

Seaweed modeling for drying and the efficiency as heavy metal removal in Kappaphycus Striatum variety Sacol using Solar Dryer

Abstract

The solar drying experiment of seaweed using Green V-Roof Hybrid Solar Drier (GVRHSD) was conducted in Semporna, Sabah under the metrological condition in Malaysia. Drying of sample seaweed in GVRHSD reduced the moisture content from about 92.68% to 32.06% in 4 days at average solar radiation of about 600W/m² and mass flow rate about 0.5 kg/s. The drying kinetics was fitted with six published exponential model thin layer drying models. The models were fitted using the coefficient of determination (R^2), and root mean square error (RMSE). The result showed modified page was the best model for describe the drying behavior. In addition, the dried seaweed was used to show biosorptions of cadminium, lead, zinc and copper. Batch mode experiments were performed to determine experimental parameters affecting sorption process such as pH, initial metal ion concentration, shaking rate and biomass dosage. The Pb(II) showed Int. J. Environ. Bioener. 2013, 8(1): 42 highest sorption on pH 4, shaking rate on 250 rpm with 24.18% removal rate; at initial concentration of 100 ppm and adsorbent dosage at 4g/l the removal percentage is 28.30%. Overall, this report indicates that Kappaphycus Striatum Variety Sacol is an effective and economical sorbent for removal of heavy metals from wastewaters.