

Design and development of potato grading machine

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Abstract

Potato (*Solanum tuberosum* L.) is one of the important vegetable commodities in Indonesia. Productivity of potato is increasing year by year. However, potato farming still faces obstacles such as cultivar, seed, farming method, pest and disease control techniques, and also harvest and postharvest handlings. Experimental results indicated that 70% of total damage was caused by harvest, 30% during transportation and storage; more than 30% for all products may be damaged during harvesting. After harvest, potato requires to be classified for further handling purposes, such as for storage or marketing. However, the harvesting season is generally in the same period as land preparation and other activities resulting in lack of labors for grading. Moreover, potato is perishable and easy to decay if it is not well and fast handled. Thus, suitable machinery for potato grading is necessary. A prototype of the potato grader machine was designed to classify potatoes into four classes according to SNI 01-3175-1992 based on the weight that was converted into potato diameter, and then it was used for determining the roller distance of the grader machine. Performance test indicated that the machine capacity was 1800 kg/hour with less than 8% of grading error and less than 1% of potato damage (bruise). Manual grading needs 25 persons/day/ha, Rp 27500,-/person/day, with average of potato yield of 15 tons/ha, manual grading cost was 46,-/kg, whereas by potato grader with capacity of 1800 kg/hour, grading cost was Rp 26,-/kg, it reduced grading cost down to 43% lower than manual grading cost.