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Development of improved compact corn mill

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This research has successfully designed and developed an innovative compact corn mill with milling capacity of 250 kg/h. The research aimed to improve the current design of village-type corn mill that satisfies the minimum product recovery of 64% and degerming efficiency of 80% as set by the Philippine Agricultural Engineering Standard (PAES) for corn mill. Majority if not all of the available village-type corn mill in the Philippines have not satisfied both these two basic quality standards of PAES and as such, produces high postharvest losses. Based on the country's supply and utilization account, the average consumption of corn as food was estimated at 1.675 million metric tons in 2013 or roughly 14 million Filipinos have utilized corn grits as their staple food. Performance tests revealed that the newly developed technology has an output capacity of 160.8 kg/h with product recovery of 64.2%. The degerming efficiency of the corn mill is high at 91.45%. The total operating cost per kg output is estimated at Php1.18/kg (US$0.026/kg). The power consumption of the corn mill at full operation is 6.26KW/h. This research has invented a degermer using a hexagonal screen huller with counter flow screen to separate the endosperm from the germ, tip cap, and hull of the corn grain. Such design is totally different from the traditional corn mill in the Philippines that uses emery stone or steel huller as its degerming mechanism. It also innovate the grading assembly of corn mill by introducing a 3-layer rotary slotted sheet cylinder, instead of the commonly used oscillating sieve grader, to sort corn grits No. 10 & 12; No. 14, 16, 18; corn flour; and, grits greater than No. 10. The improved hammer mill introduces a 36 spokes that is made of flat steel bars sharpen at one side. A pneumatic conveyor is provided to separately convey corn grain and grits to the hopper, thus, requiring only one operator of the corn mill.

Biography

Michael A Gragasin is a Supervising Science Research Specialist at the Philippine Center for Postharvest Development and Mechanization where he led the implementation of projects geared towards achieving food sufficiency in the Philippines, i.e. development of a village-type corn mill, cassava belt-dryer, compact rice mill with impeller huller, etc. He spearheaded the formulation of the National Mechanization Roadmap for Rice, Corn, and Cassava. In 2013, he was awarded the Most Outstanding Agricultural Engineer in the Field of Postharvest Technology and Food Engineering by the Philippine Society of Agricultural Engineers. He also became a Post Doctorate fellow in Chiba University under the Japanese Government JASSO Program in 2010.

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