

## **Dehumidification Efficiency (DHE) of the Automated Multi Commodity Heat Pump Dryer (AMCHPD)**

Lorcelie B. Taclan, Emson Y. Taclan, Roy Ephraim M. Umpad, Darwin Garduque,  
Jolly S. Balila and Miriam P. Narbarte  
Adventist University of the Philippines

### **Abstract**

The inside condition of the drying air (% relative humidity) in a drying process is a crucial parameter to consider during the dehydration of commodities but this is often neglected yielding to food losses. The study identified the dehumidification efficiency of the Automated Multi Commodity Heat Pump Dryer (AMCHPD) in terms of the percent Relative humidity, ambient (RH<sub>a</sub>) and Relative humidity, desired (RH<sub>d</sub>). The AMCHPD was set to drying process using 5 selected fruits and vegetables, namely: mango, pineapple, moringa, saluyot and ube, respectively. From each drying process, the RH<sub>a</sub> and RH<sub>d</sub> were recorded in a database using a Raspberry pi. Average RH<sub>a</sub> and RH<sub>d</sub> were calculated using MS Excel. The % DHE was calculated using the formula: . Research findings revealed that the average RH<sub>a</sub> using the 5 commodities is 80.0% and the average RH<sub>d</sub> is 18.0% yielding to a 77.5% DHE. This means that the % RH<sub>d</sub> required to extract the initial moisture content of the commodities dehydrated is within the standard which is > or = to 18.0% and the calculated % DHE falls within the standard simulated in a convective drying method. Thus, the assembly of the major components of the AMCHPD was appropriate such that the operating conditions of the drying system are ideal.

**Keywords:** *multi-commodity heat pump dryer, relative humidity, dehumidification efficiency*