

Aquaponics & Aquaculture Product Knowledge is a continuing education series of guides that will help us on our journey towards a sustainable garden and farm. We all live on this beautiful and wondrous place we call earth. At Advanced Biological Concepts, our goal is to improve our lives through sustainable cultivation, understanding and education. We will explore how we can be good stewards of our planet while keeping our minds, bodies, animals and plants healthy.

Remember for your healthy mind and body, you are what you eat!

We will present most of our guides in easy to understand language, some issues will be geared towards the person just starting and some will be advanced that go into detail. We will learn as more information and technology becomes available and we will share it with you. We will listen to you, tell us what you want to know, we will do our best to cover topics and present them in future issues.

To start, we would like to share the ingredients we use in our signature blend:

Organic Fish Pellets



This product contains only certified organic agricultural products or ingredients that conform to the National Organic Program's national list of materials acceptable for organic livestock production.

Guaranteed Analysis

Crude Protein (min).....	31.000 %
Crude Fat (min).....	4.500 %
Crude Fiber (max)	8.000 %
Lysine (min)	1.250 %
Calcium (Ca) (min).....	0.700 %
Calcium (Ca) (max).....	1.200 %
Phosphorus (P) (min).....	0.400 %

Ingredients

Organic Canola Meal, Organic Sesame Seed Meal, Organic Corn, Organic Linseed Meal, Dicalcium Phosphate, Calcium Carbonate, Lactobacillus Acidophilus Fermentation Product, Organic Wheat Middlings, Organic Dried Kelp, Reed-Sedge Peat, Choline Chloride, Ferrous Sulfate, Manganese Sulfate, Zinc Oxide, Sulfur, Magnesium Oxide, Copper Sulfate, Calcium Pantothenate, Thiamine, Biotin, Sodium Selenite, Ethylenediamine Dihydriodide, Vitamin B12, Cobalt Carbonate, Organic Dried Tomato Pomace, Attapulgitic Clay, Diatomaceous Earth, Monosodium Phosphate, Organic Apple Cider Vinegar, Organic Dried Whole Milk, Organic Aloe Vera Gel Concentrate, Organic Potato Starch, Organic Dehydrated Eggs, Yeast Culture, Organic Lecithin, Potassium Chloride, Niacin, Sodium Sulfate, Copper Choline Citrate Complex, Ferric Choline Citrate Complex, Zinc Sulfate, Zinc Amino Acid Complex, Manganous Oxide, Manganese Amino Acid Complex, Ascorbic Acid, Vitamin A Acetate, Vitamin D3, Natural Source of Vitamin E (d-alpha Tocopheryl acetate), Riboflavin, Pyridoxine Hydrochloride, Carotene, Folic Acid, Cobalt Sulfate, Cobalt Choline Citrate Complex, Lactobacillus Acidophilus, Lactobacillus Casei, Bifidobacterium Thermophilum, Enterococcus Faecium, Potassium Citrate, Citric Acid, Calcium Sulfate, Magnesium Sulfate, Silicon Dioxide, Organic Sugar, Organic Sources of (Cayenne Pepper, Peppermint, Fabaceae Poaceae, Garlic, Parsley, Dandelion Root Extract, Licorice, Orange Peel Extract, Elder Flowers, Dandelion Extract, Ginger Extract, German Chamomile, Lemon Grass Extract, Thyme, Hops Extract, Sweet Fennel Extract, Sweet Basil, Sage, Cloves), Natural Antioxidants.

In this edition we will cover Tilapia, filtration and worms. Tilapia have a number of characteristics that make them attractive for tank culture. Their heavy, large scales and coating protects them from abrasion and bacterial infections that would adversely affect many other fish. Tilapia will grow well at high stocking levels in tanks when good water quality is maintained. Due to their very efficient digestive system, the solid fecal waste (the highly technical term for this is “Poopy”) doesn’t cloud the water as much as other species. They can be grown on diets that are high in vegetables, which are more renewable and sustainable than from rapidly disappearing ocean caught fish meal. Anyone having fish for relaxation, their beauty, and for the organic nutrients they will provide for their plants will be rewarded at harvest time. Herbs and veggies grown on an aquaponic system are unmatched in flavor and health! If you are going to harvest your fish to eat, you will be amazed with the flavor of the fish you grew using our organic fish feed. Most Tilapia are grown in algae ponds - they absorb the flavor of the water they are grown in; unfortunately algae has a very muddy flavor. If you keep your system clean, your fish will taste clean. Tilapia absorbs spices extremely well; the flavors you add will penetrate completely through and into the meat, not just on the top! We will talk more about this in future issues!

There has been a considerable amount of research and science that has gone into the development of Advanced Biological Concepts organic fish pellets. ABC has included ingredients that address all aspects of fish development and growth, including essential vitamins such as vitamin C (Ascorbic acid). If Tilapia are lacking in vitamin C their spines can break, called broken back syndrome - this is just one of the issues that can occur with a poor diet.

In regards to the digestibility of the food, we want the fish to be able to utilize as much of the food as possible. If your feed uses poor quality ingredients that will not be completely digested, the result in an aquaponic system is excess excreted waste solids. Other sources of waste are uneaten food and algae. Most of the solid waste should be removed before it enters the plant growing part of the system. If this waste accumulates in the system, it will depress available oxygen levels as it decays and produce carbon dioxide and ammonia. If deep deposits of sludge form, they will decompose anaerobically (without oxygen) and produce methane and hydrogen sulfide, which are very toxic to fish and smell very bad. This is avoidable by removing the sludge and waste and keeping your system clean. There are three categories of waste solids (poopy)—settleable or sinking, suspended, and dissolved. In the plant part of an aquaponic system there are different types: floating, also called raft and deep water culture system and NFT (nutrient film technique) where the fish water flows through pipes or small troughs with holes cut in the top and the plants are growing out of the top of the pipes. In these types of systems, the fish water needs to be filtered and clarified or the solids will get stuck in the roots and cause problems. To remove the waste, use a pond filter, usually a shoebox size container made from a plastic mesh with filter material inside. We will teach you how to make your own filters and go into much more detail about filtration and dissolved fish waste in future issues!

Another type of system is an ebb and flow, also called a flood and drain gravel or mixed media aquaponic system. Adding earth worms to these systems can be very beneficial. I will add a few words of caution; keep your worms free of harmful bacteria. If you buy worms, make sure the grower is not using manure that has dangerous bacteria. Don’t use worms that could have come into contact with harmful bacteria. Fish waste solids do not contain harmful bacteria; bacteria, that is, dangerous to humans. Worms are great at breaking down fish waste solids in your system and releasing nutrients that your plants need to be healthy. If you are incorporating worm beds into your system, the worms will do better when feeding the fish ABC’s high quality organic feed. Your worms will thrive on it and release more dissolved nutrients into your system. *Guess what?* You’ll have safe organic worms to share with your fellow aquaponic growers!

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