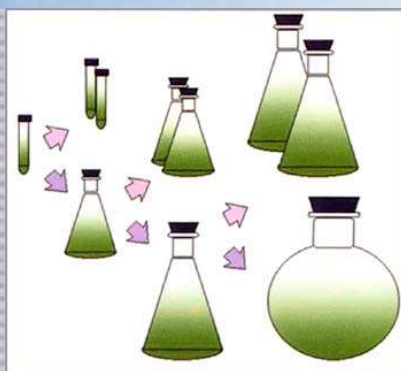


CULTURE PROTOCOL OF LIVE FEED ORGANISM IN SHRIMP HATCHERY



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INTRODUCTION

- ❑ Fishes, prawns and other cultivated aquatic animals at the time of their first feeding are quite fragile and delicate creature.
- ❑ It is the most **critical phase** of their life when they need right type of nourishment for their survival and growth.
- ❑ Lack of suitable live feed organisms is a major deterrent in the rearing of marine prawn larvae.
- ❑ Live feed organisms play a vital role-in the artificial propagation of shrimp larvae.
- ❑ Live feed provides: Wide spectrum of composition of food.
Autodigestion characteristics;
Facilitate better nutrient assimilation.
- ❑ It is also called **living capsules of nutrition**.

IMPORTANT LIVE FEED

- ✓ Microscopic algae
- ✓ Infusoria
- ✓ Rotifers
- ✓ Artemia
- ✓ Cladocerans
- ✓ Tubifex
- ✓ Chironomid larvae
- ✓ Ostracods
- ✓ copepoda

LIVE FEED USED IN HATCHERY

- Microscopic algae: *Isochrysis*
Chaetoceros
Skeletonema
Platymonas
- *Artemia*
- Rotifers

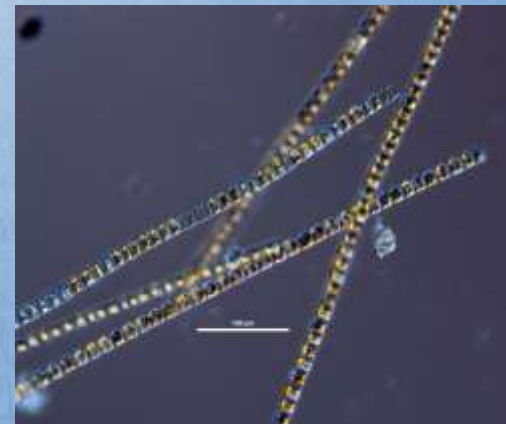
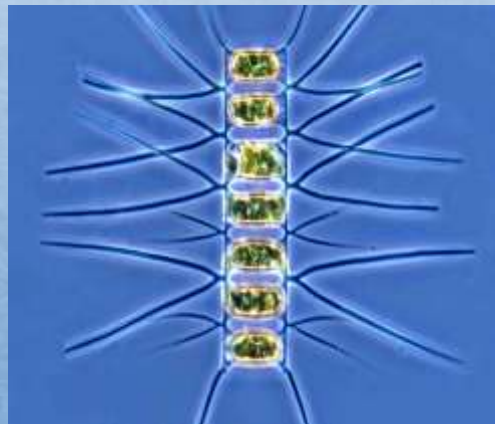


ALGAE

- ❖ Micro algae form the first link in the food chain.
- ❖ Algae are chlorophyll bearing unicellular or multicellular plants.
- ❖ Besides chlorophyll, they also show various carotenoid pigments which impart different colour to algae.
- ❖ According to nature of photosynthetic pigments, algae are further classified into three divisions:
 - Rhodophyta
 - Chlorophyta
 - Phaeophyta
- ❖ Use of micro-algae as a possible source of protein food was recognised by the researcher in 20th century.
- ❖ In recent years, mass culture of unicellular algae such as diatoms and small phytoplankton is becoming quite popular for feeding larvae of shrimps and prawns in aquahatcheries.

Cont...

- **Importance of micro-algae in aquahatcheries:**
 - Owes to its its nutritional value.
 - Small in size ranging from 5 to 25 microns.
 - It stimulates enzymatic synthesis and on set of feeding in young once.
- Now a days, micro-algae is used as an essential food source for rearing all stage of shrimps, bivalves, gastropodes and larvae of fishes.
- It is also consitute an important source of food for live food organisms (rotifers, brine shrimp etc.) used in aquahatcheries.

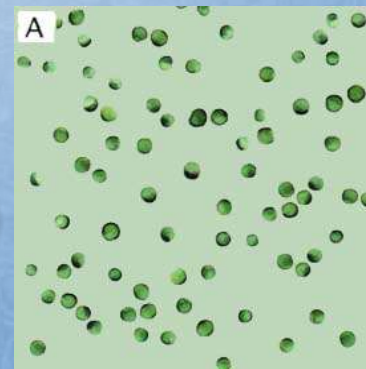
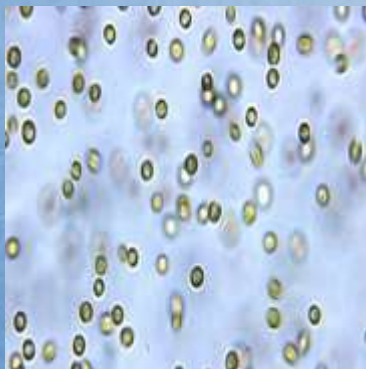


Isochrysis galbana

- ❖ Isochrysis is a small golden brown flagellates.
- ❖ Present of Haptonema, a filliform appendage situated between the flagella.
- ❖ Haptonema may be coiled and uncoiled, short and flexible, reduced to a few crotubules inside the cell, or absent.
- ❖ Chloroplast one or two, each with pyrenoid that is immersed or bulging.

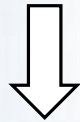
CULTURE MEDIA

Soilwater medium: Soilwater medium is made using the basic formula that is garden soil 1 teaspoon and glass-distilled water 200ml.



PROCEDURE FOR MASS CULTURE

Collection, Identification & Isolation



Test tube culture



250 ml, 500 ml, 1 litre conical flask culture



3 or 4 litre Hafkin culture flask for stock culture



5 litre conical flask for inoculation

10 litre Pearl-pet jars for inoculation



100 litre polythene bags

200 litre cylindrical FRP tanks



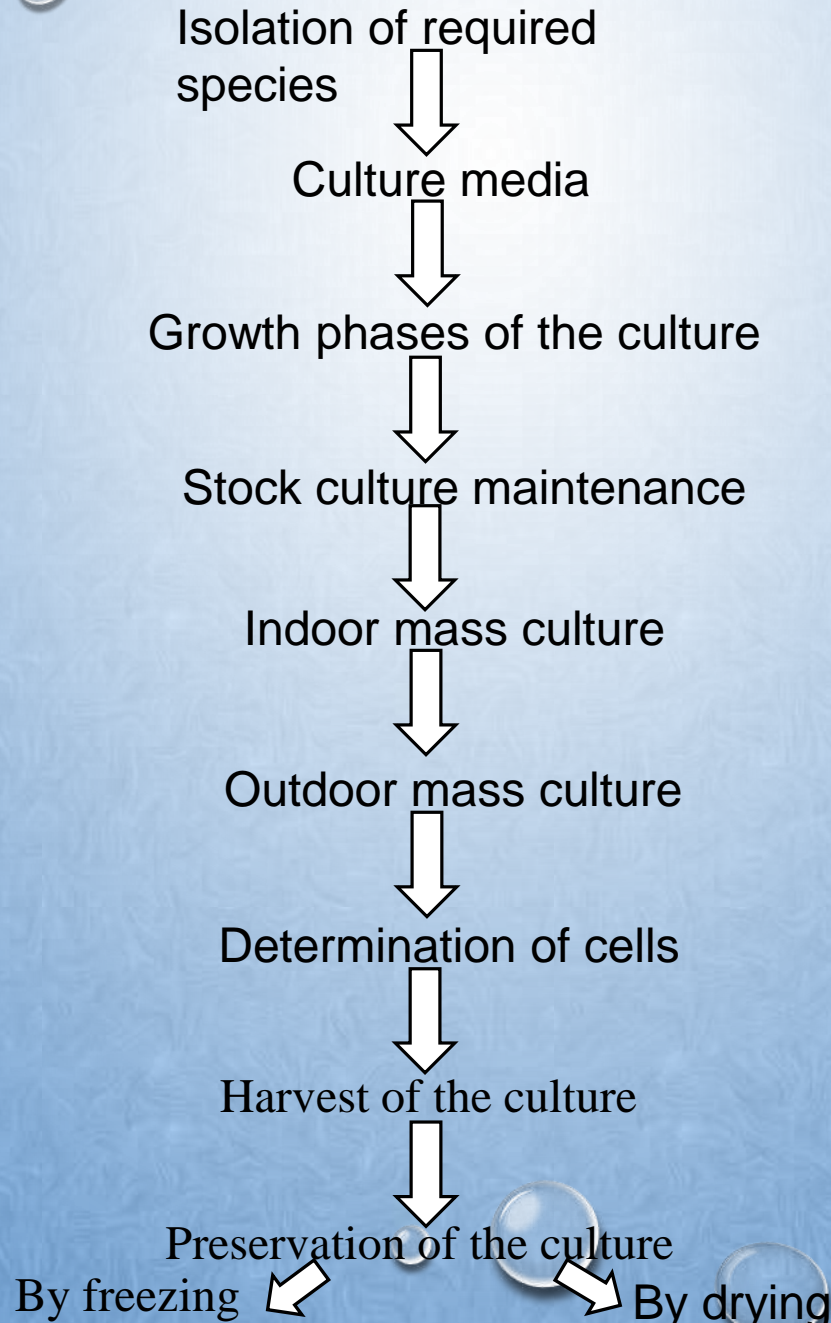
1-2 tonne FRP tanks outdoor

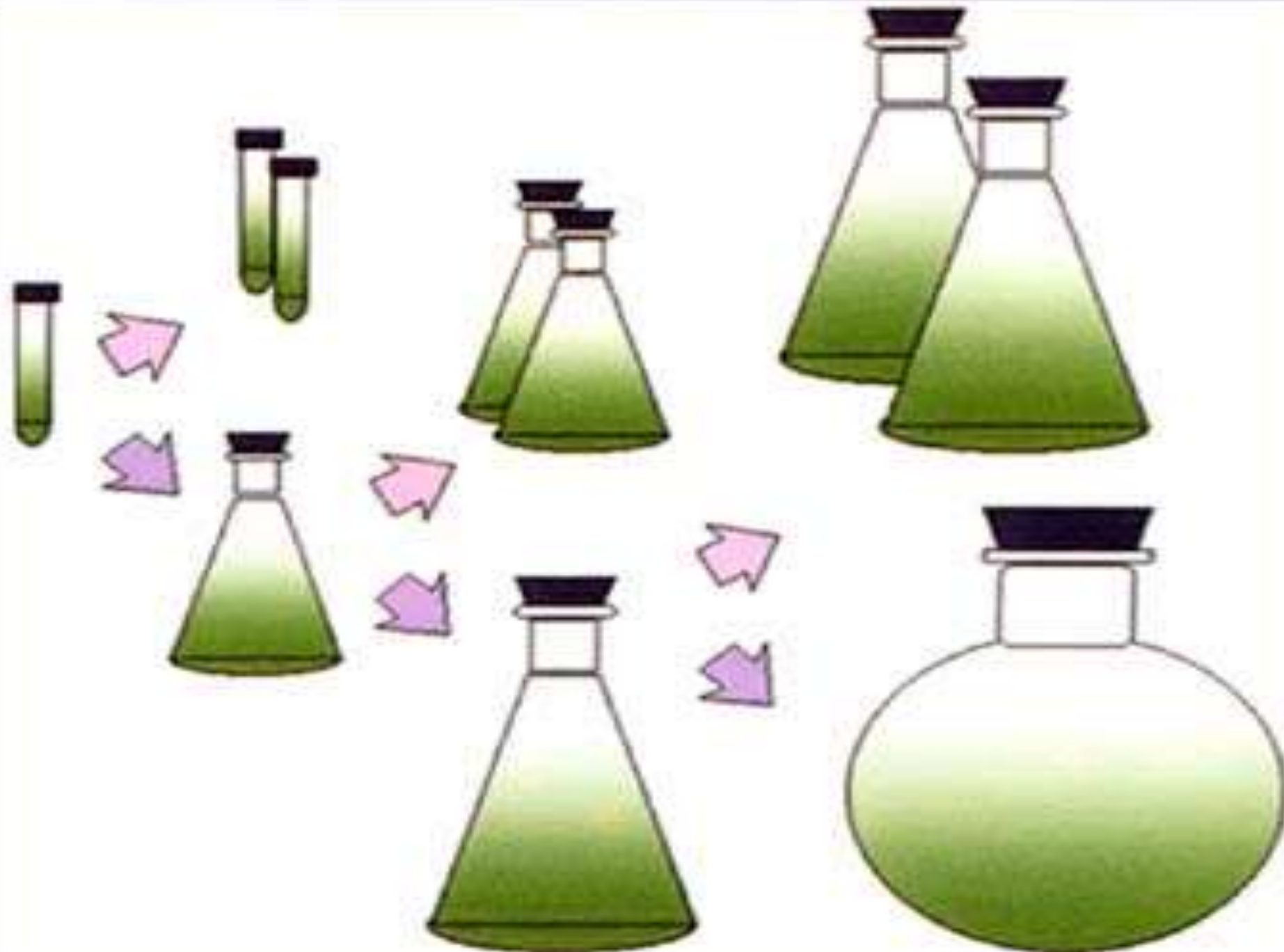
5-10 tonnes FRP tanks outdoor culture



Harvest

PROCEDURE OF MICRO ALGAE CULTURE: VARIOUS STAGES





Chaetoceros

- ✓ Chaetoceros belong to class Bacillariophyceae.
- ✓ Dorsal- ventral flattening cells produce a lighter frustule.
- ✓ Colony formed of a number of cells held together by fusion of sibling setae. Chains can be of a variety of lengths.
- ✓ Chains may be straight, twisted, or showing torsion about the chain axis, helically coiled.
- ✓ Formation of spines or setae- A hollow outgrowth of the valve projecting outside the valve margin, with a structure difference from that of the valve.

CULTURE MEDIA

Most common media is F/2. Another media used DM (Diatom Medium)



PROCEDURE FOR MASS CULTURE

Collection, Identification & Isolation



Test tube culture



250 ml, 500 ml, 1 litre conical flask culture



3 or 4 litre Hafkin culture flask for stock culture



5 litre conical flask for inoculation

10 litre Pearl-pet jars for inoculation



100 litre polythene bags

200 litre cylindrical FRP tanks



1-2 tonne FRP tanks outdoor

5-10 tonnes FRP tanks outdoor culture



Harvest

Skeletonema costatum

- ❑ *Skeletonema costatum* commonly dominates the diatom abundance in coastal waters.
- ❑ *Skeletonema* is increasingly used as live feed in the larviculture of penaeids, polychaetes, lobsters, mussels, oysters, scallops etc.
- ❑ It is an important coastal organism that can tolerate a wide variety of light regimes and temperatures, and it is an ideal laboratory organism that grows readily in various media.
- ❑ The fact that *S. costatum* was found to be a suitable food for shrimp zoea stages was of critical importance.

CULTURE MEDIA

Most common used media For stock culture of the is *Skeletonema* **Guillards F/2 medium.**



PROCEDURE FOR MASS CULTURE

Collection, Identification & Isolation



Test tube culture



250 ml, 500 ml, 1 litre conical flask culture



3 or 4 litre Hafkin culture flask for stock culture



5 litre conical flask for inoculation

10 litre Pearl-pet jars for inoculation



100 litre polythene bags

200 litre cylindrical FRP tanks



1-2 tonne FRP tanks outdoor

5-10 tonnes FRP tanks outdoor culture



Harvest

Artemia salina

- ✓ *Artemia* is the most widely used live food organism in aquahatcheries because of its ready availability in the form of dry cysts containing dormant embryo.
- ✓ Common names: Brine shrimp, brine worm and sea monkey.
- ✓ It is a highly adaptable organism capable of living at high temperatures, high salinity, and very low dissolve oxygen.
- ✓ *Artemia* cysts measure about 200 micron in diameter and are brown in colour.
- ✓ Adult *Artemia* measures about 1.0-2.0 cm in length;
- ✓ In nature *Artemia* chiefly feeds on algae.



PRODUCTION OF *ARTEMIA* NAUPLII

Artemia cysts are hatched into nauplii following the standard technique involving the following steps:

1. Hydration of cysts:

- A container containing 20ml of water for every 1gm of cysts.
- Provided vigorous aeration.
- After one hour, cysts get hydrated and turn spherical;
- The hydrated cysts are filtered on 100 micron mesh bolting silk cloth.

2. Decapsulation of cysts:

- ✓ Hydrated cysts are kept in 5% NaOCl solution @ 15ml for every 1gm cyst.
- ✓ To prevent from the heat, containers kept in ice, stirring required continuously.
- ✓ Cyste change the colour from dark brown to white due to chlorine.
- ✓ Filter decapsulated cysts on 100 micron cloth;
- ✓ Decapsulated cysts washed properly and give dip in 0.1% sodium thiosulphate solution to remove residual chlorine, if any.

3. Hatching and decapsulated cysts

- *Artemia* cysts are hatched in cylindroconical jar

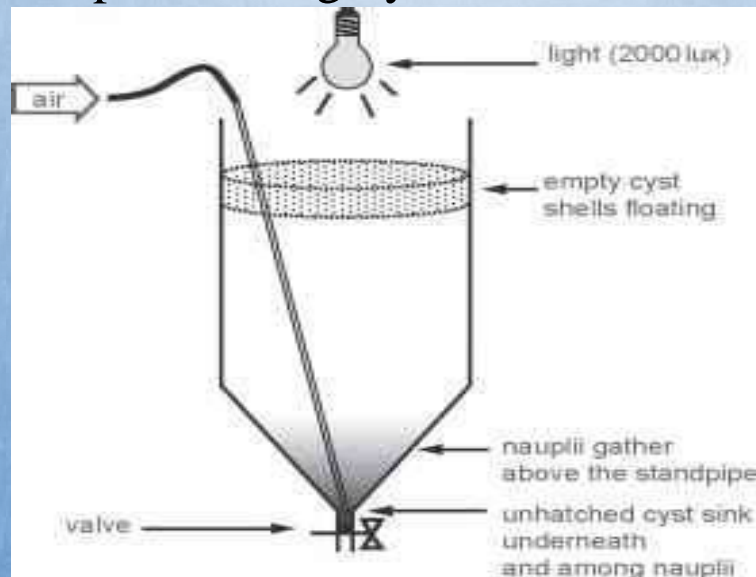
Water quality for hatching cysts

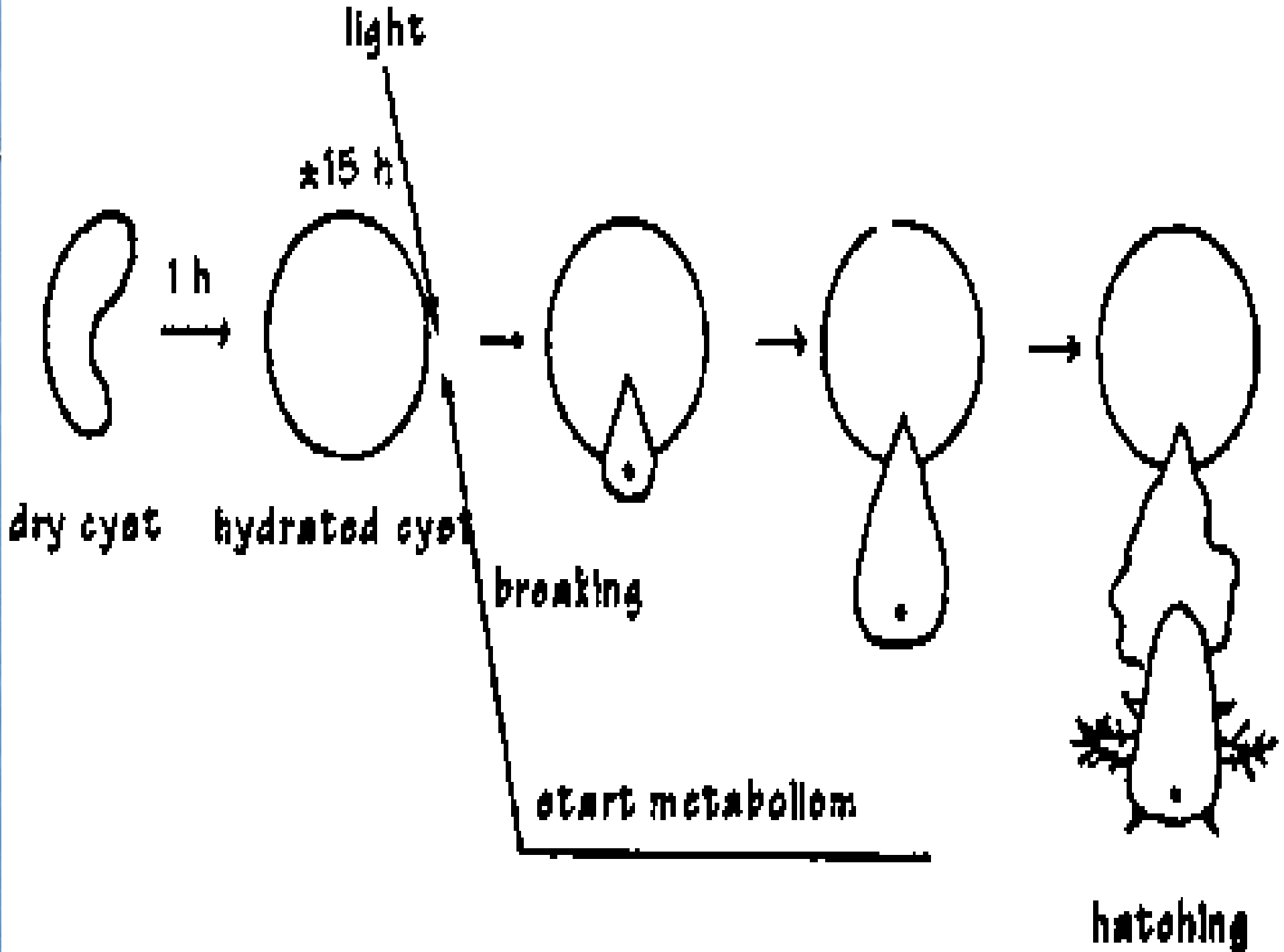
1.	Temperature	27 to 30°C
2.	pH	7.5 – 8.5
3.	Salinity	25-30ppt
4.	Light	1000lux
5.	Oxygen	Saturation point

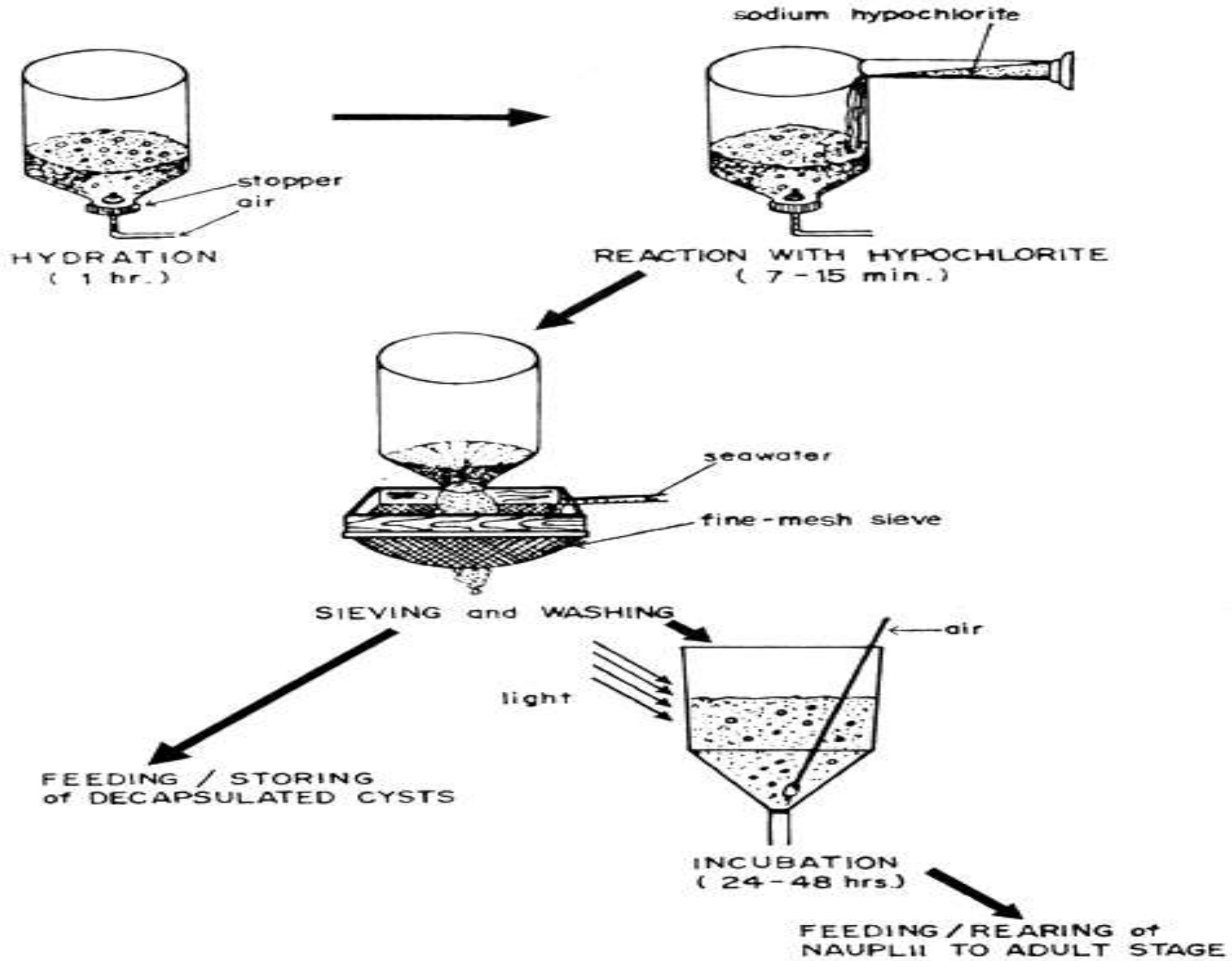
- Provide vigorous aeration;
- Cysts hatch into nauplii in about 18-24 hours.

4. Harvesting of Artemia nauplii:

- ❑ Harvest freshly hatched nauplii by their photostatic nature.
- ❑ Stop the aeration jar and close with a lid
- ❑ Illuminate the transparent portion of jar.
- ❑ Collect the concentrated nauplii by opening out let valve or through siphon on micron cloth;
- ❑ Wash harvested nauplii thoroughly and stock in a container.

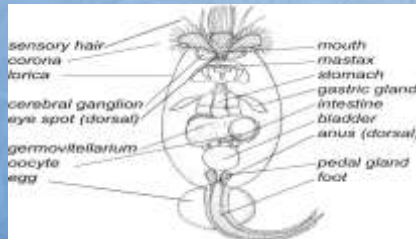






ROTIFERS

- ❖ Rotifers are commonly called as **wheel animalcules**.
- ❖ Among the rotifers *Branchionus spp.* Become more popular as live food because of its high nutritive value, small size, world wide distribution, fast multiplication and easy adaptability to captive culture.
- ❖ It is used as prime live food for the early stage of fish and invertebrates in aqua hatcheries
- ❖ *B. Plicatilis* is fastidious filter feeder, feed on particle size less than 5 micron in size.
- ❖ *B. Plicatilis* undergo two types of reproduction depending upon the culture condition.
 - In favorable condition: Parthenogenesis
 - In unfavorable condition: Sexual reproduction.



Stock culture

Collection of *B. plicatilis* from brackish water bodies



examine the sample on the microscope and pickup *B. plicatilis*



inoculum *B. plicatilis* in 10ml capacity test tube



Feed the *B. plicatilis* with yeast 200ppm or chlorella.



Gradually increase the volume from 50 to 100ml capacity breakers



The above culture is use as inoculum for mass.

Mass culture technique

Preparation of slurry

Tanks are thoroughly cleaned & filled with 10 - 15ppt saline water

Aeration system is arranged properly

Tank is fertilized with slurry for 3 - 4 days regularly

Chlorella is inoculated on the first day of fertilization

B. plicatilis is inoculated on 6th day of fertilization

After inoculation fertilization will reduce

B. plicatilis feed chlorella, bacteria and decomposed organic matter

After 4-5 days *B. plicatilis* is harvested with a scoop net.

The background is a solid blue color with a fine, repeating pattern of small, stylized floral or leaf-like motifs. Scattered across the top and bottom edges are several realistic-looking water droplets of various sizes, some with highlights and shadows, giving a fresh and clean appearance.

THANK YOU!