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Research Paper :

Performance evaluation of square beater bar type threshing drum on groundnut threshing

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ABSTRACT

A square beater bar drum type groundnut thresher was fabricated which mainly consists of a feed hopper, threshing unit, cleaning unit and power transmission unit. During the trials, the effect of 50 mm concave clearance for developed square beater threshing drum and existing flat plate beater threshing drums on performance was evaluated for three plant moisture contents *viz*, 21.30, 18.40 and 16.10% (w.b.) for SB XI variety of groundnut. The average feed rate of thresher was 660 kg/hr. Average sieve loss of 7.4% was observed at 16.10% (w.b.) plant moisture content. The average highest value of blown pod percentage of 4.89 was observed at 16.10% (w.b.) plant moisture content. The average pod damage by flat plate beater threshing drum was 3.12% which was 36% more than the average pod breakage of 1.97% by developed square beater bar threshing drum. The average highest threshing efficiency of 97.23%, in case of developed square beater bar thresher was observed to be 3% more than the existing flat plate beater threshing drum for plant moisture content of 16.10% (w.b.). Average power consumption of 1.54 Kw-hr was observed for developed square beater bar thresher. Cost of groundnut threshing with developed power operated groundnut thresher was Rs. 22.71 /quintal which saves 86.40% cost and 99.3% time as compared to the manual striping.

Key words : Performance evaluation, Evaluation, Square beater bar, Threshing drum, Groundnut threshing

Groundnut (*Arachis hypogaea* Linn.) also known as peanut, is commonly called the poor man's nut. The plant is native to South America. In India, groundnut was introduced in 16th century. It is the worlds 4th most important source of edible oil (50%) and 3rd important source of vegetable protein (25%). (Handbook of Agriculture (2001) Gujarat, Tamil Nadu, Andhra Pradesh, Karnataka and Maharashtra accounts for about 86% of the total area (23.44 million ha) under cultivation of oil seeds, with share, approximately 25% in the India's total oil seed production (25.14 million tons) (www.icrisat.org). In statewise scenario, Gujarat with productivity 1.09 million tons, ranks Ist, while Maharashtra occupies Vth place in productivity (0.44 million ton) of groundnut. Maharashtra occupies IInd place followed by Tamil Nadu in terms of average yield, their, respectively average yields are 1041 kg/ha and 1784 kg/ha. Maharashtra's area under cultivation of this crops is observed to be nearly 0.42 million ha which is 7.06 per cent of the total area (5.95 m ha) of the India under groundnut cultivation.

The groundnut crop is grown in two seasons, *viz.*, *kharif* (rainy season) and summer (post rainy season). There are three types of varieties in groundnut, bunch types (with erect plant habit), spreading and semi spreading types. TG-1, TG-17, TGS-24, TKG-19, TG26, SB XI are some recommended varieties of groundnut for cultivation in Maharashtra. These varieties are seen to be cultivated largely in Marathwada region of Maharashtra. Manually pod separation is labour consuming operation, and drudgery prone activity which involves separating the pods from the plants by hand (manually). A fully mature pod is difficult to split easily with fingered press.

In some regions of the country after harvesting of crop, a heap is made which is left 2-3 days for curing, later crop is collected at one place and pods are detached either by hand or using groundnut striper/plucker for separating the pods from the plants (Abedeal Moneium *et al.*, 1992). Considering area, production and average yield of groundnut, an attempt was taken for minimization of the labour cost in post harvesting of groundnut (Wasley *et al.*, 2004).

METHODOLOGY

After studying the previous research studies of crop parameters and machine parameters required for groundnut threshing, a groundnut thresher (Fig. 1 and 2) was fabricated at the Department of Farm Machinery and Power, MAU, Parbhani, for required capacity. Testing was carried out for groundnut variety SB XI (bunch type