ABSTRACT
INTEGRATING SEAWEEDS IN MARICULTURE SYSTEM: ASSESSMENT OF THE PERFORMANCE OF *KAPPAPHYCUS* IN FISH FARM EFFLUENT

Maria Rona Rodriguez
University of the Philippines, 2006

Adviser: Dr. Marco Montaño
Reader: Dr. Lourdes San-Diego-McGlone

Intensive fish farming discharges large amount of nutrients, majority of which is composed of dissolved nitrogen in the form of ammonium, which promotes eutrophication in coastal waters. Seaweeds have been proven to effectively remove the nutrients of fish farm effluents and at the same time increase the economic output of the aquaculture system when economically important species were utilized. In the Philippines, the carrageenophyte *Kappaphycus* made up the bulk of farmed seaweeds due to its phycocolloid content which is highly valued in the world market. *Kappaphycus* are usually farmed in reef flat areas where nutrient levels are low. To investigate the suitability of the species for farming in high levels of nitrogen and its possible toxic effects, the response of two farmed *Kappaphycus* species to ammonium, the major constituent of fish farm effluent, was tested. A 7-day chronic, renewal toxicity test was done to assess the effect of ammonium on the chlorophyll *a* content of *Kappaphycus alvarezii* var. tambalang and *Kappaphycus striatum* "sacol" strain. The chlorophyll *a* content was used as a measurable endpoint and correlated as growth response of the seaweed to different concentrations of ammonium. The LOEC for both *Kappaphycus alvarezii* and *Kappaphycus striatum* for total ammonia were 1.0 mM. A biphasic response with ammonia was noted on both seaweeds. Based on ammonium toxicity test *K. striatum* is more likely to survive in ammonium-rich fish farm effluent than *K. alvarezii*. The performance of high-valued carrageenophytes (*Kappaphycus alvarezii* var. tambalang, *Kappaphycus* sp., *Kappaphycus striatum* "sacol" strain) cultured in fish farm effluent collected from a milkfish (*Chanos chanos*) fish cage was investigated in terms of effect on growth rate and total ammonia – N (TAN) removal efficiency. Phycocolloid yield and quality of these seaweeds were also determined to establish economic viability of the integrated culture system. The carrageenophytes substantially reduced the ammonium content of the fish farm effluent (41-66% removal efficiency). Tank cultivation trials showed that the three carrageenophytes grew well in fish farm effluent attaining maximum daily growth rate of 4.41%, 2.90%, 2.75% for *K. striatum*, *Kappaphycus* sp. and *K. alvarezii*, respectively. In terms of kappa-carrageenan production, all three *Kappaphycus* species improved. Kappa-carrageenan quality, however, was not significantly enhanced when cultured in fish farm effluent. The results of this study indicated that of the three *Kappaphycus* species tested, integration of *K. striatum* in mariculture system is more feasible.