

Uji Kinerja Aerator Kincir Air Berpengerak Kincir Angin Savonius Tipe-L Untuk Aerasi Air Tambak

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Abstrak

Dalam kehidupan air kelarutan oksigen merupakan faktor kritis budidaya ikan secara intensif. Kekurangan oksigen dapat membahayakan ikan karena dapat menyebabkan stress, penyakit, atau kematian. Aerasi menjadi krusial di tambak dengan kepadatan populasi yang tinggi untuk menambah kelarutan oksigen di dalam air. Penelitian ini bertujuan untuk menguji kinerja aerator kincir air berpengerak kincir angin *savonius tipe L* di tambak. Parameter kecepatan angin, torsi, daya yang dihasilkan pada kincir air dan kincir angin, serta oksigen terlarut untuk mengetahui efisiensi dan kedalaman *paddle wheel* optimal dalam menyuplai oksigen air tambak. Penelitian dilakukan selama 15 hari dengan menggunakan *paddle wheel* berdiameter 70 cm, kemiringan sudu 45° serta dilakukan beberapa perlakuan kedalamansudu *paddle wheel* yang berbeda yaitu 1 cm, 3 cm, 6 cm, 9 cm dan 12 cm. Hasil penelitian menunjukkan bahwa kincir dapat berputar dan menggerakkan *paddle wheel* pada kecepatan angin minimum yang berbeda-beda tergantung pada kedalaman sudunya. Pada kecepatan angin 2.577 m/s, daya dan torsi yang dihasilkan pada kincir angin sebesar 1.18 Watt dan 0.898 Nm. Sedangkan daya dan torsi pada *paddle wheel*nya sebesar 0.888 Watt dan 0.433 Nm. Dari hasil tersebut didapatkan daya hilang sebesar 0.291 Watt dengan efisiensi konversi energi sebesar 15.76% dan efisiensi sistem aerator sebesar 75.3%. Peningkatan oksigen terlarut pada air tambak menggunakan aerator ini sebesar 3,48 mg/l dibandingkan dengan tanpa sistem aerasi.

Kata Kunci: Aerator, Kincir Savonius, Kincir Air, DO air tambak.

Performance Test of Paddle Wheel Aerator Driven By Savonius L- Type Windmill For Embankment Water Aeration

Abstract

Performance test of paddle wheel aerator driven by Savonius l-type windmill for embankment water aeration. In the aquaculture, the dissolved oxygen rate becomes a critical factor for the intensive fish production. Oxygen inadequacy in the water put the fish in danger because it causes stress, disease, and even death. Therefore, in the highly dense embankment, aeration equipment should be installed to improve oxygen dissolution rate in the water. This research aimed to examine the performance of paddlewheel aerator driven by Savonius L-type windmill for embankment water aeration. Research parameters i.e. the wind speed, torque, paddle wheel power, windmill power and dissolved oxygen were measured to acknowledge the efficiency, to acknowledge the paddle wheel depth for optimum aeration to supply dissolved oxygen in the embankment water. Research has been conducted for 15 days and uses paddlewheel which it has 70 cm diameter and 45° slope. Several treatments of paddle wheel angle deep are used, i.e. 1 cm, 3 cm, 6 cm, 9 cm, and 12 cm. Results of research indicate that the mill rotates and moves the paddle wheel in the different minimum wind speeds depend on angle deep. At the wind speed rate 2.577 m/s, the power and torque produced by windmill reaching for 1.18 watt and 0.898 Nm. However, the power and torque of the paddle wheel are 0.888 watt and 0.433 Nm. Considering these results, the lost power is 0.291 Watt. Energy conversion efficiency equals to 15.76%, while aerator system efficiency remains as 75.3%. Considering the results of the after and before use this aeration systems in the embankment, research finds dissolved oxygen improvement to 3.48 mg/l.

Keywords: aerator, savonius mill, paddle wheel, DO of embankment water