

INORGANIC NITROGEN REMOVAL BY *Gracilaria Verrucosa* AT DIFFERENT DENSITY IN THE SHRIMP POND

*Munifatul Izzati

*Department of Biology, Faculty of Mathematics and Natural Sciences,
Diponegoro University, Semarang, Indonesia

ABSTRACT

Nitrogen in shrimp pond ecosystem is present in the form of ammonia, nitrite and nitrate. These nitrogen compounds are the indication of eutrophication as nutrient enrichment in shrimp pond ecosystem is caused by the main component of feed, protein. Removal of ammonia, nitrite and nitrate from shrimp pond ecosystem is crucial as these compound are toxic to the shrimp. The aim of this research is to study the efficiency of using *Gracilaria verrucosa*, for nitrogen removal. The density of *Gracilaria* was used as treatments. The *Gracilaria* were arranged at density of 1 kg/m³, 2 kg/m³, and 3 kg/m³, and each density was put into 1m x 1m x 1.2m polyethylene enclosures, filled with 1m³ brackish water. The performance of ammonia, nitrite and nitrate were monitored during 8 weeks of experiments. Results indicated that the presence of *Gracilaria* significantly reduced ammonia, nitrite and nitrate in the shrimp pond. There was a highly significant correlation between density of *Gracilaria* with removal of ammonia ($r=-0.83^*$, $p=0.02567$ $n=12$). There were also significant correlation between *Gracilaria* density with removal of nitrite ($r=-0.66^*$, $p=0.0488$, $n=12$) and nitrate removal ($r=0.58^*$, $p=0.03184$ $n=12$).

Key words :

INTRODUCTION

The main problem in shrimp farming is the use of intensive system. This system applied in high shrimp density and the use of excessive feed. 80% of feed is usually left unconsumed (Jones, 1995). As a results, there is n accumulation of organic material such as carbohydrate, protein and fat (Connell and Miller, 1995). Accumulation and degradation of these materials will lead to lower quality of water. Organic material degradation will increase oxygen consumption and concentration of ammonia, nitrite and nitrate also increased. Ammonia and nitrite are toxic to the shrimp. If it does not taking care of, there will be ended in shrimp mass mortality.

To overcome this problem we proposed to apply ecological engineering concept to achieved sustainable shrimp aquaculture. Ecological engineering should be applied by addition of new ecosystem component. The component, *Gracilaria verrucosa*. This red seaweed is expected to be able to remove inorganic nitrogen content in shrimp pond. The aim of this research is to study the capability of *Gracilaria* in removal of nitrogen from shrimp pond. We also investigated the effect of *Gracilaria* density on increasing the removal of nitrogen content in shrimp pond.