

Production of Malted Rice-Wheat Bread With Good Physical and Sensory Quality

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The feasibility of partially replacing wheat flour with malted rice flour in bread making was evaluated in several formulations aiming to find a flour mixture for the production of malted rice-wheat bread with better nutritional quality and consumer acceptance. The resulting breads were evaluated taking into account the physical parameters (specific volume and moisture content) and sensorial parameters (flavour, mouth satisfaction, crumb colour, crumb texture, crust colour and crust texture). From the preliminary studies it was found that it is better to use the rice flour obtained from 4 days of germination. The wheat flour was substituted with the malted rice flour at the levels of 10, 20, 30, 40 and 50% to prepare breads. Specific volume was decreased significantly ($p < 0.05$) from 4.7 to 3.0 cm³/g with increasing level of malted rice flour. Sensory evaluation showed significant differences ($p < 0.05$) with the wheat bread. Among the preparations with malt, 30% substitution level was found to be the best. This was selected and the effect of germination on the quality of bread was evaluated. Specific volume was increased significantly ($p < 0.05$) from 2.29 to 3.81 cm³/g as the germination period increases. Sensory evaluation showed no significant difference ($p > 0.05$) between the breads prepared from the rice flour germinated for different periods. Therefore rice flour malted for 4 days was used at 30% substitution level for further studies. Then effect of different amounts of margarine on the quality of bread was evaluated. Specific volume increased significantly ($p < 0.05$) from 3.81 to 3.86 cm³/g when the amount of margarine was increased from 1 to 2g per 100g of flour. After this level specific volume was decreased as the level of margarine is increased. There were no significant differences ($p > 0.05$) among treatments for sensory parameters except crumb texture. Effect of addition of ascorbic acid on the quality of bread was evaluated and no significant difference ($p > 0.05$) among treatments were observed. Then effect of baking powder on the quality of bread was evaluated and specific volume was decreased significantly ($p < 0.05$) from 3.91 to 3.31 cm³/g with increasing level of baking powder. Flavour and crumb colour of breads of different treatments did not differ significantly ($p > 0.05$) while mouth satisfaction, crumb texture, crust colour and crust texture showed significant differences ($p < 0.05$). Higher degree of mouth satisfaction was obtained for bread containing 2g of baking powder per 100g of flour. Then experiment was proceeded by using different amounts of yeast. Specific volume increased significantly ($p < 0.05$) from 4.02 to 4.52 cm³/g when the level of yeast is increased from 1 to 2g per 100g of flour. Mouth satisfaction showed significant differences ($p < 0.05$) among treatments and higher degree of mouth satisfaction was obtained with 2g of yeast per 100g of flour. When different ratios of yeast and baking powder were evaluated, specific volumes differed significantly ($p < 0.05$) between them for all ratios except the ratio of 2:0 and 1:1. Higher specific volume and higher degree of mouth satisfaction were obtained for the ratio of 2:1 than others. Then the effect of concentration of bread improver on the quality of bread was evaluated. Specific volume increased from 5.0 to 5.5 cm³/g as the amount of bread improver was increased. Based on the sensory evaluation, 4g of bread improver per 100g of

composite flour was selected. When different amounts of milk powder was added, specific volume and degree of mouth satisfaction were decreased significantly ($p < 0.05$). With optimized amounts of all the above ingredients, effect of germination time on the quality of bread was evaluated again. Specific volume was increased from 4.2 to 5.4 cm³/g as the germination period increases with no significant difference ($p > 0.05$) between 3 and 4 days of germination. Higher degree of mouth satisfaction was obtained for bread containing rice flour malted for 3 and 4 days. Finally flour obtained by malting of rice for 3 days was taken at different concentrations. Specific volume decreased significantly ($p < 0.05$) from 5.4 to 4.3 cm³/g with increasing level of malted rice flour substitution (30-50%). Higher degree of mouth satisfaction and good crumb and crust colour were obtained for 30 and 35% substitution levels. Therefore rice flour malted for 3 days at 35% substitution level was selected as best.