

Bread-Making Properties of Rice Flour Dough Using Fatty Acid Salt

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Abstract : Introduction: Rice consumption in Japan has decreased, and Japanese government has recommended use of rice flour in order to expand the consumption of rice. There are two major protein components present in flour, called gliadin and glutenin. Gluten forms when water is added to flour and is mixed. As mixing continues, glutenin interacts with gliadin to form viscoelastic matrix of gluten. Rice flour bread does not expand as much as wheat flour bread. Because rice flour is not included gluten, it cannot construct gluten network in the dough. In recent years, some food additives have been used for dough-improving agent in bread making, especially surfactants has effect in order to improve dough extensibility. Therefore, we focused to fatty acid salt which is one of anionic surfactants. Fatty acid salt is a salt consist of fatty acid and alkali, it is main components of soap. According to JECFA(FAO/WHO Joint Expert Committee on Food Additives), salts of Myristic(C14), Palmitic(C16) and Stearic(C18) could be used as food additive. They have been evaluated ADI was not specified. In this study, we investigated to improving bread-making properties of rice flour dough adding fatty acid salt. Materials and methods: The sample of fatty acid salt is myristic (C14) dissolved in KOH solution to a concentration of 350 mM and pH 10.5. Rice dough was consisted of 100 g of flour using rice flour and wheat gluten, 5 g of sugar, 1.7 g of salt, 1.7g of dry yeast, 80 mL of water and fatty acid salt. Mixing was performed for 500 times by using hand. The concentration of C14K in the dough was 10 % relative to flour weight. Amount of gluten in the dough was 20 %, 30 % relative to flour weight. Dough expansion ability test was performed to measure physical property of bread dough according to the methods of Baker's Yeast by Japan Yeast Industry Association. In this test, 150 g of dough was filled from bottom of the cylinder and fermented at 30 °C 85 % humidity for 120 min on an incubator. The height of the expansion in the dough was measured and determined its expansion ability. Results and Conclusion: Expansion ability of rice dough with gluten content of 20 %, 30% showed 316 mL, 341 mL for 120 min. When C14K adding to the rice dough, dough expansion abilities were 314 mL, 368 mL for 120 min, there was no significant difference. Conventionally it has been known that the rice flour dough contain gluten of 20 %. The considerable improvement of dough expansion ability was achieved when added C14K to wheat flour. The experimental result shows that c14k adding to the rice dough with gluten content more than 20 % was not improving bread-making properties. In conclusion, rice bread made with gluten content more than 20 % without C14K has been suggested to contribute to the formation of the sufficient gluten network.

Keywords : expansion ability, fatty acid salt, gluten, rice flour dough

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