

B-43: A Preliminary study on effect of storage on duration of soaking for parboiling paddy

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Parboiling of paddy involves a number of steps, the first of which is the soaking in hot or cold water. Many workers have observed differences in the soaking duration required for parboiling with ageing of paddy. Determination of optimum soaking time would help to minimize leaching losses, improve the grain quality, reduce the overall processing time and thereby reduce production cost. In this study, an attempt was made to understand the best soaking time in cold water for paddy to reach 30% of moisture (wet basis) required for parboiling from fresh paddy upto 2 months in storage.

Two paddy varieties, BG 300 (long white grain) and BG 450 (short white grain) were used for experiments. About 20 kg of paddy from the 2 paddy varieties collected from Batalegoda Research Station were stored in gunny bags (room temperature of 27-30°C and 65-75% relative humidity). Samples of paddy were drawn, each fortnight for 2 months and soaked at room temperature. The absorbed moisture content was determined at 2 h intervals by the air oven method. The grains were mopped to remove surface moisture and dried at 130°C for 1 h. Hydration curves were drawn using Statgraphics and the minimum time required to soak paddy to reach saturation of 30% moisture (wet basis) was determined using the predicted values from the graphs.

The statistical analysis at 5% level was performed to determine whether there is a significant effect of period of storage on duration of soaking during parboiling of paddy. Duncan's New Multiple Range Test was performed to determine significant differences among storage periods. Regression procedure of SAS was used to fit the experimental data to a suitable mathematical model.

The hydration curves for both varieties were similar. Initially the rate of hydration was faster till the moisture reached about 28 to 29%. Beyond that point, absorption of water gradually decreased and tended to zero when grains reached an equilibrium moisture content of 30%. It was also observed that the hydration rate was higher (gradient=3.1) for the short paddy variety than for the long paddy variety (gradient=2.9).

The duration of soaking varied significantly with the period of storage for the 2 paddy varieties tested upto a period of storage of 2 months. The required duration of soaking decreased from 70 to 62 h after 2 months in storage for the long grain variety and 24 to 21 h for the short grain variety.

A quadratic model was proposed to correlate the period of storage with duration of soaking and are given below by equations (1) and (2) for BG 300 and BG 450 respectively.

$$Y = 69.82 - 1.657X + 0.106x^2$$

$$Y = 24.01 - 1.084x + 0.1075x^2$$

(X= storage time in weeks, Y= soaking duration in hours)

The nature of hydration curves are the same for the 2 paddy varieties BG 300 and BG 450 at duration of storage upto 2 months. With the storage of paddy there is a significant change in the duration of soaking required for parboiling of paddy. This duration of soaking can be determined using the estimated parameters of the quadratic model developed for fresh paddy upto a storage period of 2 months.