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Roasting Chilli (*Capsicum annuum* L.) Using Far-Infrared Radiation

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ABSTRACT: *Chilli (Capsicum annuum L.) is presently roasted using conduction heating in electrically-heated mechanical roasters. In this study, the possibility of using Far-Infrared (FIR) radiation heating for roasting chilli was investigated. The moisture content, temperature and colour variation of chilli pods at 3240, 3920, 5260 and 7188 W/m² FIR radiation intensities with different exposure times were measured. The colour of the factory roasted chilli pods prepared using a drum roaster at 120 °C for 25 min were 30.73(L^*), 9.33(a^*) and 48.51(b^*). These values were used as the standard and compared with the colour values of chilli roasted with FIR radiation. The factory-roasted colour of chilli pods was achieved in 60 s at the highest intensity of FIR radiation (7188 W/m²) used in the experiment. The chilli temperature rose above 100 °C and the moisture content reached 9.02% (dry basis - db) at 60 s FIR exposure with 7188 W/m². At the radiation intensities of 3240, 3920, 5260 W/m², the factory-roasted colour of chilli was achieved at 124, 117, 107 s and the corresponding interpolated moisture contents were 8.38, 6.70 and 6.59% db, respectively.*

Keywords: *Chili, drying, far-infrared, heating, roasting.*

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Rice Grain Cooling Using Intermittent Adsorption and Desorption of Water Vapour: Development of a Mathematical Model

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ABSTRACT: *A one-dimensional heat and mass transfer model was developed for predicting grain temperature in a deep bed of paddy exposed to intermittent adsorption and desorption cycles and the numerical solutions of the model were approached by finite difference method. The inlet temperature and relative humidity of air were used as the model inputs. The model was validated using a laboratory scale experimental setup. The data were collected by forced air ventilation with moist air following intermittent adsorption and desorption cycles of 5 and 10 min in a 0.15 m bed of paddy in a 0.11 m diameter circular bin. The measured and predicted grain temperatures at different layers were in close agreement over the test period with accuracy of ± 0.5 °C. Thus, the mathematical model developed can be used in predicting the rice grain temperature with similar applications.*

Keywords: *Heat and mass transfer, numerical solutions, paddy, grain temperature, mathematical model*

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