

INFLUENCE OF THE AGITATION METHOD IN THE GROWTH OF ALGAE TANKS (*Ulva ohnoi*) INTEGRATED IN A MULTITROPHIC AQUACULTURE SYSTEM (IMTA)

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Integrated multitrophic aquaculture is gaining importance between fish producers because it can improve the sustainability of this activity by using fish wastes to grow up algae species of commercial interest, in our case *Ulva ohnoi*.

The most important limitation to the expansion of fish-seaweed integrated production is the large seaweed culture area required to reach the necessary uptake of nutrients in order to significantly reduce their concentration. It makes very important to increase the seaweed production and nutrients uptake per unit surface. This can be influenced by the tank design and the algae agitation system, which plays an important role in light availability. The main goal of this work is to analyze the influence of the agitation systems at different nutrient load levels in algae growth and bioremediation capacity.

Three experiments lasting three weeks each were conducted. In all the experiments, two tanks with identical geometry, lighting conditions and stocking density were used.

To assure that there were no differences of water quality between both tanks a pump mixed and recirculated the water of both tanks in a closed loop at a ratio of 3.3 renewals per hour.

In the first experiment, conducted at a high nutrient load, two agitation systems were compared: 1) bottom aeration, provided a higher turbulence level, 2) water jets entering into the tank, producing a lower turbulence level but a more homogeneous tumbling.

In the second experiment the conditions were the same than in the first one, but it was conducted at a low nutrient load.

In the third experiment both tanks were set up with bottom aeration systems and high nutrient loads. Two different air flow rates were used to provide different agitation levels.

During all three experiments sample collecting and analysis were regularly made. Twice a week biomass yield was checked and some biomass kept for organic nitrogen and phosphorous analysis. Three times per week water samples were collected for nutrient analysis, algae chlorophyll analysis was made at the beginning and at the end of each experiment.

The results obtained show that the agitation method influences the algae growth only when the availability of nutrients is a limiting factor.

The water jet agitation method seems to provide a more uniform distribution of light over the algae, but its influence on the algae growth and nutrient uptake has not been currently proved.

Acknowledgements

This work was funded by Spanish Ministerio de Economía y Competitividad (AGL2013-41868-R).