

Impact of Parboiling Techniques on Milling Yield of Selected Paddy Varieties in Sri Lanka

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Abstract: Parboiling improves the rice quality by enhancing its physiochemical properties. Milling of raw rice without parboiling increases grain breakage. Therefore, the present study aimed to identify the most effective parboiling process for two department-recommended paddy varieties, Bg 406 and Bw 312, to reduce such loss. Initially, the selected paddy varieties were soaked under two different conditions: cold water soaking at an ambient temperature of $27\pm 5^{\circ}\text{C}$ for three different durations such as 24 hours, 48 hours, and 72 hours and hot water soaking at three different temperatures of 40°C , 50°C and 60°C . The soaked paddy samples were then steamed using three methods: pressure-soaked steam parboiling (PSS), open-soaked steam parboiling (OSS), and un-soaked steam parboiling (USS). After the steaming process, the samples were dried at 60°C for 3 hours and followed by milling using an analytical grade de-husking machine. Subsequently, the brown rice was polished, and the bran was removed to a certain degree. Finally, the milling recovery, head rice yield (HRY) and broken rice percentage were measured. The results showed that hot water soaking at 60°C with PSS achieved the highest milling recovery rates of 80.16% for Bg 406 and 84.44% for Bw 312. Conversely, cold water soaking for 72 hours, followed by un-soaked steam parboiling (USS) resulted in the lowest milling recovery rates, with 45% for Bg 406 and 43.21% for Bw 312. Regarding HRY, hot water soaking at 60°C and steamed in PSS produced the highest HRY of 83.33% for Bg 406 and 79.81% for Bw 312. On the other hand, a poor HRY of 42% for Bg 406 and 41.34% for Bw 312 were observed in milling of paddy without parboiling. The study concludes that hot soaking at 60°C followed by pressure-soaked steaming, produces the highest milling recovery and head rice yield for both Bg 406 and Bw 312 rice varieties as rice becomes harder with the application of heat. Additionally, future research should assess the sensory qualities and cooking characteristics of parboiled rice to give processors and customers the required information on the optimal parboiling condition.

Keywords: Head rice yield, Hot water soaking, Physiochemical properties, Pressure-soaked steaming, Raw rice.