

ABSTRAK

Makhluk hidup yang tinggal di bumi seperti manusia membutuhkan makanan dan minuman. Elemen terpenting bagi kehidupan manusia adalah air. Ketersediaan air bersih layak konsumsi mulai sulit didapatkan terutama di daerah terpencil. Distilasi air energi surya merupakan salah satu solusi penjernihan air yang terkontaminasi zat berbahaya. Alat distilasi energi surya memiliki beberapa kelemahan seperti rendahnya nilai produktivitas dan efisiensi. Penelitian ini bertujuan untuk mengetahui efek penggunaan tinta hitam dan pengaruh tinta hitam terhadap penyerapan energi surya guna meningkatkan produktivitas hasil distilasi dengan prinsip kapilaritas sumbu. Penelitian ini menggunakan dua alat distilasi, yaitu distilasi bersekat dan konvensional. Terdapat 3 variasi yang digunakan, variasi 1 distilasi bak bersekat tanpa tinta (DBBTT) tinggi air 5 cm dan distilasi bak konvensional (DBK) tinggi air 3,5 cm, variasi 2 distilasi bak bersekat dengan tinta (DBBDT) tinggi air 5 cm dan DBK tinggi air 3,5 cm. Variasi 3 DBBDT tinggi air 5 cm dan DBK dengan tinggi air 1 cm. Penelitian menggunakan metode eksperimental yang dilaksanakan di Universitas Sanata Dharma Yogyakarta, pengambilan data selama 8 jam dilaksanakan selama tiga hari. Alat distilasi memiliki luasan sebesar $0,58 \text{ m}^2$ dan kaca penutup setebal 3 mm dan diposisikan pada kemiringan 15° . Hasil penelitian menunjukkan penggunaan tinta hitam DBBDT memperoleh hasil distilasi tertinggi sebesar $1,32 \text{ l}/(\text{m}^2 \cdot \text{hari})$ dan DBBTT sebesar $0,809 \text{ l}/(\text{m}^2 \cdot \text{hari})$ dan penggunaan tisu bambu pada variasi 1 DBBTT menghasilkan efisiensi sebesar 60,6 % sedangkan DBK hanya 37,7 %. Hal ini membuktikan penggunaan tinta hitam jenis *durabrite* dan sekat berbahan tisu pada distilasi bersekat mampu meningkatkan produktivitas distilasi air energi surya.

Kata kunci : Distilasi jenis bak, tinta hitam, metode kapilaritas, karbon hitam, produktivitas

ABSTRAC

Living things that live on earth like humans need food and drink. The most important element for the life of living things is air. However, the availability of clean water suitable for consumption is starting to be difficult to obtain, especially in remote areas. Solar energy water distillation is one of the solutions for purifying water contaminated with harmful substances. Solar energy distillation equipment has several drawbacks such as low productivity and efficiency values. This study aims to determine the effect of using black ink and the effect of black ink on the absorption of solar energy in order to increase the productivity of distillates with the principle of the capillary axis. This study used two distillation tools, namely partition and conventional distillation. There are 3 variations used, variation 1 insulated tub distillation without ink (DBBTT) 5 cm water height and conventional tub distillation (DBK) 3.5 cm water height, 2 DBBTT variation 5 cm water height and 3.5 cm water height DBK. Variation 3 distillation tub insulated with ink (DBBDT) with 5 cm water height and DBK with 1 cm water height. The research used an experimental method which was carried out in the field of Sanata Dharma University, Yogyakarta, data collection for 8 hours was carried out for three days. The distillation apparatus has an area of 0,58 m² and a cover glass 3 mm thick and stores at a slope of 15°. The results showed that the use of DBBDT black ink obtained the highest distillation results of 1.32 l/(m².day) and DBBTT of 0.809 l/(m².day) and the use of bamboo wipes in variation 1 DBBTT resulted in an efficiency of 60.6 % while DBK only 37.7 %. This proves that the use of durabrite type black ink and the use of screens made from tissue in partition distillation can increase the productivity of solar energy water distillation.

Keywords : Basin type distillation, black ink, capillary method, carbon black, productivity