CHAPTER I

INTRODUCTION

Larviculture of marine animals, including fish and crustaceans, especially shrimp has become increasingly important due to an expansion of shrimp culture in the coastal water. Thailand, the biggest exporter of black tiger shrimp in the world, produced more than 250,000 metric tons in 1994 with a total annual income more than 36,000 million baht. It is clear that shrimp farmers need billions of postlarvae to maintain successful shrimp culture industry. In order to ensure enough shrimp larval supplies, it is neccessary to provide good quality of food either natural or artificial diet. However, natural live food may be uncontrollable and varies seasonally. The development of artificial feed then needs to be improved.

The most important requirement for a successful aquaculture aims at high health of the larvae that could withstand environmental stress. The achievement of complete and well-balanced diets and feed management is needed. Special complex organic micronutrients like vitamins and carotenoids play an important role in metabolic functions of animals. For example, Vitamin A and its derivatives can enhance immune response and protection against diseases by oxygen free radicals (Latscha, 1989).

In crustaceans, the prevalent carotenoid found in the integument is astaxanthin which is oxidized from β-carotene, representing about 65-98% of the total carotenoids in shrimp. It is well distributed in orange to red in animals and contributed to consumer appeal in the marketplace. Moreover, it is concerned in intra-cellular protection, stabilizing in cell walls and improve health and immunology in fish and shrimp (Roche News, 1993). While the synthetic astaxanthin is expensive and difficult in the preparation, there is considerable interest in using natural sources of astaxanthin. The principle natural astaxanthin can be produced from crustacean extract, microalga Haematococcus sp. and yeast Phaffia rhodozyma (Kobayashi et al., 1991). Crustacean meals have relatively low content of astaxanthin and high level of moisture, ash and chitin. P. rhodozyma also produces less content of astaxanthin (approx. 0.02-0.03 %). The alga Haematococcus sp. especially H. pluvialis is preferred because of its rapid growth and proficient production of astaxanthin (approx. 0.2-2 %) (Johnson and An, 1991). Moreover, it may be produced in large quantity and free from toxicity.

In the present experiment, natural astaxanthin from H. pluvialis NIES144 was produced and used to compare with synthetic astaxanthin in order to study their effects on shrimp larvae health and other biological parameters.

Objectives

The main objectives of this study are :

1. To produce astaxanthin from H. pluvialis NIES144.
2. To determine the efficiency of astaxanthin from H. pluvialis NIES144 and synthetic astaxanthin on growth, survival and stress resistance of black tiger shrimp Penaeus monodon larvae.