

Intisari

Penelitian ini bertujuan untuk mengetahui pengaruh aerasi dan padat tebar terhadap daya dukung (*carrying capacity* / CC), sintasan, pertumbuhan, dan respon stres udang vaname (*Litopenaeus vannamei* Boone, 1931). Model eksperimen Rancangan Acak Lengkap 2 faktorial digunakan dalam penelitian ini, faktor pertama jenis aerasi (*microbubble* dan *blower*) dan faktor kedua padat tebar (50%-CC, CC, dan 50%+CC). Udang vaname yang digunakan berasal dari Unit Kerja Budidaya Air Payau (UK-BAP) Congot berbobot ± 4 g dan panjang ± 8 cm, dipelihara pada bak bervolume 1 m³. Udang vaname dipelihara selama 45 hari, diberi pakan dengan kadar protein $\geq 33\%$ sebanyak 4 kali sehari dengan *feeding rate* 5%. Pengamatan pertumbuhan dilakukan di hari ke-1, 23, dan 45. Pengambilan sampel hemolim dilakukan pada hari ke-1 dan 45. Parameter performa pertumbuhan yang diamati meliputi sintasan, *Average Daily Growth*, *Specific Growth Rate*, biomassa, dan *Feed Conversion Ratio*. Respon stres yang diamati meliputi kadar glukosa darah, kortisol, total protein plasma dan konsumsi oksigen. Hasil penelitian menunjukkan penggunaan aerasi *microbubble* terbukti mampu menghasilkan O₂ terlarut hingga 7,5 mg/l, sedangkan aerasi *blower* hanya mencapai 6,5 mg/l. Perbedaan kandungan O₂ terlarut tersebut sekaligus berpengaruh terhadap daya dukung aerasi *microbubble* yang lebih tinggi dibanding dengan aerasi *blower*. Laju sintasan udang pada bak dengan *microbubble* memiliki nilai yang lebih tinggi yaitu 85-90%, sedangkan pada *blower* hanya 74-88%. Pertumbuhan harian udang dengan *microbubble* juga memiliki nilai yang lebih baik mencapai 0,23-0,29 g/hari dibandingkan *blower* hanya 0,18-0,23 g/hari. Daya dukung yang lebih tinggi, sintasan dan pertumbuhan yang lebih baik pada bak dengan aerasi *microbubble* menghasilkan biomassa mencapai 1,4-3,3 kg pada hari ke-45. Pemeliharaan menggunakan aerasi *microbubble* lebih efektif menekan respon stres udang vaname. Hal ini dibuktikan pada hari ke-45 kadar glukosa (49-74 mg/dl), kortisol (221-313 ng/mg), dan konsumsi oksigen (1786-2778 mgO₂/kg/h). Nilai konstanta yang lebih rendah dibanding perlakuan dengan aerasi *blower* membuktikan aerasi *microbubble* lebih efektif menekan respon stres udang vaname.

Kata kunci: aerasi, *microbubble*, daya dukung, respon stres, udang vaname.

Abstract

This study aimed to determine the effect of aeration and stocking density on the carrying capacity (CC), survival, growth, and stress response of white shrimp (*Litopenaeus vannamei* Boone, 1931). The experimental model of Completely Randomized Design 2 factorial used in this study, the first factor was the type of aeration (microbubble and blower) and the second factor was stocking density (50%-CC, CC, and 50%+CC). The vaname shrimp used came from the Balai Air Payau Congot weighing ± 4 g and ± 8 cm long, reared in a 1 m³ volume tank. Vannamei shrimp were reared for 45 days, fed with protein content of 33% 4 times a day with an FR of 5%. Growth was carried out on days 1, 23, and 45. Hemolyme sampling was carried out on days 1 and 45. Growth performance parameters observed included Survival Rate, Average Daily Growth, Specific Growth Rate, biomass, and Food Conversion Ratio. The stress response observed included blood glucose levels, cortisol, total plasma protein and oxygen consumption. The results showed that the use of microbubble aeration was proven to be able to produce dissolved oxygen up to 7.5 mg/l, while blower aeration only reached 6.5 mg/l. The difference in dissolved oxygen content affects the CC of microbubble aeration which is higher than that of blower aeration. The survival rate of shrimp in tanks with microbubble has a higher value, namely 85-90%, while in blowers it is only 74-88%. ADG of shrimp with microbubble also has a better value of 0.23-0.29 g/day compared to blower only 0.18-0.23 g/day. Higher bearing capacity, better survival and growth with microbubble aeration resulted in biomass reaching 1.4-3.3 kg on day 45. Maintenance using microbubble aeration was more effective in suppressing the stress response of vaname shrimp. This was proven on the 45th day of glucose levels (49-74 mg/dl), cortisol (221-313 ng/mg), and oxygen consumption (1786-2778 mgO₂/kg/h). The lower constant value compared to the treatment with blower aeration proved that microbubble aeration was more effective in suppressing the stress response of vanname shrimp.

Key Word: Aeration, microbubble, carrying capacity, response stress, vannamei shrimp.