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Effect of dissolved calcium carbonate in soaking water on parboiled rice quality

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Parboiling of rice is an ancient traditional process in Asian countries. It reduces the level of grain breakage and increases head rice during yield milling. Broken kernels are a great monitory loss because they have a much lower market value than head rice. Generally, the parboiling process consists of three stages: Soaking the cleaned rough rice in water to saturate the grain with water, gelatinization of rice starch by adding heat to the moist kernels through steaming, and drying the product to obtain a moisture content that is suitable for milling or storage. Parboiling also improves the nutritive value and some sensory qualities of rice. The market demand for parboiled rice also depends on its other quality characteristics such as kernel whiteness and hardness (texture). Even though many factors contribute to improving the quality of parboiled rice, soaking water quality, soaking procedures and steaming procedures are the main factors that alter the qualities of parboiled rice, especially kernel whiteness, hardness, broken grain percentage and head rice yield. It can be observed that the quality of parboiled rice varies from place to place, in spite of the similarity between parboiling treatments such as soaking procedures and steaming procedures. However, the quality of ground water used for parboiling varies in different parts of the country. It was observed that chemicals such as $CaCO_3$, Cl^- ions; NO_3^- and Fluoride ions are dissolved in ground water particularly in the dry zone of Sri Lanka. $CaCO_3$ is the most commonly found chemical in ground water in the dry zone. $CaCO_3$ concentrations in ground water from the dry zone varied between 250 – 1800 mg/L. Hence, this study focused mainly on investigating how dissolved $CaCO_3$ in soaking water affects the quality of parboiled rice. An experiment was conducted using BG-358 rice variety. The results revealed that the $CaCO_3$ concentration in soaking water significantly changes the whiteness of the rice kernel of parboiled rice. The $CaCO_3$ concentration in the soaking water did not significantly affect other quality parameters of rice such as kernel hardness, broken grain percentage and head rice yield percentage. However, increase of $CaCO_3$ concentration in soaking water significant improved (increased) kernel whiteness, but the relationship was not linear.

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