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Research Paper :

Ergonomical study and performance evaluation of different types of coconut dehuskers

M.K. GHOSAL AND S.K. MOHANTY

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See end of the article for authors' affiliations

Correspondence to:

M.K. GHOSAL
Department of Farm Machinery and Power, College of Agricultural Engineering and Technology, Orissa University of Agriculture and Technology, BHUBANESWAR (ORISSA) INDIA
Email :mkghosal1 @rediffmail. com

ABSTRACT

The performance and ergonomical study of a power operated coconut dehusker and other manually operated coconut dehuskers was carried out at College of Agricultural Engineering and Technology, OUAT, Bhubaneswar for its suitability among the farmers on the basis of dehusking efficiency and ergonomical considerations like heart rate, oxygen consumption rate etc. during operation. Dehusking of coconut is a very tedious job and many of the labourers show reluctance for this work as it causes injury to them by following traditional method. Development of a suitable coconut dehusker is, therefore, very much important in the state Odisha where there is a great potential for coconut cultivation and marketing of commercial products like copra and coir from coconut husk. Hence, the aim of the study was to develop a power operated coconut dehusker which would become safe and easy to operate, simple to fabricate, commercially feasible and economically viable compared to other manually operated coconut dehuskers. It was observed that the power operated dehusker worked well in terms of number of nuts dehusked per hour, dehusking efficiency, cost of use and with ergonomical considerations.

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Dehusking is the process of removing the outer covering called husk from the coconut to get two important commercial products such as copra or dried kernel and fibre or coir. Copra yields oil and oil cake where as fibre produces carpets/mattresses and coir pith briquettes. Coconut shell obtained after dehusking is also a very useful industrial product to get coconut shell charcoal, activated carbon and coconut shell powder which have a good market value (Jacob and Bastian 1998). Dehusking is, therefore, an important operation for coconut processing industry. The coconuts reaching markets are either partially husked or dehusked as per demand and requirement in distant markets. Coconuts meant for copra making are fully husked. Coconuts meant for distant market places are left with some fibres covering the eyes or on all around the nuts. Such partially husked coconut minimizes the breakage during transportation and attains longer keeping quality. It is also observed that even when coconuts are fully husked, a tuff of husk is left at the end of the nut over the eyes as it is considered to be auspicious and believed to preserve the nuts from spoilage. It has been reported that about 20 per cent of the total coconut produced in Odisha are consumed as tender nuts and 5 per cent are retained by the farmers for household and seed nut purposes (Anonymous, 2007). About 42 per cent of the coconut produced is consumed in the state itself and 33 per cent are exported to the other states like Bihar and Madhya Pradesh where cultivation of coconut is not favourable. Hence, dehusking of coconut needs to be done not only to increase the bulk density for easy transportation but also to process quickly for industrial purposes. Mechanization of dehusking operation is needed in the state like Odisha as coconut is one of the most important plantation crops of the state. The area under coconut production in the State is about 43.3 thousand hectares producing 296.05 million nuts. The present productivity of the crop has been reported to be 8741 nuts per hectare as against the productivity of 6285 nuts per hectare in India (Anonymous 2004).

The most frequently used dehusking method in the state is by the use of pointed metal spike, secured in the ground in a slightly slanting position, with the pointed ends upwards (Mishra and Sutar 2007). The nuts are brought down with force on the spike, followed by twisting the nut sideward against the spike, causing loosening of the husk. Care is taken for the desired entry of the sharp end