

Title Performance Analysis of an Impeller Husker considering the Physical and Mechanical Properties of Paddy Rice

Author D. Shitanda, Y. Nishiyama and S. Koide

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Abstract

Some physical and mechanical properties of three varieties of rice namely; Akitakomachi (short grain), Delta and L201 (long grain) were determined and used in the performance analysis of an impeller husker. Grain motion on the blade was observed at the rated impeller speed of 2362 min^{-1} using a high-speed camera. The grain exit velocity resulted in an impact force above the yield force of the husk but below the yield force of the grain. However, the maximum friction force experienced on the blade was far below the yield shear force of the husk for all three varieties of rice. Husking tests were performed at different impeller speeds using a hard urethane liner, a soft polystyrene liner and without a liner. Type of liner significantly affected the husking performance. Short-grain rice had high husking energy capacity and cracked grain ratio, but a low broken grain ratio compared with long-grain rice. Performance curves for the three varieties of rice were well expressed by the Weibull's distribution function.