

Kinetics modelling of the colour, hardness, grinding energy consumption and oil yield changes during the conventional roasting of palm date seeds

ABSTRACT

Palm date seeds can be a potential source to prepare a decaffeinated coffee-like brew and to produce oil. Hence, the objectives of this work are to model the changes in colour and hardness of date seeds during roasting process, as well as to study the effects of roasting conditions on the total specific grinding energy and the oil extraction yield of the seeds. General reaction models and general regression equation were applied to simulate the changes in colour, hardness, oil extraction yield, and total specific grinding energy during roasting process. The outcomes showed that the colour parameters (L^* -value and b^* -value) and the hardness of the roasted date seeds can be satisfactorily described by the first-order equation, while a^* -value and ΔE were adequately defined by the zero-order model. A decrease in total specific grinding energy and an increase in oil yield were recorded as the roasting temperature and time were increased. Hence, this study concludes that the roasting of date seeds at 200 °C for 30 min generates the lowest grinding energy and a high amount of oil.

Keyword: Palm date seeds; Roasting; Physical properties; Grinding energy consumption; Oil yield