

Effect of Roasting Treatment on Milling Quality, Physicochemical, and Bioactive Compounds of Dough Stage Rice Grains

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Abstract : Rice during grain development stage is a rich source of many bioactive compounds. Dough stage rice contains high amounts of photochemical and can be used for rice milling industries. However, rice grain at dough stage had low milling quality due to high moisture content. Thermal processing can be applied to rice grain for improving milled rice yield. This experiment was conducted to study the chemical and physic properties of dough stage rice grain after roasting treatment. Rice were roasted with two different methods including traditional pan roasting at 140 °C for 60 minutes and using the electrical roasting machine at 140 °C for 30, 40, and 50 minutes. The chemical, physical properties, and bioactive compounds of brown rice and milled rice were evaluated. The result of this experiment showed that moisture content of brown and milled rice was less than 10 % and amylose contents were in the range of 26-28 %. Rice grains roasting for 30 min using electrical roasting machine had high head rice yield and length and breadth of grain after milling were close to traditional pan roasting ($p > 0.05$). The lightness (L^*) of rice did not affect by roasting treatment ($p > 0.05$) and the a^* indicated the yellowness of milled rice was lower than brown rice. The bioactive compounds of brown and milled rice significantly decreased with increasing of drying time. Brown rice roasted for 30 minutes had the highest of total phenolic content, antioxidant activity, α -tocopherol, and γ -oryzanol content. Volume expansion and elongation of cooked rice decreased as roasting time increased and quality of cooked rice roasted for 30 min was comparable to traditional pan roasting. Hardness of cooked rice as measured by texture analyzer increased with increasing roasting time. The results indicated that rice grains at dough stage, containing a high amount of bioactive compounds, have a great potential for rice milling industries and the electrical roasting machine can be used as an alternative to pan roasting which decreases processing time and labor costs.

Keywords : bioactive compounds, cooked rice, dough stage rice grain, grain development, roasting

Conference Title : ICASFE 2018 : International Conference on Agricultural Science and Food Engineering

Conference Location : Tokyo, Japan

Conference Dates : May 28-29, 2018