

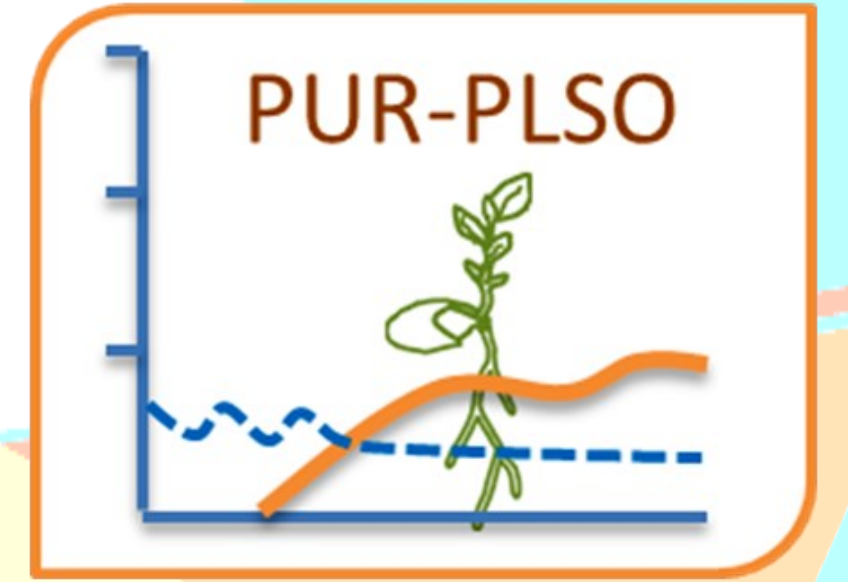
The Quality Improvement of Giant Freshwater Prawns Postlarvae (*Macrobrachium rosenbergii*) in Swamp Media with Addition Sodium during the Acclimatization

Ferdinand Hukama Taqwa^{1,3*}, Ade Dwi Sasanti^{1,3}, A.K. Gaffar^{2,3}, Yuri Amiro Hitosi^{1,3}

¹Aquaculture Program Study, Agriculture Faculty-Sriwijaya University
Jl. Raya Palembang-Prabumulih KM 32, Indralaya, Ogan Ilir, Sumatera Selatan
e-mail : perikanan_unsri@yahoo.co.id
^{*}Corresponding author : Telp. +6281367088484
e-mail: ferdinand_unsri@yahoo.co.id

²Research Institute of Inland Fisheries (BP3U)-Ministry of Marine Affairs and Fisheries Republic of Indonesia
Jl. Beringin 308, Mariana-Palembang
e-mail : brppu_brkp@yahoo.co.id; adm_bppu@yahoo.com

³Research Center for Suboptimal Lands (PUS-PLSO)- Sriwijaya University
Jl. Padang Selasa No. 524, Bukit Besar Palembang 30139
e-mail: purplso@yahoo.co.id



ABSTRACT

The purpose of this study was to improve the quality of giant freshwater prawns postlarvae with the addition of sodium during the acclimatization medium from 12 ppt until 0 ppt. This research used Completely Randomized Design with 5 treatments and 3 replications. The treatments addition of sodium were 0 ppm (A), 25 ppm (B), 50 ppm (C), 75 ppm (D) and 100 ppm (E) by using swamp water diluent. Parameters experiment included survival rate, the level of osmotic work, oxygen consumption rate and water quality. The results indicated that the survival rate of giant freshwater prawns postlarvae significant different between the treatments (84-91,67%). The osmotic work level is significantly different, with treatment on D can produce osmotic level of postlarvae more lower with a value of 185.68 mOsm.l H₂O⁻¹. Oxygen consumption rate also the best on treatment D that showed 1.378 mg O₂.g⁻¹.h⁻¹. These results showed that the addition (until 75 ppm) or without addition of sodium did not significantly affect the survival rate of giant freshwater prawns postlarvae, whereas to improve osmoregulation (level of osmotic) and metabolism mechanism (oxygen consumption) can add sodium as much as 75 ppm in swamp water. Water quality during acclimatization still in range appropriate to survival rate of giant freshwater prawns postlarvae.

Keywords : sodium, giant freshwater prawns postlarvae, survival rate, osmotic level, oxygen consumption, swamp water, acclimatization

INTRODUCTION

Giant freshwater prawns (*Macrobrachium rosenbergii*) is a freshwater prawn that has a fairly high economic value and potential for propagation. According Hadie *et al.*, (2001), that 84.65% of the waters in the South Sumatera has the potential to clear land for cultivation. This is due to the characteristics of the waters in the South Sumatera match the natural habitat of giant freshwater prawns. One of the main problems in aquaculture is the low rate of survival and growth in the larval stage.

MATERIALS AND METHOD



Decreasing from 12 ppt, 10 ppt, 8 ppt, 6 ppt, 4 ppt, 3 ppt, 2 ppt, 1.5 ppt and 1 ppt. Decreasing salinity is done 24 hours per day during acclimatization. The salinity 1 ppt done, water changes as much as 25% of the total volume. At the turn of the 9th day, water that was done gradually 12 liters for 24 hours and salinity gained 0.5 ppt. 10th day change of water for 24 hours by 50% and gained 0 ppt.

RESULTS AND DISCUSSION

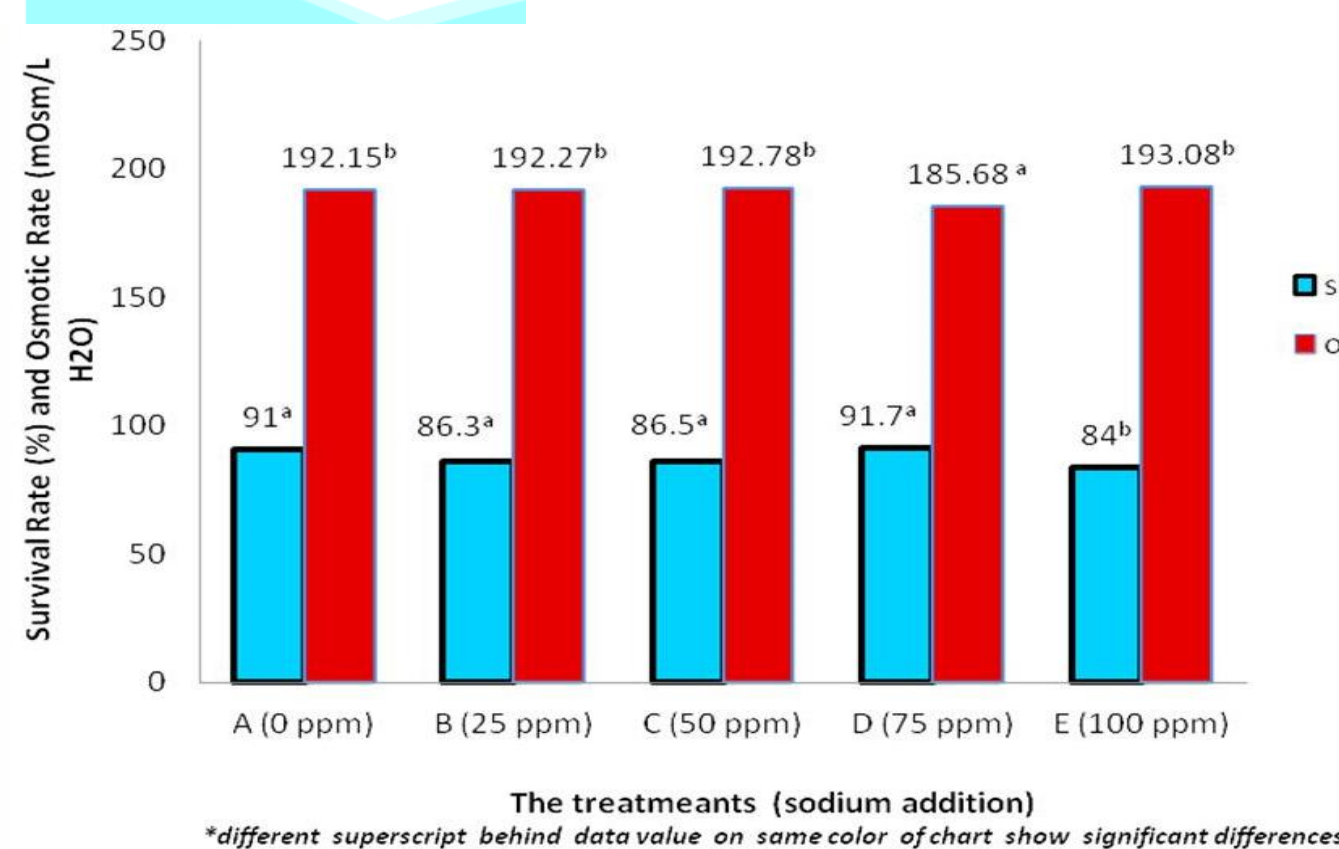


Figure 1. The graphic of survival rate and osmotic rate of giant freshwater prawn postlarvae

Treatment (Sodium Addition)	Temperature (°C)	Salinity (ppt)	Dissolved Oxygen (mg.l ⁻¹)	pH (unit pH)	Ammonia (mg.l ⁻¹)	Alkalinity (mg.l ⁻¹)
A (0 ppm)	26-30	0-12	6.06-6.70	6,7-7,4	0.364-0.730	26-82
B (25 ppm)	26-30	0-12	6.11-6.69	6,7-7,4	0.364-0.061	44-82
C (50 ppm)	26-30	0-12	6.01-6.74	6,7-7,5	0.364-0.243	80-82
D (75 ppm)	26-30	0-12	6.06-6.97	6,7-7,4	0.364-0.033	82-108
E (100 ppm)	26-30	0-12	6.07-6.98	6,7-7,5	0.364-0.066	82-130

Table 1. The measurements of water quality on acclimatization media

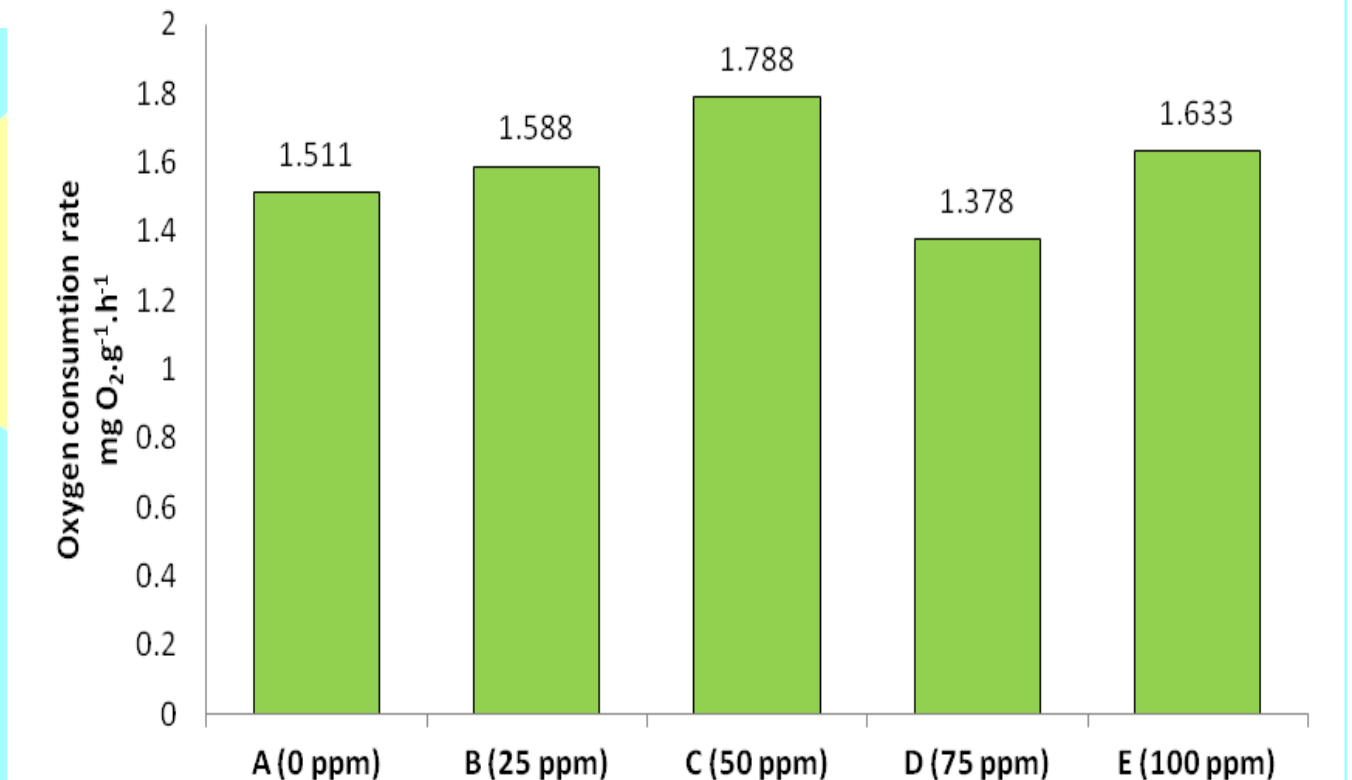


Figure 2. Oxygen consumption rate of giant freshwater prawn postlarvae

The survival rate of giant freshwater prawns postlarvae during the acclimatization period was significantly different to the levels survival rate of prawns. The highest survival rate is contained in the D treatment with the addition of sodium as much as 75 ppm. Dersjant-Li *et al.*, (2001) states that the value of the ratio of Na⁺/K⁺ contained in the water function to maintain the balance between the ions K⁺ and Na⁺ in appropriate liquid intraseluller. Survival rates were higher during the acclimatization period allegedly can cause decreased salinity less of energy use for setting the concentration of K⁺ in haemolymph. The osmotic work level shows the activity rate is the lowest osmotic on treatment D with the value of 185.68 mOsm.l H₂O⁻¹, while the highest levels of osmotic on treatment E (193.08 mOsm.l H₂O⁻¹). The low levels of osmotic work associated with the level of oxygen consumption, the lower the employment rate of osmotic energy use osmoregulation in prawns postlarvae can be utilized for the growth process. The water absorption ions such as Na, Ca, and Cl absorbed by the body through the gills. Ion settings generally require a lower the energy which close to isoosmotic environment, so that the energy can be used for growth enhancement (Imsland *et al*, 2003). The lowest oxygen consumption rate on treatment D (1,378 mg O₂.g⁻¹.h⁻¹) shows that addition of sodium as much as 75 ppm can reduce energy using to metabolism, so growth energy of giant freshwater prawn postlarvae more higher than the other treatments.

Based on Table 1, shows the temperature of all treatments during the study ranged from 26-30°C. According Hiron (1982) in Abidin (2011), the optimal temperature for growth of freshwater prawn between 28-32°C. Temperature affects the rate of metabolism in animal waters. The degree of acidity (pH) during the study ranged from 6.4-6.8. According Sya'fe'i (2006), the optimal pH is in the range 7.0-8.5, while based on this study under the range of optimal pH range of prawns, it is alleged by the addition of diluents swamp water causes a decrease in pH during acclimatization period of prawns postlarvae. Alkalinity value during acclimatization prawns at the beginning of period on all treatments are 82 mg.l⁻¹, at the end of the period the value of alkalinity in treatment A, B, and C are 26 mg.l⁻¹, 44 mg.l⁻¹, and 80 mg.l⁻¹, while in treatment D and E worth 108 mg.l⁻¹ and 130 mg.l⁻¹. Value for ammonia measurements showed decreased during the study. The high ammonia value can cause death in prawns (Sya'fe'i, 2006). Dissolved oxygen during the study is still in the range of optimal care of giant freshwater prawn. Sya'fe'i (2006) said that for rearing, the optimal range of dissolved oxygen for prawns is range 5-8 mg.l⁻¹. Wynne (2000) and Ahmad (2005) states that giant freshwater prawns will be able to grow well if it is cared in medium temperature of 28-31°C, dissolved oxygen above 3 mg.l⁻¹, pH 6.5 to 8.8 and ammonia content below 1 mg.l⁻¹.

CONCLUSION

The addition of sodium significantly affect the survival rate of giant freshwater prawns postlarvae, if it more than 75 ppm make survival rate became low. At the end acclimatization, sodium addition on swamp water diluent as much as 75 ppm could produce the best performance of postlarvae, based on the value of the osmotic work level and oxygen consumption rate that more efficiency.

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