Effective moisture diffusivity and activation energy of rambutan seed under different drying methods to promote storage stability

ABSTRACT

The effects of two drying methods, oven and microwave drying on the effective moisture diffusivity and activation energy of rambutan seed were studied. Effective moisture diffusivity and activation energy are the main indicators used for moisture movement within the material. Hence, it is beneficial to determine an appropriate drying method to attain a final moisture content of rambutan seed that potentially could be used as secondary sources in the industry. An appropriate final moisture content will provide better storage stability that can extend the lifespan of the rambutan seed. The rambutan seeds were dried with two drying methods (oven and microwave) at two level of the process variables (oven temperature; 40o C and 60o C and microwave power; 250W and 1000W) at constant initial moisture contents. The result showed that a higher value of effective moisture diffusivity and less activation energy were observed in microwave drying compared to oven drying. This finding portrays microwave drying expedites the moisture removal to achieve the required final moisture content and the most appropriate drying method for longer storage stability for rambutan seed. With respect to the process variables; higher oven temperatures and lower microwave powers also exhibit similar trends. Hopefully, this study would provide a baseline data to determine an appropriate drying method for longer storage period for turning waste to by-products.

Keyword: Rambutan seed; Drying methods; Storage stability; Moisture diffusivity; Activation energy