

Use of Live Food for Aquaculture I

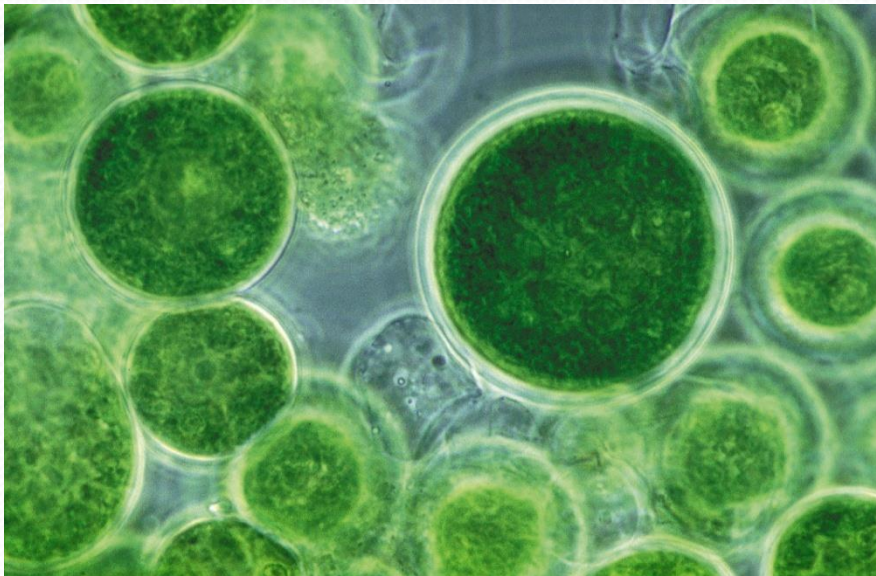
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What is Live Food?

- They are living organisms which are cultivated for feeding the fishes and larvae and are organized very similar to their natural feeding cycle to provide their nutritional needs.
- Microalgae
- Rotifera
- Water-Flea (Daphnia)
- Artemia

MICROALGAE

- Microalgeas which belong to the various taxonomic groups, are single celled or colony forming eukaryotic and planctonic algae.



- Microalgae are the first food of shelled water organisms and several fish larvae. Because, the microalgae are food of rotiferias, cladoceras or copepods which are used in feeding fishes, phytoplankton cultivation is very important also.
- Despite all kinds of efforts to use pellet bait instead of microalgae, the cultivation of most of the commercially important fishes, mollusk and crustaceans still depends on use and production of microalgae.
- Cultivation of microalgae in aquaculture are used directly for feeding mollusks, crustaceans and shelled larvae, but they are used as a first feed in indirect zooplankton feeding .

Microalg Cultivation Systems

- Extensive algae production means; using natural phytoplanktons in aquaculture.
- Specific microalgae's pure cultures are used in intensive algae production.
- In semi-intensive production; they are used for encouraging natural phytoplankton blooms.
- 40 different species which are collected from different regions of Earth are cultivated intensively.

Microalgae Culture In Bags





Zooplankton

- Rotifera
- Cladocera
- Copepod

Brachionus plicatilis

- Root: Nemathelminthes or Aschelminthes
- Class: Rotatoria
- Order: Monogononta
- Family: Brachionidae
- Species: *Brachionus plicatilis*

- Rotifers are the smallest metazoans feeding with filtering waters. They consist of 1000 cells and this doesn't occur with cell dividing, with increase of the instead. Because of their typical rotational movements, these organisms are called *Rotatoria*.
- Most of these species adhere to the substrats with retractile foots, except for *Brachionus placilis* which is a planktonic, not-sessile living rotifer and because of this this specie has a great importance in marine fish aquaculture.

Why is *Brachionus plicatilis* preferred in Aquaculture?

- Small size
- Slow swimming speed
- Can float (suspend) in water column
- Can be cultivated in high densities
- High efficiency
- Salt tolerance

Environmental Conditions in Rotifer Culture

Parameters	Acceptable Limits	Optimum Limits
Temperature (°C)	20-30	25-27
Salinity (ppt)	1-60	18-25
Dissolved Oxygen (mg/l)	> 4	5-7
NH ₃ / NH ₄ (mg/l)	6-10	-
NH ₃ (mg/l)	-	<1
pH	5-10	7,5-8,5
Light Emission (lux)	-	2000

Crustaceans

Water Flea: *Daphnia pulex*

- Phylum: Arthropoda
- Classis: Crustacea
- Subclasis: Entomostraca
- Order: Cladocera
- Family: Daphniidae
- Genus: *Daphnia*



Daphnia Aquaculture

- Water flea is cultivated in 15-22 °C.
- Water flea can be cultivated in different sizes of containers or tanks.
- This is advised; pool water depth shouldn't be more than 1m.
- Fresh horse fertilizer or sheep fertilizer is added to pool water.
- Culture can be maintained for 4-12 weeks.
- While starting a new culture, the used water in the old culture is taken and added into the new culture as 5-10% of the new culture.
- In the production step yeast, ammonium nitrate, wheat or rice flour, dried cow, chicken or horse fertilizer all can be mixed and used. For example, to produce 375 pieces/L water flea, 14 g/L ammonium nitrate fertilizer and 8,5-14 g/L yeast is added every day.
- Water flea is inoculated one day after fertilization.
- Harvest = 5-6 days later.
- Water flae can be fed with microalgae.



Copepods

Artemia salina

- Class : Crustacea
- Sub-class : Brachiopoda
- Order : Anostraca
- Family : Artemidae
- Genus : *Artemia*



- Because of their larvae in Nauplii stage contain a ratio of %40 protein, they are very important in fish and shrimp larval stage and used as living feed stock.

- Their eggs have 200-300 μ diameter, their hatchings (nauplii) have 0,4 mm of length, adults have 8-10 mm of length. One female individual can lay between 100-300 pieces in one time. 1g egg contains 150-300 thousand pieces eggs.

- Artemia, is an organism which lives in salty lakes, coastal seas and lagoons.
- *Artemia salina*
- Artemia, is perfect food for sea fishes, fresh water fishes and precious aquarium fishes or their young individuals.
- Artemia kists are used in aquaculture.
- **Nauplii**, reaches maturity in 8 days and during this time they change their shells for 15 times.
- Adult Artemia has a length of 8 mm. They can grow up to 20 mm.
- Artemia can live up to 4 months.
- They feed on bacterias, microalgae and various organic particles.
- Optimum salinity can differ between 30-35 per thousand.
- In aquaculture of several sea fishes such as gilt-head bream are primarily fed with rotifers then artemias are given.

Decapsulation

- Outer shell of Artemia eggs are treated with hypochloride solution for a short time to remove the shell without damaging the embryo. This process is called decapsulation.

