IV SEMESTER

Course No.: 11 - Fish nutrition & Feed technology

credits :3

Course outcomes:

1.Understand Nutritional requirements of cultivable fishes and factors affecting energy partitioning and feeding.
2. Know different types of feed and FCR and different types of feeders
3. Gain Knowledge of Feed manufacture and storage methods of feeds
4. Understand the value of Feed additives and Non-Nutrient ingredients.
5. To create awareness of different nutritional deficiency and importance of natural and supplementary feeds and balanced diet.

UNIT-I: Nutritional requirements of cultivable fish

1.1 Requirements for energy, proteins, carbohydrates, lipids, fiber, micronutrients for different stages of cultivable fish and prawns

1-2 Essential amino acids and fatty acids, protein to energy ratio, nutrient interactions and protein sparing effect

1.3 Dietary sources of energy, effect of ration on growth, determination of feeding rate, check tray

UNIT-II: Forms of feeds & Feeding methods

2-1 Fed conversion efficiency, feed conversion ratio and protein efficiency ratio

2-2 Wet feeds, moist feeds, dry feeds, mashes, pelleted feeds, floating and sinking pellets, advantages of pelletization

2-3 Manual feeding, demand feeders, automatic feeders, surface spraying, bag feeding and tray feeding

UNIT-III: **Feed manufacture & Storage**

3-1 Feed ingredients and their selection, nutrient composition and nutrient availability of feed ingredients

3-2 Feed formulation – extrusion processing and steam pelleting, grinding, mixing and drying, pelletization, and packing

3-3 Water stability of feeds, farm made aqua feeds, micro-coated feeds, micro-encapsulated feeds and micro-bound diets

3-4 Microbial, insect and rodent damage of feed, chemical spoilage during storage period and proper storage methods.

UNIT-IV: **Feed additives & Non-nutrient ingredients**

4-1 Binders, anti-oxidants, probiotics

4-2 Feed attractants and feed stimulants

4-3 Enzymes, hormones, growth promoters and pigments

4-4 Anti-metabolites, afflatoxins and fiber.

UNIT-V: Nutritional Deficiency in Cultivable fish

5-1 Protein deficiency, vitamin and mineral deficiency symptoms

5-2 Nutritional pathology and ant-nutrients

5-3 Importance of natural and supplementary feeds, balanced diet.

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credits :1

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1. Estimation of protein content in aquaculture feeds

2. Estimation of carbohydrate content in aquaculture feeds

3 Estimation of lipid content in aquaculture feeds

4. Estimation of ash in aquaculture feed

5. Study of water stability of pellet feeds

6. Feed formulation and preparation in the lab

7. Study of binders used in aquaculture feeds

8. Study of feed packing materials

9. Study of physical and chemical change during storage

10.Study on physical characteristics of floating and sinking feeds

11.Visit to a aqua-feed production unit

PRESCRIBED BOOK(S):

1.HALVER JE 1989. Fish nutrition. Academic press, San diego

REFERENCES:

1.1 Lovell rt 1998. Nutrition and feeding of fishes, Chapmann & Hall, New York

1.2 Sena de silva, trevor a anderson 1995. Fish nutrition in aquaculture. Chapmann & Hall, New York.