

Preliminary study of seaweed drying under a shade and in a natural draft solar dryer

Abstract

A solar dryer was designed to study the seaweed drying process under natural convection and compared to a shade drying process. A dewatering pre-treatment process was initially applied to enhance drying process for both methods. The initial weight of seaweed before pre-treatment and after pre-treatment was recorded and the seaweed was then introduced into the solar drying system and shade drying system. The air temperature and relative humidity inside the solar dryer and surrounding were recorded during experiment. A representative sample on each tray was taken for final moisture content determination where the difference of seaweed weight less than 5% for subsequent measurement. The average weight loss of seaweed from pre-treatment was about 54%. The final moisture content of seaweed for solar drying was in the range of 24-61% (d.b.) and for shade drying was in the range of 40-48% (d.b.) with a standard deviation of final moisture content of 20.45% for solar drying and 3.78% for shade drying. The total time for solar drying inclusive of pre-treatment was 6 days and shade drying was 9 days. The drying kinetics of each method was modeled and the results of this study will be utilized to enhance the design and operations of seaweed solar dryers.