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Development of a rice bread formula by pre-gelatinization, post gelatinization and forced gelatinization techniques

S.B Navaratne
Harischandra Mills Ltd, Matara.

Pre gelatinization, post gelatinization and forced gelatinization techniques were adapted in order to improve physical properties of rice flour with a view to incorporating over 60 % of rice flour in manufacturing of rice bread. Therefore, a study was carried out with respect to two factor factorial design with three variables at two levels such as moisture content in rice grain (12 % and 16 %), forced gelatinization (with and without) and method of soaking (cold soaking and hot soaking). Twenty kilos of white raw rice (BG352) was taken and divided into two portions and moisture content of each was adjusted to 12 % and 16 % respectively. The portion at 12% moisture content was divided into two and one portion was subjected to heat treatment at 95^0C for 3 minutes. The rest was kept untreated. These two portions were divided into two and one portion of each was subjected to a cold soaking process for 12 hours. The other two portions were hot soaked at 700C for 3 hours. Thereafter, these 4 portions were shade dried to get a moisture content 22–24% and ground using a pin mill in order to get particle size 150 µ (micron). A similar procedure was adopted for rice at 16% moisture content.

Rice flour obtained from eight treatment combinations were mixed with 1% yeast, 1% sugar and 58 % distilled water and subjected to the leavening index test “increment volume divided by initial volume” in order to determine which treatment/s are capable of accomplishing the desirable leavening index two. Rice flour obtained from the best treatment combination in terms of leavening index was mixed with 50%, 40% and 30 % wheat flour to prepare three flour combinations. These flour combinations were incorporated with 1% yeast, 1 % sugar and 58% distilled water and subjected to a commercial scale bread manufacturing process and the prepared bread were compared in terms of pH value, moisture content and bulk density. The organoleptic properties of the bread prepared with the best flour combination were compared with the same properties of wheat bread and results were analyzed with respect to Duo trio statistical test method.

Results revealed that the best treatment combination in terms of leavening index was rice at 16 % moisture subjected to heat treatment at 95^oC for 3 minutes with cold soaking process, because this treatment was capable of accomplishing the optimum leavening index of 2.0. The best rice flour wheat flour ratio was 60:40 because, organoleptic properties of this treatment were almost in par with the same properties of wheat bread.

Keywords: Pre gelatinization, Force gelatinization, Post gelatinization, 60% Rice flour incorporated bread, Two factor factorial design, Leavening index