are vulnerable

EMS affects two species of shrimp commonly raised around the world, the Giant Tiger Prawn and Whiteleg Shrimp. Clinical signs of the disease include lethargy, slow growth, an empty stomach and midgut and a pale and atrophied hepatopancreas (an internal digestive organ that serves the function of a liver), often with black streaks. Within 30 days of a pond being stocked, large-scale die-offs begin. Disease spread is considered to be linked to proximity to already-infected farms or the movement of infected live shrimp, usually juveniles used to stock ponds.

As of the end of April 2013, countries officially reporting EMS included China, Malaysia, Thailand and Vietnam. But any place where *P. monodon* and *P. vannamei* are cultivated is potentially at risk. This includes most of Asia and much of Latin America, where shrimp farming is also important, as well African countries where shrimp are cultivated (Madagascar, Egypt, Mozambique and Tanzania).

Some rare strains of *V. parahaemolyticus* do cause gastrointestinal sickness in humans - through the consumption of raw or undercooked shrimp and oysters - but only strains carrying two specific genes cause human disease. Just 1-2% of wild *V. parahaemolyticus* strains worldwide contain these two genes - and the strain identified by the research team of University of Arizona as responsible for EMS is not among them.

The team also suggested that freezing kills the bacterium. Since shrimp trade is mostly in frozen form, there is apparently no or very low risk of disease transmission from these products.

According to a seafood safety expert at FAO, there have been no reports of human illness being associated with EMS, and these new findings would tend to confirm that EMS-infected shrimp do not pose a health risk to people.