

Intisari

Perancangan Aerator Venturi untuk Meningkatkan Kandungan Oksigen Terlarut dan Sintasan Budidaya Ikan Nila Merah (*Oreochromis* sp.)

Penelitian ini bertujuan merancang dan menguji alat aerasi jenis venturi sebagai microbubble generator untuk meningkatkan kadar oksigen terlarut (DO) dan sintasan ikan nila dalam sistem budidaya intensif. Penelitian dilakukan selama 51 hari di Laboratorium Akuakultur dengan tiga perlakuan, yaitu venturi (P1), pompa (P2), dan aerator (P3), masing-masing tiga ulangan pada bak fiber berkapasitas 450 L dengan padat tebar 55 ekor per bak. Parameter yang diamati meliputi DO, suhu, pH, alkalinitas, CO₂, TAN, amonia, dan sintasan ikan, yang dianalisis menggunakan ANOVA dan uji lanjut Duncan. Hasil menunjukkan bahwa venturi menghasilkan DO tertinggi dengan rerata 4,24 mg/L, lebih tinggi dibanding aerator 3,99 mg/L dan pompa 2,95 mg/L, serta secara statistik berbeda nyata. Perlakuan venturi juga memberikan sintasan tertinggi sebesar 83,64%, lebih tinggi dibanding aerator 75,76% dan pompa 60,61%, disertai nilai TAN dan amonia yang lebih rendah serta CO₂ yang lebih terkendali. Secara keseluruhan, penggunaan venturi sebagai microbubble generator efektif meningkatkan kualitas air dan berpengaruh positif terhadap kelangsungan hidup ikan nila, sehingga berpotensi diaplikasikan pada sistem budidaya intensif.

Kata kunci: ikan nila, kualitas air, *microbubble*, oksigen terlarut, venturi

Abstract

Venturi Aerator Design to Increase Dissolved Oxygen Content and Survival of Red Tilapia Cultivation (*Oreochromis* sp.)

This study aimed to design and evaluate a venturi-type aeration device functioning as a microbubble generator to enhance dissolved oxygen (DO) concentration and survival of nile tilapia in an intensive aquaculture system. The experiment was conducted for 51 days in an aquaculture laboratory using three treatments, namely venturi (P1), water pump (P2), and aerator (P3), each with three replications in 450 L fiberglass tanks stocked with 55 fish per tank. Observed parameters included DO, temperature, pH, alkalinity, CO₂, TAN, ammonia, and fish survival rate, which were analyzed using ANOVA followed by Duncan's multiple range test. The venturi treatment resulted in the highest mean DO value of 4.24 mg/L, significantly higher than the aerator (3.99 mg/L) and pump (2.95 mg/L) treatments. The highest survival rate was also recorded in the venturi treatment at 83.64%, compared to 75.76% in the aerator and 60.61% in the pump treatment, accompanied by lower TAN and ammonia concentrations and more controlled CO₂ levels. Overall, the venturi-based microbubble generator was effective in improving water quality, particularly DO, and positively affected nile tilapia survival rates, indicating strong potential for application in intensive aquaculture systems.

Keywords: dissolved oxygen, microbubble device, nile tilapia, venturi, water quality