BIO-MARINE, INC.
Aquafauna

WHAT IS DHA?

Dososahexaenoic acid (DHA), 22:6(n-3) is one of the longest chain HUFA's in the n-3 and n-6 series of fatty acids. DHA along with DPA and EPA are long chain fatty acids essential for the normal development of larval fish and shrimp (Watanabe et al. 1978) and also oyster spat (Langdon and Waldock (1981), Ostrowski and Divakaran (1990), Watanabe (1993), and Ozkizilcik and Chu (1994). Aquaculturists derive these fatty acids mostly from fish oils (ie: Menhaden or Squid oil) offered by many manufacturers. Though these oils do contain DHA, it is at very low, levels. They are mainly rich in EPA (Eicosapentaenoic acid, 20:5n-3) which is also essential but not the only HUFA necessary. The main concern is most animal's inability to elongate EPA into DHA. Studies suggest that most animals have the capability to retro-convert DHA into EPA but not the reverse. Therefore, an EPA rich oil may still leave an organism DHA deficient. This also includes enrichment of rotifers and Artemia prior to feeding the predator larvae. One major reason for increased interest in higher levels of DHA in larval feeding programs is that for many marine organisms, proper larval development and survival is now known to be highly depending on the right DHA to EPA ratio. This ratio is not balanced in most larval diets based on fishmeals and oils since they lack the necessary levels of DHA. (See: Nutritional Enhancement of n-3 and n-6 Fatty Acids in Rotifers and *Artemia* Nauplii by Feeding spray-dried *Schizochytrium* sp., William Barclay, OmegaTech Inc., & Sam Zeller, NutraSweet Kelco Co.)

WHAT IS EPA & DPA?

Eicosapentaenoic acid (EPA), 20:5n-3 and Docosapentaenoic acid (DPA), 22:5(n-6), are also in the category of longest chain HUFA's in the n-3 and n-6 series of fatty acids. These longchain HUFA's are integral, through biosynthesis, to early nervous system development of fish and shrimp. The n-6 HUFA, including arachidonic acid (20:4n-6) is also important as the precursor of some prosta-glandins and other biologically active compounds which regulate growth and reproductive functions (Stanley-Samuelson 1987; De Petrocellis and Di Marzo 1994). Napolitano et al. (1988). Tests suggest further that the n-6 fatty acid may be critical for normal marine bivalve development and reproduction (Napolitano et al. -1988). Again, the focus is on the *ability* of marine animals to retro-convert DHA into EPA/DPA and its *inability* to elongate EPA/DPA into the higher chain DHA.

High DHA emulsions/oils verses Algamac-2000 and AlgaMac-3050

High DHA emulsions/oils may be DHA rich but like any oil, have a shelf life. Over time, the integrity of the oil will diminish and ultimately go rancid. Also, oils compromise water quality. They are generally not soluble in water (especially cold water), and much of it ends up fractionated out of the water column and wasted. With Algamac-2000 and AlgaMac-3050, you get a clean, hygienically safe dry product that readily mixes in water. The reason being that this product is a whole cell that has been deactivated and de-moisturized. As a cell, it contains not only the essential fatty acids but proteins, carbohydrates, phospholipids, amino acids, and its own anti-oxidants for natural preservation. In aquatic nature, EPA, DPA, and especially DHA are derived from zooplankton and phytoplankton in the form of cells, not as free-form oils.

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