CULTIVATION OF SEAWEED ON A MACROSCALE

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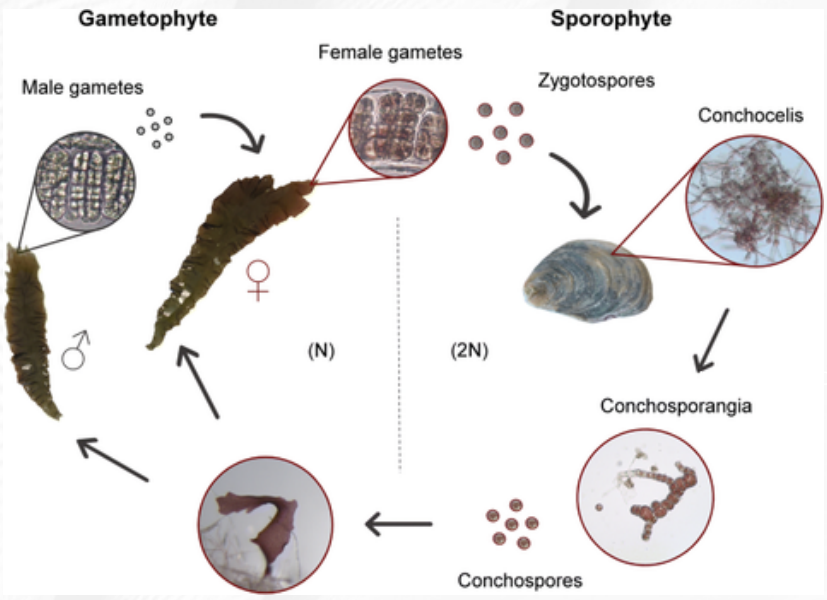
PORHYRA
SUPER PHYLUM: ARCAEPLASTIDA

Red algae belonging to clade Rhodophyta contains roughly 6000 varying species, within these we find the genus Porphyra with approxametly 130 species. These are rich in both proteins and vitamins that have long been a source of nutrituin for both humans and animals all over the world. However it might be best known for being used in eastern asian cuisine as nori , where a few of these species been cultivated for over 100 of years. Using traditional methods that allow the algaes to grow by their natural life cycle is both expensive and time consuiming, and not suffiecient enough to meet todays demands. Over the past two decades several methods of cultivation have been performed to enhance the production of the seweed. The understanding of the different stages within the life cycle has been of utter importance.

Lifecycle

The lifecyle of Porphyra is heteromeric, the two stages being a gametophytic pase and a filamentus sporophytic pase (concocelis phase).

In the gametophytic phase cells differentiate into forming two seperate structures, carpogonia and spermatangia, either on the same or on different thalli. Upon fertilisation by ameboid sperm zygotospores are produced in the carpogonia. These are under right conditions released to begin the conchocelis phase which is the filamentous sporophytic phase. These will later result in formation of conchosporangia and conchospores, the latter will germinate a suitable substrate to form new thalli.



For cultivation purposes its the concocelis phase that is espessialy impportent, as its the release of the conchospores that later form the edible thalli. Being able to control when the spores are released allow modern agriculture to catch the seeds onto nori nets and transfer them into bioreactors where the environment can be monitored.

Researches have been experimenting on how different conditions will maximize the conchospore mass release for different species of Porphyra. Factors such as temperature and photoperiod have been studdied under different laboratory conditions.
Temperature seem to play an important role in initiating different stages of the life cycle, as it alters enzymatic activities during metabolistim. The general conditions for conchospore release seem to be around 9 – 15 degrees cellcius for *P. dioica* and *P. dentana* but can differ during differetn salinity ranges. The optimal photoperiod being 16h light and 8h dark (for *P.leucostica*), light intensity however dont appear to affect the conchospore release.

The heteromeric lifestyle of the genus Porphyra shows interesting charecters, and by increasing the understanding of how different parametrics such as temperature and ligt affeccts the growth rates, agriculture can increase efficiency of Porphyra cultivation.

Literature

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Picture

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