

**DEVELOPMENT OF OPTIMUM CONDITIONS FOR INDUCING
RELEASE OF SWARMERS IN**

Ulva lactuca

DISSANAYAKE THALANGAMA APPUHAMILAGE SUPIPI PRAMODYA

DISSANAYAKE

Aquatic Resources Technology Degree Programme

Department of Animal Science

Faculty of Animal Science and Export Agriculture

Uva Wellassa University of Sri Lanka

2018

Abstract

The green algae, *Ulva lactuca* plays a vital role in the economy. Due to periodic reproduction of *Ulva spp*, the continuous supply of swarmers (reproductive bodies) is low and also as a result of excessive pollution, natural sporulation of seaweed is becoming less feasible. Hence, the productivity is reduced. Transformation of vegetative cells directly into swarmers by stimulating them through environmental shock treatments has been practiced in many countries as a remedy to this problem. In this study, attempts are made to determine best temperature-time combination, best dehydration, salinity condition for inducing release of swarmers in *Ulva lactuca*. To induce release of swarmers, *Ulva* (15 g for one treatment) was shocked at 2°C, 4°C and 6°C temperatures for different shock time periods of 5, 10 and 15 minutes. The control treatment was done without providing temperature shock and all treatments were triplicated. Subsequently those were chopped and placed in petri dishes with filtered autoclaved seawater (30 ml) for a week of incubation period at 25°C. All treatments in experiments were done simultaneously. The reproductive output of *Ulva lactuca* was determined by quantifying the number of discharged swarmers per millilitre using a hemocytometer. Collected data were subjected to univariate analysis ($P < 0.05$) to determine significant differences of parameters. It was identified that 2°C and 10 minutes was the best temperature which gave maximum ($1,293.333 \times 10^3 \pm 52.061 \times 10^3$ Individual/ ml) density of swarmers. In the second experiment, effect of dehydration was determined by exposing thalli (15 g for one treatment) to different dehydrations (0, 15, 30, 45, 60 and 90 minutes) at constant 2°C and 10 minutes temperature shock and data were analysed using one-way ANOVA ($P < 0.05$). From different dehydration periods, 30 minutes was noted as the optimum dehydration time which resulted maximum density of swarmers ($5,503.3 \times 10^3 \pm 768.396 \times 10^3$ Individuals / ml). In the third experiment, after thalli (15 g for one treatment) was exposed to constant 30 minutes dehydration, 2°C for 10 minutes temperature shock, thallus was chopped and cultured in artificial seawater with different salinity series (10 ppt, 20 ppt, 30 ppt, 40 ppt, 50 and 0 ppt) including three replicates. Collected data were analysed using one-way ANOVA ($P < 0.05$). As best salinity, 30 ppt artificial seawater medium was identified which gave highest density of swarmers ($5,586.667 \times 10^3 \pm 373.511 \times 10^3$ Individuals / ml) in all three experiments. The results ($P < 0.05$ level) indicated, temperature, dehydration and salinity affects the release of swarmers in *Ulva lactuca*. Highest swarmer density was resulted when thallus was dehydrated for 30 minutes followed by temperature shock at 2°C for 10 minutes and incubated in 30 ppt filtered autoclaved artificial seawater. This can be used as baseline method for mass production of swarmers in tropical *Ulva lactuca*.