

Different Hydrothermal Treatments in Paddy Parboiling Process Enhance the Formation of Resistance Starch during Milling

M. Prabhakaran^{1*} and D. Hammahaka²

¹Department of Agricultural Engineering, Faculty of Agriculture, University of Jaffna, Sri Lanka

²Department of Food and Life Sciences, Faculty of Agriculture, Kagoshima University, Japan

*aenpraba@gmail.com

Parboiled rice exhibits several advantages over raw rice, such as strengthening kernel integrity by forming resistant starch, increased milling recovery and preventing the loss of nutrients during cooking and improve the Glycemic Index in digestibility. Recommended paddy varieties tested with red pericarp (At 362), red pericarp (Bg 366) and one commercially available red pericarp (Adakari). The main objective of this study is to investigate the effect of soaking duration and steaming method on milling yield and resistant starch formation during cooking of parboiled rice. Soaking was done in cold water (30 °C) for different time duration (a day, 2 days, 3 days, 4 days, and 5 days) with a volume ratio of 1:1.5 and the steaming (boiling) was practiced for 20 minutes' duration as Pressurized Soak Steam as closed steam (PSS), Un-soaked Steam as semi open steam (USS), Soak Steam as open steam (SS), in an electric steam rice cooker with steamer. The parboiled paddy was dried under a conventional oven at 60 °C temperature for 3 hrs for safe milling. Head Rice Yield (HR), Broken rice yield, milling recovery, and texture hardness of parboiled rice were evaluated. Statistical analysis showed a significant interaction between soaking interval and steaming methods ($p < .005$). Cooking of parboiled rice was performed with water in a volume ratio of 1:1.2, duration of 20 minutes in an electric rice cooker and resistance starch (RS) formation during cooking was investigated by texture analyzer under Trigger Force of 0.05 N (auto). Results showed that the higher head rice yield was counted in the closed pressure steam (PSS) method with 2 days of cold soaking duration (48 hrs). Closed pressure steam (PSS) resulting formation of harder resistant starch parboiled rice during texture analyzing than other treatment methods investigated. Open and semi open parboiling treatments gave moderate head rice yield and hardness texture value. Closed pressure steaming parboiling (PSS) process was yield the high hardness texture value and improved yield product.

Keywords: Head rice yield, Hardness, Paddy soaking & steaming, Resistant starch