

# ABMac™



## New conceptual product for Abalone looks very promising.

Initial findings show abalone adapts to new ABMac Abalone Diet in less than one week. Results reveal a greater increase in weight gain over abalone fed on similar amounts of kelp. ABMac uses abalone-specific attractants and a specialized “sheet” format which is made fresh

on-site. ABMac remains stable in seawater for over 4 days. Commercial trials indicate increased uptake, after acclimatization, by 30% over control animals being fed standard kelp diet. Further research is in progress on growth rate impact, and feed conversion ratio's (FCR's).

### **A "Make on-site" Artificial ABalone Diet Targeting Three Use Sectors:**

#### **ABMac as a prophylactic delivery diet**

- Make fresh and on-site.
- Excellent carrier for hormones, medications, and vitamins.

#### **ABMac as a weaning diet (from diatoms to substrate)**

- Start weaning with a protein rich diet 3-10 times that of kelp (see ABMac/Kelp Comparison)
- Reduce weaning time through increased growth rates. Shorter weaning means shorter growouts and reduced overhead, labor, feeds and expenses.
- Specific attractants and kelp-like “sheet” format promotes ease of conversion to ABMac.
- Remains stable in water for more than 4 days.

#### **ABMac as a selectively applied supplement to standard grow-out diets or kelp.**

*Still under research & development, the application of ABMac as a general growout diet has yet to be decided, pending final production costs, FCR (feed conversion ratio) and rate of growth for use as either a supplemental or 100% substitution diet*

Preliminary trials by several abalone farms along the coast of California indicate that animals accept and feed on this diet once they have been acclimated to its physical properties. As recognized, ABalone normally fed on kelp may take some time to adjust to this new format. The type of culture system incorporated may also impact feeding habits. The diet, in its current format, is designed as a sinking sheet. Aquafauna Bio-Marine (ABM) is currently working on a floating format based on the same formulation.

# The ABMac / Kelp Comparison

Does Mother Nature provide the best food source for Abalone?

Optimizing the Growth, Health, Development & Survival is Bio-Marine's credo when creating new diets. With protein being a primary requirement for ABalone, we raise the question that if ABMac's protein levels surpass that contained in kelp by more than 10 times, is kelp really the best food source available? We think not.... With today's technology, we can provide a format that is truly commensurate with Mother Nature herself... only we've gone one step further by increasing the nutrient profile to their optimum levels. This includes the DHA rich Algamac-2000 and Abalone-specific attractants.



<b>Proximate Analysis</b>		<b>(Dry Weight Basis)</b>	
	<b>ABMac ABalone Diet</b>	<b>KELP</b> (Ascophyllum Nodosum) [Norwegian 'brown seaweed']	<b>KELP</b> (Macrocystis Periphery) [partially dried]
<b>Protein</b>	<b>45.97%</b>	<b>4 - 10%</b>	<b>5-6%</b>
Fat	13.65%	1-1.2%	1-1.2%
Carbohydrates (by subtraction)	17.84%	38-45%	40-45%
Ash	15.32%	17-22%	33-35%
Moisture	7.22%	13%	10-11%

## ABMac Fatty Acid Profile

Name	Fatty acid	mg/g	%Total Fatty Acid
Myristic	14:00	11.74	9.11
Myristoleic	14:01	0.59	0.45
Palmitic	16:00	41.87	32.5
Palmitoleic	16:01	7.55	5.86
Stearic	18:00	5.05	3.92
Oleic	18:01	14.37	11.15
Linoleic	18:2(n-6)	8.16	6.33
Arachidic	20:00	0.14	0.11
Linolenic	18:3(n-3)	0.87	0.68
11-Eicosenoic	20:01	0.45	0.35
Octadecatetraenoic	18:4(n-3)	0.68	0.53
Behenic	22:00	0.01	0.01
Eicosatrienoic	20:3(n-3)	0.12	0.1
Arachidonic	20:04	1.27	0.98
Nervonic	24:00:00	0.35	0.27
<b>Eicosapentaenoic</b>	<b>20:5(n-3)</b>	<b>4.94</b>	<b>3.84 EPA</b>
<b>Docosapentaenoic</b>	<b>22:5(n-6)</b>	<b>5.47</b>	<b>4.24 DPA</b>
<b>Docosapentaenoic</b>	<b>22:5(n-3)</b>	<b>0.47</b>	<b>0.37 DPA</b>
<b>Docosahexaenoic</b>	<b>22:6(n-3)</b>	<b>24.74</b>	<b>19.2 DHA</b>

## Sponsored Testing Facility

Aquafauna Bio-Marine is seeking a limited number of field testing facilities who are commercially culturing ABalone for which we will provide the product and training necessary to implement an on-going field study of ABMac ABalone diet. Size of the facility is not necessarily an issue as much as the time factor. Candidates would be providing the time to supply periodic data regarding ABMac feeding procedure, diet acceptance, growth rates and other observations with regards to health, development, feed uptake, etc.. Protocols may be estimated mutually. Strictly controlled testing and monitoring of larval and growout stages will be expected for a minimum of 1 year. If you are interested in becoming a sponsored field testing facility, please contact us and we will send you an application.

## PRICING

Contact local distributor

*Packed in 3kg vacuum foil bags  
10kg/cs (Bulk pack also available)*

**BIO-MARINE, INC.**  
*Aquafauna*

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## How can ABMac Augment your ABalone's Growth, Health, Development & Survival?

**Growing an ABalone to full maturity can take several years. This becomes a tremendous endeavour when considering labor, overhead, feeds and the risks of disease. ABMac is formulated to optimize the Growth, Health, Development and Survival of your ABalone. From larval to grow-out, an integrated feeding regimen with ABMac can increase growth, shorten the grow-out period while sustaining proper health and development. All this culminates with maximum survival which reflects directly on your bottom line. See how ABMac can become your diet of choice.**



### GROWTH

Growth is always a critical subject. In order to maximize it, you would expect to feed your animals the highest quality feeds available keeping in mind budgetary concerns. Then why is kelp (which only consists of 4-11% protein) the main source of protein? Answer: Kelp is cheap. Composed mostly of water with an FCR (Feed Conversion Ratio) of about 16-18:1, kelp is the feed of choice, based purely on price and availability. Artificial diets may not be able to compete with kelp on price alone but consider the whole picture. Feeds are not the only expense involved. Farming is an integrated process that includes feeds, labor and overhead. So, a reduction in grow-out time also means a reduction in feeds, reduced labor, and lower overhead costs like electricals (pumps, lighting, etc), wear & tear on equipment, rent, etc.. Even if the cost/rate of growth trade off was even, your cash turn-over and flow would be accelerated. More importantly, you are optimizing the health of your animals at no extra cost.



### HEALTH

The health of your animals is partly dependent on Nutrition. For the same reason your body needs proper nutrients for optimal health, Abalone are no different. But, what about the animals that are borderline... the ones that consistently don't make it through the weaning stage let alone the growout process? Marginal improvements in early stage survival delivers a great impact at harvest. Combine this with a shorter growout time and you have begun to compound your yields.



### SURVIVAL

Everything you do in the culture process involving growth, health, and development has one goal and that is to assure the best survival for the crop. Literature indicates that fats are not a high requirement for abalone yet, in most marine organisms, lipid loading equates to stored energy. In many marine forms, higher lipid levels relate to better stress coping and resistance. In early abalone feeding trials, animals were presented prototype diets with three levels of lipid content. While other components remained relatively the same, the test animals preferred the highest fat diet.



### DEVELOPMENT

*Proper development is a double-sided concern. Without it, chances are your animals won't survive the long growout period. A lot can happen in the years it takes to culture a marketable product... disease, malnutrition, poor eating habits to name a few. Again, you may currently be satisfied with the yields. After all, it's on par with what all the other growers are getting, right? But let's look at the other side. Proper development also carries a very important aesthetic value which is related to market quality. Inferior looking animals bring inferior prices. Early trials indicate an enhanced red coloration in animals fed ABMac for 60 days. If you could capture even 5% better margins or maintain market share, you would certainly impact your bottom line performance.*



## ABMac & ALGAMAC-2000

We didn't have to think twice about including Algamac-2000 into our ABMac ABalone diet formulation. It is the cleanest, hygienically safe source of amino and fatty acids, vitamins & minerals available with an unrivaled HUFA profile (over 24% DHA). Algamac-2000 promotes strong, disease resistant animals, facilitating proper development and better survival.

### WHAT IS DHA?

Docosahexaenoic 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 EPA and DPA 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 oils (ie: Cod Menhaden or Squid -lka- 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 required. The main concern is that most marine organisms do not have the ability to elongate EPA into DHA. Studies suggest that most organisms have the capability to retroconvert DHA into EPA but not the other way around. Therefore, an EPA rich oil source may still leave your animals DHA deficient. (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 long chain HUFA's in the n-3 and n-6 series. These long chain HUFA's are integral for early nervous system development in 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, through biosynthesis, for normal marine bivalve development and reproduction (Napolitano et al. -1988). Again, the focus is on the ability of marine animals to retroconvert DHA into EPA/DPA and its inability to elongate EPA/DPA into DHA.

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