



## **ANCHOVY MARINE FISH EMULSION**

Fish material has been used by various cultures to promote plant growth over centuries. Today the use of solid and liquid Fish products are used throughout the world in ever increasing volumes by professional and amateur growers alike. Considering the growing international interest in *organic plant and crop production* it is clear that the importance of 'un-amended' Fish as a *qualifying* organic plant food source in these fields has a promising future.

### **PRODUCT QUALITY**

With the ever growing number of products made from various fish resources, it has become important to consider the differences in quality; i.e. sourcing, processing and formulations that exist between these products.

Variations in product quality do exist when considering the following important factors:

#### **1. Sourcing the raw fish material.**

The source of the fish material for processing. Fish are either obtained from fresh water or marine (ocean) environments. It is thought that, due to the *higher levels and greater diversity* of minerals found in the ocean, marine fish analyses and composition would reflect this fact.

Products sourced from marine fish should therefore be more effective as plant 'foods' than fish products manufactured from fresh water fish.

#### **2. Manufacturing.**

There a number of ways to prepare fish fertilizers. However, when considering large scale commercial processing, two methods are generally used:

##### **2.1 The Enzyme Hydrolysis Method. (E.H.M.)**

A wide variety of raw materials may be used in the E.H.M. Fish flesh or waste is separated from the bony material and mixed with water. This mixture is homogenized and subjected to 50 degrees C.

The pH of the slurry is reduced by adding acid (HCL) and a selected enzyme such as acid protease. Hydrolyses then proceeds during which oligopeptides are formed while the acidification stabilizes the liquid.

The enzyme-fish mixture is stored at 48 degrees C for a number of hours to maximize the hydrolyses effect. The fish proteins are reduced by this process to basic free amino acids.

The resulting liquid product should be stored at a low pH to prevent microbial degradation. This product is a source of soluble organic nitrogen but lacks concentration due the amount of water required by the process.

Normally such products would contain less than 25% solids and Nitrogen reading as low as 2% requiring chemical amendment to attain acceptable nitrogen levels.

## 2.2 The Fish Solubles Method (F.S.M.)

Cambrian's organic marine fish emulsion, A-Hoy®, is produced during marine **Anchovy** fish product manufacturing operations. The fish flesh is minced and subjected to flash steam temperatures (100 seconds) to sterilize and weaken tissue fibers.

The slurry is then subjected to a mechanical pressing operation during which the body liquids and oils are separated from the solids. After the oils are removed, the press liquid is then further processed by evaporation which removes suspended solids. It is important that the press liquid be totally free of any particles that could cause nozzle blocking during spray-on applications; another important quality factor to the producer and consumer.

A-Hoy® is therefore the result of successive steps to concentrate (evaporation) the resulting liquid. The Fish Emulsion contains soluble protein and a broad spectrum of amino-acids (Nitrogen source) and trace minerals which function synergistically to the plant's benefit.

A-Hoy® is totally un-amended and not enriched with N, P or K chemicals which preserve its **organic nutritional value**.

It is thought that the balance of 'natures' formulation of organic compounds displays an 'unknown growth factor' as A-Hoy® outperforms chemical fertilizer formulations containing much higher levels of purified, inorganic N, K and P.

In summary:

A-Hoy® is manufactured from Anchovy pelagic fish harvested in the South Atlantic Ocean. The whole fish, once landed, is steamed and pressed to separate the solids from the body fluids. The body fluids are centrifuged and the fish oils removed. After an evaporation process, the resulting concentrated liquid is then stabilized at pH 5.5 with the use of phosphoric acid.