

Validation of the Mathematical Model for Rice Quality Simulation by the Function of Paddy Parboiling Treatments for BG 358 Rice Variety

Gunatilake D.M.C.C., Singh A., (2009) Development of a mathematical Model for simulation of Paddy parboiling Process, J. of Food Engineering

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Parboiling (hydrothermal treatment) of paddy/rough rice is an ancient traditional process of South Asian countries and it's reducing the level of grain breakage and increase in head yield of rice during milling. However, parboiling of rice associated minor drawbacks such as reduce rice kernel whiteness and increase in kernel hardness. Level of grain breakage, kernel whiteness and hardness can be altered by controlling of water temperature and duration of soaking in paddy parboiling. The mathematical model developed by Gunathilake (2009) can be used to predict the values of broken grain percentage, head rice yield percentage, kernel whiteness and hardness by the function water temperature and duration of soaking in paddy parboiling however, model should be validate/verified before applied. Hence, this research study was carried out to validate/verified this mathematical model for checking its suitability and accuracy to predict above mentioned rice quality values in local rice variety. BG 358 short grain rice (Most popular rice variety in Sri Lanka, L: B ratio is 2.15) was used for validation/verification the model. In this model single paddy grain parboiling (hydration) was considered because, the quality traits of a single grain kernel can produce an index of the overall quality of the bulk grain, as individual kernels comprise a grain bulk. Results were shown that mathematical model is fit for predict rice quality values of kernel whiteness, hardness, broken grain percentage and head rice yield percentage, by the function of water temperature and duration of soaking that the major treatments of paddy parboiling. Goodness of fit (E) value of predicted values and actual values of kernel whiteness, hardness broken grain percentage and head rice yield were showed 5.91, 6.73, 8.32 and 7.92 respectively. The average Goodness of fit (E) value was 7.22. Hence, it was revealed, that the mathematical model is capable to predict rice quality values by water temperature and soaking duration similar to actual values for BG 358 variety. Finally, it can be concluded that mathematical model was good fit to simulate above rice qualities by the paddy parboiling treatments of water temperature and soaking duration for BG 358 paddy.