**ISSN 0511-5728**
*The West Indian Journal of Engineering*
Vol.42, No.2, January 2020, pp.87-95

# Microwave Drying of West Indian Bay Leaf (*Pimenta racemosa*)

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*(Received 31 July 2019; Revised 26 December 2019; Accepted 07 January 2020)*

***Abstract:*** *The effect of microwave power (200, 500, 700 and 1000W) on the drying behaviour of West Indian Bay leaf (Pimenta racemosa) was investigated. Leaves were dried in a commercial digital microwave oven until there was virtually no change in weight. The initial moisture content and water activity ($a_w$) values of fresh leaves averaged 0.85 g $H_2O$/g DM (46.0 % wb) and 0.912, respectively. Although a decrease in moisture content, water activity and drying time increased with microwave power level, the most noticeable changes were seen as microwave power increased from 200 to 500W. Overall, drying time to equilibrium moisture values decreased from 48.8 to 5.2 minutes for leaves dried at 200-1000W, respectively. The final moisture content values of leaves dried at 200, 500, 700 and 1000W averaged 0.22, 0.05, 0.04 and 0.02 g $H_2O$/g DM (18.7 to 2.0 % wb), respectively. Corresponding water activity values for microwave-dried leaves averaged 0.756 for leaves dried at 200W power and 0.326 for leaves dried at 1000W. Drying rates at the start of drying averaged 0.02 g $H_2O$/g DM/min for leaves dried at 200W power, compared with 0.63 g $H_2O$/g DM/min for leaves dried at 1000W. Drying of all leaves occurred in the falling rate period. Drying rate constants (k) ranged from 0.0410 to1.0930 1/min, with the corresponding diffusivity values averaging 0.62 and 16.69 x $10^{-9}$ $m^2$/s, for leaves dried at 200-1000W, respectively. Rehydration ratios were found to increase with rehydration temperature ($p \leq 0.05$). Significantly lower rehydration ratios were seen in leaves dried at 200W when rehydration was carried out at ambient temperature. Leaves experienced changes in colour and texture during drying, with undesirable changes occurring during drying at 200W and 1000W power levels. Drying at 500W and 700W was favourable and found to be similar with respect to the colour attributes and equilibrium moisture content of dried leaves, as well as energy consumption. The chlorophyll content was higher in leaves dried at 500W while the odour of leaves dried at 700W was stronger. Of the nineteen thin layer models applied to the MR data, the Verma model best fit the data for leaves dried at 500W power level and the Jena and Das model best fit the data for leaves dried at 700W. The results show the clear potential for microwave drying as a rapid drying method of drying bay leaves.*

***Keywords:*** *Microwave drying, West Indian Bay leaf, thin layer modelling*