Fish Nutrition and Health Management

Nutrition requirements

The nutritional requirement of fish are all to those of terrestrial animals for growth producers and other normal physiological functions they need to consume protein, carbohydrates, fat minerals, vitamins and growth factors and energy sources. Deficiencies of one or more of the essential nutrients result in disease or even death. These nutrients may come from artificial or prepared diets or from natural aquatic organism source of energy.

All animals use chemical compounds to supply energy and for tissue building. They must obtain their energy directly by eating plant material or by eating other organisms' naturals. These organic maters belongs to these major groups (i.e.) proteins, carbohydrates, and fats in which energy is stored.

Other essential minerals

Dietary requirement for most of the other minerals have not been established for fish difference in growth response have been obtained by changing the dietary levels of Mg 1K, Cu, and Ve for several sp. of fish.

· Forage materials Gef. Grasses & Macrophyty which may be introduced into culture system or made to grow in the culture system (e.g. in F. H2O way fish culture)

· Prepared feed including a wide array of feeds, lagging from simply on from based mixtures of a few ingredients to micro en-capsulated diets.

Feed: The great bulk of fed used in aquaculture to the last category and are compounded using a number of ingredients.

Feed ingredients: A wide variety of ingredients are available for use in fish and crustacean feeds

1. Grasses

2. Pulses and Legumes

3. Miscellaneous fodder plants crop

4. Fruits and vegetables

5. Root crops

6. Cereals

7. Oil-bearing seeds and oil cakes

8. Animal products

9. Miscellaneous feed stuff

10. Additives

Feed Materials: Feed formation is followed by manufacture; their technology will differ, at least in details, depending on the type of feed to be manufacture.

Organic compounds

Vitamins

Vitamins are essential growth factors that are required in the diet in only very small quantities. The essential vitamins required in fish feed formation are Vitamins-A,D,E,K (fat soluble), Thiamine (Vitamin B1), riboflavin (vitamin B2), Phydoxine (vitamin B6) choline, Niacin, Biotin, Pantothenic Acid, inositol, Cynacopalamine (Vitamin B12), folic acid, Ascorbic acid (Vitamin c) one of the 1st systems of deficiency of practically any of the 13 to 15 essential vitamins for warm water fish is depressant appetite and reduced growth rate and their common symptoms are abnormal colour, back of co-coordinator nervousness, harmostrage fatty acid and increased susceptibility to baternoil arfectors.

Minerals

Fish probably requires the same minor as warm-blooded animals for tissue formalin various metabolic process. In addition, fish use inorganic element to maintain osmotic balance between fluids in their body and the H_2O , Mineral require is fish may he classifies as hulk elements as Ca, P, K, Na, Mg and Cl and race element like Cu, Co, Fe, I, Mn, Se, Zn, Ai, Cr, Vanadium.

Ca & P

Fish like mammals require large amount of Ca and P for the growth and devil. Most fish appear to be able to absorb enomy calcium from the HO through the gells for normal growth, except when H_2O is unusually low in Ca.

Level of dissolved phosphorous are very low in natural H_2O in relation to cacium consequently, the H2O in fish culture envin is not a significant source of phosphorous dietary deficiency in phosphorous have caused reductions in growth late, body content of ca. d. Phosphorous and appetite in fish.

Fats

Fats are the principal for of energy storage in planted of animals' fat contains more energy/unit at than any other biological product the exclusion of fat usually increases the palatability of a feed. Tineralty fats are well digested and utilized by fish.

Carbohydrates

Carbohydrates are the cheapest and the most abundant source of energy for animals. Most of plant material is carbohydrate is feeding range from easily digested sugars to most complex cellulose molecules which cannot be digested by animals. It is only through their symbolic relation bacteria that nutrient animal can utilize large amounts of cellular. There is controversy as the value of carbohydrate in fish food.

Protein

Protein is the gain consistent of the fish body, thus a generous dietary supply needed for required growth. Protein is expensive than carbohydrate or fat, that the amount of protein in the diet limited to that extent which is needed growth and tissue repair and the entire come from the cheaper sources.

Protein level in fish diets

Fish require a higher of protein in their diet than do not blooded animals for eg. The optimum protein in practical diets for Harvest fish is 30 to 36%

Protein quality

Protein quality is includable primarily by amino acid compositors. They are made up of 20-25 amino acids. It can synthesize 10 of them (by interconversions) from each other or from other molecules of intermediary but the other 10 (essential amino acids) cannot be synthesis in the fish must be provided in the diet. They are methionine, Arginine, Threonine, tryptophan, isolucine, Leucine, valine, phenylalanie, histidine and lysine (TAMIL TV HPL).

Types of feeds

Feeds can be classified based on the stage on the life cycle, at which they are largelted. Accordingly they are

1. Starter

2. Fly

3. Figerling

4. Growthout

5. Brood stock

This does not necessarily comply that for the production of a culture sp all 5 types feeds are fly feed may be same while grow-out and broad stock feed may also the same.

In addition, product quality feeds are used in many cultures to increase the quality of the final sale able product. Starter feeds should be complete, easily digestible and be of the appropriate particle size.

Natural feed staffs are usually adult in K, Mg, Na and Cl of normal growth of animals, unless there is high rate of mineral loss. These element are probably available in sufficient quantity in practice fish feed count mineral supplementation. However, in fish feeds low in animal products (fish meal, meat and bone break) May be deficient in tall

minimum when losses than 15% of the ratio in composed of animals products a brace mineral supplement is recommended.

Feed formulation and Processing

Following points need to be considered in fish feed formation

1. Cost of feed ingredients

2. Nutrient content of feed ingredient

3. Nutrients requirement of the animal (protein energy, vitamins, minerals, amino acid)

Available of nutrients to the animal from various feed materials. Cost nutrient content are readily available for most commercial feed stuff information is avail on nutrient requirements for several fish sp, enough to formulate reasonably satisfactory production ratios.

The Basic information requirement for feed formulation is,

· Nutrients requirement of the sp. Cultural

· The feeding habit of the sp.

· Local avail cost & nutrient composition of ingredients

· Ability of the cultured organism to utilized nutrients from various ingredient as well as prepared diet.

· Expected feed consumption

· Feed additives need and

· Type of feed processing desired

Aims of Feed Preparation

Proper nutrition is one of the most important function influenced the ability of cultured organism to attain the potential for growth, repro, and survival. The nutrients requirement varies between sp. and different stage of it life cycle.

Forms of diets

Diets supplied to aquatic organisms could to vary in form possible diet include.

· Live food generally required for the culture of most aquatic organism at their larval phase.

Starter feed are generally in the forms of fine consumable or flakes

Forms of feeds

Feed types can take numerous forms

However, they basically fall in one of 2 general forms

a. Dry

b. Moist

Basic steps

(a) Grinding: Grinding reduces particle size and increase the surface area of ingredient, thereby facilitating, mixing, pulleting & digestibility.

(b) Mixing: Ground ingredients are mixed in desired proportion to form hormony blend.

(c) Pelleting: Defined as the compacting of feeds formed by extruding in ingredients or mixture of ingredients feed storage.

Feed storage

Manufactured diet require storage at least at the place of Manufacture and one of the food feeds are compared of punishable biological material which deteriorates storage. It always desirable to minimize storage lime

DETERIORATIVE EFFECTS DURING STORAGE ARE CAVSFED BY

· Oxidative damage

· Microbial damage

· Insect and or rodent damage/ infestation and

· Other chemical changes during storage

Proper storage

Good feed storage should provide protection against high temper humidity, moisture and insect and rodent enfestation. Feed stuffs as far as possible be stored for a minimum length of time. Materials such as trash fresh should be used immediately as kept frozen until used.

Feeding

Feed assumes more than 50-60% of cost production in most aquaculture practices. Hence great car has to be taken in providing feed to the cultured organism under feeding may result in poor growth sutitmal deficiency, disease and even mortality

whereas over feeding may incase the cost of production reduce the H2O quality breading to stress and poor growth.

Quantity of feed given to depend on total biomass available on the pond expected growth and conversion rates. Based on periodic sampling the total biomass of fish available in the ponds is estimated and then quantity of feed to gn is estimated. The daily ratio is given in split doses depending on the feeding habit of culture organism for crustaceans having nocturnal feeding habit, feeding during high is also sea meals whereas for all other special day feeding is followed,

Feed is either provided by broad casting or placed in bays or in feeding bays so that the feed in completely fixed by the factor fishes cultured.

In intestine fish crustaceans use of demand feeders and automatic feeders is also followed to increase the efficiency of feeding.

Food conversion Ratio (FCR)

Food conversion ratio in which the feed given is converted to flush-tt is an indicator of quality of feed gn and efficiency of cultured fish to convert into biomass

$$\text{Food conversion Ratio (FCR)} = \frac{\text{Total Quantity of feed gn}}{\text{Total biomass increase}}$$

Feed in which the FCR is usually low in the best quality feed for sp. Cultured.