

Effect of roasting conditions on the browning intensity and structural changes in jackfruit (*Artocarpus heterophyllus*) seeds

ABSTRACT

Central composite rotatable design (CCRD) was used to optimize the settings for the roasting conditions of jackfruit (*Artocarpus heterophyllus*) seed (JFS). The response variables studied were; color attributes L*, a*, and b*, browning intensity, and fracturability. The colors L*, a*, b* and browning intensity were well predicted by a second-order polynomial model. Fracturability was predicted by a first-order polynomial. The determination coefficients for colors L*, a*, b*, browning intensity, and fracturability were 0.81, 0.96, 0.93, 0.92, and 0.74 respectively. The fitted models were checked for adequacy using analysis of variance (ANOVA). The optimum roasting conditions were established at a temperature of 153.36 °C, 34.36 min, and pH of 6.34 with composite desirability value of 0.95. Micro-structural studies of both raw and roasted JFS at different roasting levels (i.e., low, medium, and high) were also investigated using scanning electron microscope (SEM). JFS starch granules fell in the B-type category with semi-oval to bell-shaped granules (5-9 µm in diameter). In addition, Fourier Transform Infrared analysis was carried out on both raw and roasted JFS. The IR spectra was in the 4000-1000 cm⁻¹ region which is described by five main modes; O-H, C-H, C = O, (C-H) CH₃, and C-O.

Keyword: Browning intensity; FTIR; Fracturability; Jackfruit cultivar (J31); Roasting