

PRELIMINARY STUDY ON THE EFFECT OF VITAMIN C ON THE GROWTH AND SURVIVAL RATE OF THE FRESHWATER PRAWN (*Macrobrachium rosenbergii*) LARVAE

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ABSTRACT

This experiment was conducted to investigate the influence of vitamin C on growth and survival rate of freshwater prawn larvae. The treatment dosages of vitamin C were 0.0, and 0.75 mg/L. Each treatment was in triplicates and arranged in a complete randomized design. Vitamin C was given to the larval rearing media every three days. Larvae were cultured in six conical fibreglass tanks of 50 L volume installed in a fibreglass tank (2 x 0.8 x 0.8 m³) filled with water for temperature stabilizer. Each conical tank was stocked with 6,500 larvae (nauplii). *Artemia* nauplii were given on D3 and egg custard as artificial feed on D9. Larval rearing was done for 25 days in constant temperature (29°C–31°C) using automatic heater. Statistical analysis showed that metamorphosis speed of larvae was significantly affected by adding of vitamin C (P<0.05), but survival rate was similar (P>0.05). Addition of vitamin C also resulted in a better growth of freshwater prawn larvae.

KEYWORDS: vitamin C, grow, freshwater prawn, survival rate

INTRODUCTION

Giant freshwater prawn (*Macrobrachium rosenbergii* de Man) is a potential aquaculture commodity in Indonesia. Recently, this commodity has been being developed in both extensive and intensive level. Increasing of seed demand is its direct consequence. Unfortunately, there are still some problems in culture of the freshwater prawn, i.e. the quality and supply of seeds.

The growth of freshwater prawn larvae are influenced by some environmental factors including temperature, rearing media, nutrients, light intensity and water quality (Aquacop, 1983; Hadie & Hadie, 1993; New & Valenti, 2002). Moulting is a routine process for prawn to growth at both young and adult stages. During metamorphosis process to the postlarvae stage, larvae moult eleven times (Uno & Soo, 1969; D'Abramo, 2002). At this condition prawn larvae are weak due to decreasing feed con-

sumption and having soft shell. At this condition, high mortality often occurs if water quality is inferior. The mortality of larvae was also caused by its cannibalism where health larvae will feed on the moulting larvae. This low survival rate of *Macrobrachium rosenbergii* in larval stage often inhibits the development of full economic potential of this crustacean.

One method to increase the fish immunity is by vitamin C supplementation to its feed. Masumoto *et al.* (1991) stated that vitamin C is essential component for fish immunity. Bad quality of water and physiological change of fish body disturb the fish, so optimal availability of vitamin C in fish body is very essential to prevent stress and increase disease resistances. Enrichment of vitamin C (as ascorbil palmitate) in live food of *M. rosenbergii* larvae was done by Merchie *et al.* (1993) with result that various enrichment levels of vitamin C had no differences on growth nor survival, but gave

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a significantly positive effect on the physiological condition of the postlarvae.

Based on those studies, we tried to use vitamin C (as ascorbic acid) on freshwater prawn larvae rearing through culture media to find the effectivity of this method and the effect of vitamin C on growth and survival rate of giant freshwater prawn larvae.

MATERIALS AND METHODS

One-day-old (D1) giant freshwater prawn larvae were used in this study. The dosages of vitamin C were 0.00 and 0.75 mg/L. Each treatment was applied in triplicates and arranged in a completely randomized design. Vitamin C was given to the media for larval rearing every three days. Larvae were reared in clear water system with the salinity of the media of 12 ppt (Aquacop, 1983; D’Abramo, 2002). Larvae were maintained in six conical fiberglass tanks of 50 L volume installed in a 2 x 0.8 x 0.8 m³ fiber tank filled with water for temperature buffer. Each conical tank was stocked with 6,500 larvae (nauplii).

Artemia nauplii were given to the three day old (D3) larvae following egg custard as the artificial feed starting on D9 larvae. Larval rearing was done for 25 days in a constant temperature of 29–31°C regulated by an automatic heater. The water quality was maintained in a good condition by siphonization and water exchange of about 60 percent after the larvae were given artificial feed starting on D9 every day.

The growth stage of larvae (Larval Stage Index, LSI) was observed every three days by sampling 25 individuals per tank. Water quality variable were measured every week. The data of survival and total post larvae were analyzed by Anova followed by LSD test.

RESULTS

Significantly higher total number of postlarvae was observed in larval rearing with vitamin C supplementation (Fig 1). The larvae Stage Index (LSI) showed that addition vitamin C is effective to support larval growth (Table 1).

However, vitamin C supplementation into larval rearing media did not result in significantly higher survival rate of larvae on D25 (Fig 2).

Water quality variables showed that ammonia and nitrite value were significantly increased up to of 0.52 mg/L and 0.46 mg/L, respectively, after giving artificial feed (egg custard), but the other variables were suitable for larval rearing.

DISCUSSION

Total of postlarvae number on D25 was significantly higher (P<0.05) between treatments. This data showed that vitamin C gave positive effect for larvae to recovery after moulting and increased larval resistance to diseases and stress. The LSI value of the vitamin C treatments was higher than that of control. Masumoto *et al.* (1991) stated that vitamin C was the essential component for fish immunity, optimal availability of vitamin C in fish body is very essential to increase stress and disease resistance.

Main target of freshwater prawn hatchery is the juvenile (pasca larvae stage) production. Although survival rate of larvae at 25-day was not significant (P>0.05) but total production of pasca larvae were predicted will significant. Number of larvae stage 9 (nine) and 10 (ten) at treatment of 0 mg/L vitamin C at 24-day is 1650 larvae higher than treatment of 0.75 mg/L (315 larvae). According to that data, predic-

Tabel 1. Average of LSI of giant fresh water prawn larvae during the trial

Treatment (vitamin C)	LSI									
	Days									
	0	3	6	9	12	15	18	21	24	
0.00 mg/L	1	2.04	3.54	5.04	6.35	7.43	8.95	9.66	10,29;	PL
0.75 mg/L	1	2.89	4.09	5.96	7.09	8.55	9,68;	10,54;	10,80;	PL PL PL

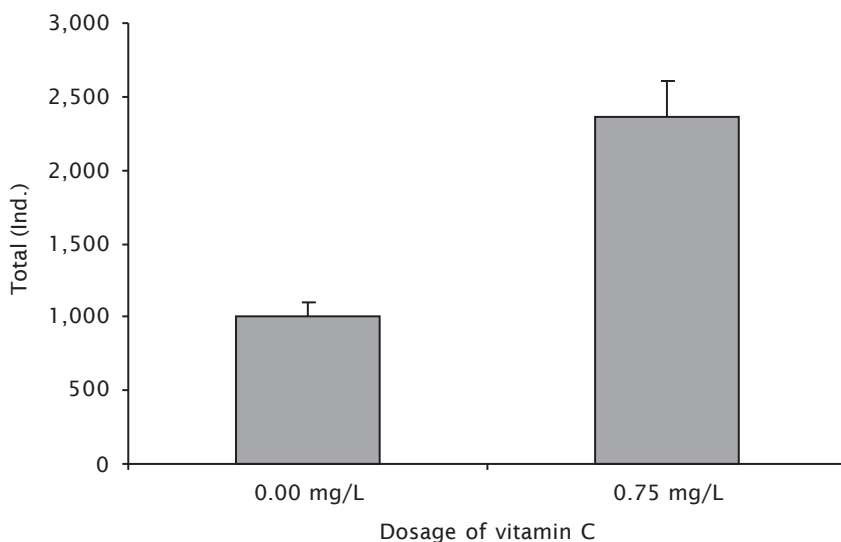


Figure 1. Total of freshwater prawn postlarvae on D25 in the trial

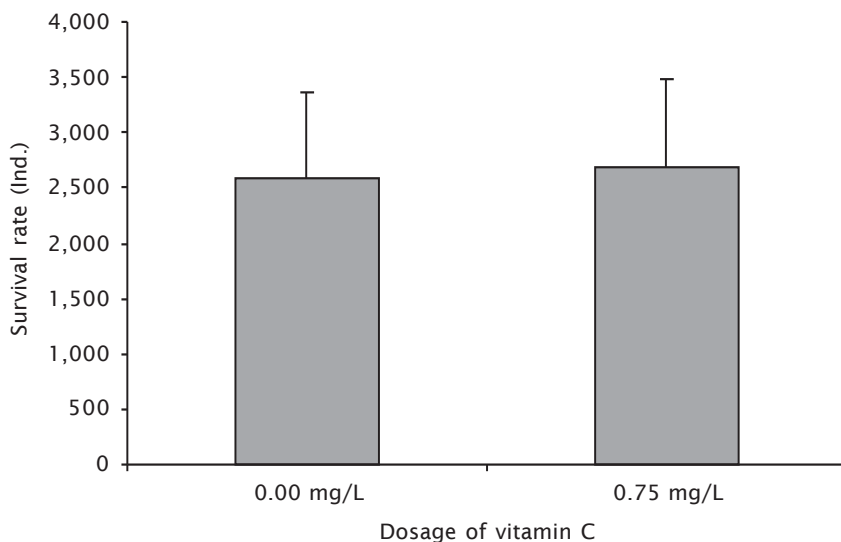


Figure 2. Survival rate of freshwater prawn larvae on D25

tion of survival rate at treatment of 0 mg/L will decrease because larvae stage more sensitive than pasca larvae from disease and environment stress.

CONCLUSION

To maintain high survival and growth rates of freshwater prawn larvae can be obtained by supplementing vitamin C into the culture media.

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