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Commentary

Fish Nutrition, Feed Types, and Management of Fish Waste

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DESCRIPTION

Channel catfish (*Ictalurus punctatus*), salmonids (*Oncorhynchus* spp.), common carp (*Cyprinus carpio*), tilapias (*Oreochromis* spp.), and eels have reported dietary requirements for amino acids and fatty acids (*Anguilla japonicus*). Channel catfish and salmonids have access to the majority of their vitamin and mineral needs, while common carp, tilapia, eel, and other finfish and crustaceans do not. Cost-effective feeds can be created for the main commercial aquaculture species.

The following are the main variations in nutritional needs between fish and mammals or birds: Fish require n-3 fatty acids, whereas land animals require n-6; fish can absorb minerals from the water, which negates the need for some minerals in the diet; fish have limited ability to synthesize vitamin C and must rely on a dietary source. Fish also have a lower digestible energy to protein ratio.

Prepared or synthetic foods come in complete or supplemental varieties. Complete diets give fish all the nutrients they need for optimum growth and health, including proteins, carbs, lipids, vitamins, and minerals. The majority of fish farmers employ complete diets, which typically contain the following ingredients in the following percentage ranges: protein, 18%-50%; lipids, 10%-25%; carbohydrates, 15%-20%; ash, 8.5%; phosphorus, 1.5%; water, 10%; and trace levels of vitamins and minerals.

Types of feed

Commercial fish diets are produced as pressure-pelleted (sinking) or extruded (floating or buoyant) feeds. Although both floating and sinking feed can result in sufficient growth, certain fish species prefer floating while others prefer sinking. Shrimp for instance will not accept a floating feed, whereas most fish species can be trained to accept a floating pellet. Fish size influences feeding rates and frequency to some extent.

Fish fry and larvae need to be frequently (and typically in excess) fed a high-protein diet. Due to their high energy requirements, little fish must be fed almost continuously every hour. Because small fish only need a modest amount of feed in relation to the amount of water in the culture system, overfeeding them is not as problematic as overfeeding larger fish. Feeding frequencies, rates, and protein content should all be decreased as fish grow.

Automatic (timed) feeders come in a range of designs, from belt feeders that operate on wind-up springs, to electric vibrating feeders, to timed feeders that can be set to feed repeatedly or hourly. Demand feeders don't need batteries or electricity. They often hang above fish tanks and raceways and function by letting fish strike a moving rod that extends into the water to initiate feed release. A little feed is delivered into the tank each time a fish pulls on the trigger.

The vigilance required for hand-feeding is sacrificed in favour of the time, labour, and financial savings provided by automatic and demand feeders. Some growers employ night lights and bug zappers to attract and destroy flying insects and bugs so they can provide an additional source of natural food for their fish. Fish feeding patterns that change or stop should be investigated for issues.

Management of fish waste

The most crucial fish nutrition guideline is to avoid overfeeding. Overfeeding is a waste of expensive feed. Additionally, it causes bacterial loads to grow, low dissolved oxygen levels, low biological oxygen demand, and water pollution. Fish should often only be fed as much food as they can ingest fast (in less than five to 10 minutes). This is approximately 80% of the feed they desire to consume. This is a decent general rule of thumb when feeding fish (satiation).

According to this method, feed the fish for one day's worth of food on a regular basis, perhaps twice a month. Following that, feed roughly 80% of that ration for the following few weeks, then repeat. To monitor feeding activities and determine whether to provide more or less feed, many growers utilise floating (extruded) feeds. Even under the best management, some feed is wasted.

CONCLUSION

The high phytic acid concentration of many plant based feed additives seems to bind metal ions like calcium, phosphorus,

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magnesium, manganese, zinc, and iron, rendering them inaccessible. When the phosphate groups are hydrolyzed by the enzyme phytase, phytic acid loses its capacity to bind metal ions. Even though phytase activity has been demonstrated in ruminants, fish and other animals with simple stomachs do not have this enzyme, therefore they are unable to use the phytate-bound phosphorus or other metal ions. As a result, phosphorus in the form of mono or di-calcium phosphate is frequently added to feeds. The needs for calcium and phosphorus are interrelated. By taking into the consideration of refinement of the nutrient needs of the main culture species, the effects of fish size, temperature, and management; the nutrient needs of crustaceans; the effects of nutrition on fish health and product quality; and feeding technology are all areas that require more research.