Mass culture of microalgae

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Since large quantity of micro algae is needed for zooplankton as well as fish larval rearing system, the cultures need to be multiplied within the limited period of time. So mass culture needs to be done with suitable culture medium to meet sufficient requirement. The mass culture can be of batch culture, semi-continuous or continuous culture. A small inoculum equal to 0.5 % of the volume of the new culture will normally generate new healthy cultures for healthy cells of a robust species. However, if the species is delicate or the culture is less healthy, then a larger inoculum of 10% - 20% may be needed to support a new culture. The cultivation of microalgae required high consumption of water and on average needed 1000 L of water to produce a kilogram of biomass. The most common method of microalgae cultivation is to use an open cultivation system may be ponds, tanks, etc., or controlled cultivation systems after using various types of bioreactors. The cultivation process generally required acclimatized space with a stable temperature to encourage the activities that are necessary to the cell. Different cultivation modes also can be used for the rearing of microalgae; they may be phototrophic, heterotrophic, mixotrophic, and photo-heterotrophic.

Algal culture techniques

The following are the different algal culture techniques used for microalgae culture.

1) **Batch culture:** In this culture the resources present in the culture medium are abundant; the micro algae grow according to sigmoid curve. Once the resources are utilized by the cells, sub culturing is followed by transferring a small volume of the existing culture to the large volume of fresh culturing medium.

2) **Continuous culture:** In this culture, the resources are potentially infinite. Culture is maintained on chosen point on the growth curve by the regulated addition of fresh medium.

3) **Indoor/outdoor:** Indoor culture allows the control over illumination, temperature, nutrient level, contamination with predator and other competing

algae; however, outdoor culture will not have any control on the above said parameters.

4) **Open/closed:** Open cultures in uncovered tanks and ponds are more contaminated than closed cultures in test tube, conical flask etc.

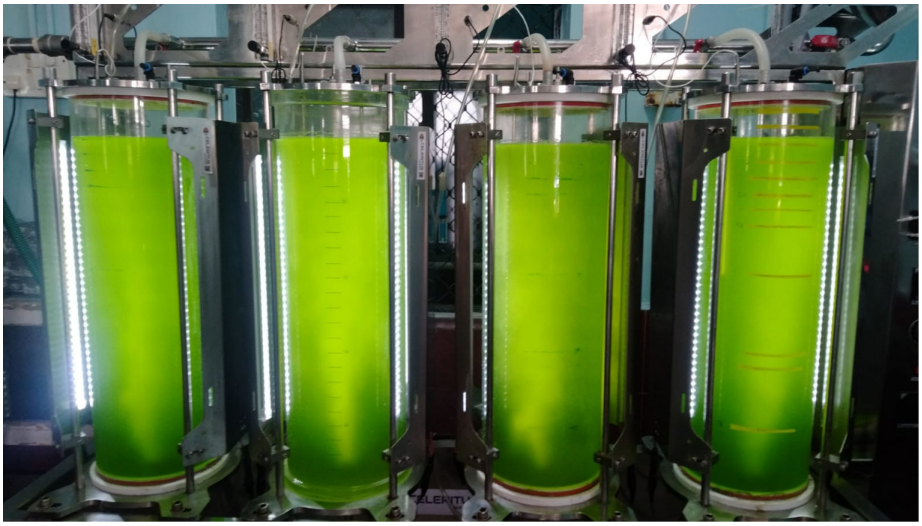
5) **Axenic (sterile) / xenic:** Axenic cultures are pure cultures free from all foreign contaminants and this type of culture requires strict sterilization of glass wares, culture media and vessels to avoid contamination, where as xenic culture might be a contaminated

Commercial fertilizer medium/1t	
Ammonium sulphate	100 gm
Urea	10 gm
Tripple super phosphate	10 gm

The maximum density of algal cells in outdoor culture depends mainly on factors like atmospheric light and temperature, salinity of sea water without any contaminants suitable to the cultured species, and a good density of indoor inoculums. In outdoor culture with 100 l tanks around 8-10 million cells per ml can be achieved within 2 days of inoculation and around 2-3 million cells per ml can be achieved in 1 t outdoor tanks with suitable environmental conditions.

Outdoor mass culture of micro algae in 100 l carboys

Outdoor mass culture of micro algaein 1t FRP tanks



Photobioreactor based mass culture of microalgae