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Performance evaluation of hand operated linseed thresher

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Abstract
Linseed (*Linum usitatissimum* L) considered the most important oil and fibber crop in the world. The manufacturing of linseed thresher was fabricated through local materials for deseeding of linseed crop. The two rollers for driving through the handle. Fabricate of manually hand operated linseed thresher is given all dimension. It is overall dimension of frame (L×W×H) cm = 50×30×100, diameter of roller (cm) = 13, length of roller (cm) = 30. The result shows that the physical properties of linseed crop was determined as average length of linseed capsule 79.4 mm, average width of linseed capsule 70.8 mm, average length of linseed 4.54 mm, & average width of linseed 2.27 mm. the result show that the machine capacity, threshing efficiency & grain damage of this thresher. The machine capacity was found maximum as 7.02 kg/h. The threshing efficiency was found maximum as 98.6%. The grain damage was found minimum as 0.9%.

Keywords: Linseed crop, hand operated linseed thresher, machine capacity, threshing efficiency and grain damage

Introduction
Linseed (*Linum usitatissimum* L.) is considered as one of the most important economic yarn crops. The major linseed production countries are Kazakhstan, Russia, Canada, China, India, and USA. The area harvested under the crop India is estimate to be 0.30 million hectare. India's production quantity of linseed was recorded as 0.184 million tons during 2017. India is 5th rank among the linseed producing countries during 2017. In India, the major linseed growing states are Madhya Pradesh, Maharashtra, Uttar Pradesh, Bihar, Rajasthan, Orissa, Karnataka, West Bengal, Assam, Andhra Pradesh, Himachal Pradesh, Jammu & Kashmir, Punjab and Nagaland. Madhya Pradesh and Uttar Pradesh together contribute to the national linseed production to the extent of about 70 percent (www.factfish linseed production). Agriculture has an important place in Indian economy and the main work force in it is human power. Table 1.1 gives the population dynamics of Indian agricultural worker and it was estimated that by 2050, the population of agricultural worker will be about 202 million of which 121 will be the female workers and 81 male workers (*source:* vision 2050 document of CIAE, Bhopal). Women in India play a significant and crucial role in agriculture development and allied field. Women play a vital role in agriculture development resource. It was observed that more than 75% woman are involved in activities like winnowing, weeding, grading, cleaning of field farm operation. Szarszunow *et al.*, (1998) concluded that ineffective threshing and threshing damage are the main causes of flax seed losses. Experiments were carried out to reduce the losses and damage of flax seeds by improving the precision of their separation during threshing. Klenin *et al*., (1985) conducted that threshing performance are largely affected with design factors such as concave length, diameter, cylinder speed, feed rate and moisture content of harvesting crops. Many practices have been done to overcome these problems.
Keeping in view the above points, the project work was undertaken with the following objectives.
1. To fabricate the manually operated linseed thresher.
2. To determine the performance of manually operated linseed thresher.

2. Materials and Methods
Performance evaluation of hand operated linseed thresher was conducted with male agricultural workers of the farm of SHUATS, Prayagraj. Hand operated linseed thresher is fabricate in the farm machinery workshop. The detail specification of the thresher is given table 2.1.

Table 2.1: Specification of linseed thresher

S. No.	Particulars	Specifications
1	Overall dimensions L×W×H (mm)	500×300×1000
2	Power transmission unit	Hand operated, Chain
I	Drive type	Chain and sprocket
A	No. of Chain & No. of sprocket	1 & 3
B	Sprocket dia. (mm)	70
C	No. of teeth on sprocket	18
II	Blower dia. (mm)	280
3	Crop feeding device	Chute type
I	Method of feeding	Manual, Hold on method
II	Feeding height above ground, (mm)	920
III	Size of opening, (mm)	460 × 390
4	Threshing cylinder	Nylon roller
I	Size of nylon roller, (mm)	300×130
5	Cancave type	Open type cancave
I	Size of open cancave (mm)	380 ×208
6	Blower	Blade type

Experiment research plan

- Independent variables - sample was selected as 1 kg, 3 kg & 5 kg
- Dependent variables - variables were determined as:

1. Machine capacity

$$M.C\ (kg/hr) = \frac{wt.of\ thresh\ grain(\ kg) \times 60}{time\ required\ to\ thresh\ the\ grain(\square r.)} \quad 2.1$$

2. Threshing efficiency

$$TE\ (\%) = \frac{wt.of\ thresh\ \ grain(kg) \times 100}{total\ weight\ of\ thresh\ \&\ unthreshed\ grain\ (kg)} \quad 2.2$$

3. Grain damage

$$G\,D\ (\%) = \frac{wt.of\ damage\ grain\ \times 100}{wt.of\ sample\ (g.)} \quad 2.3$$

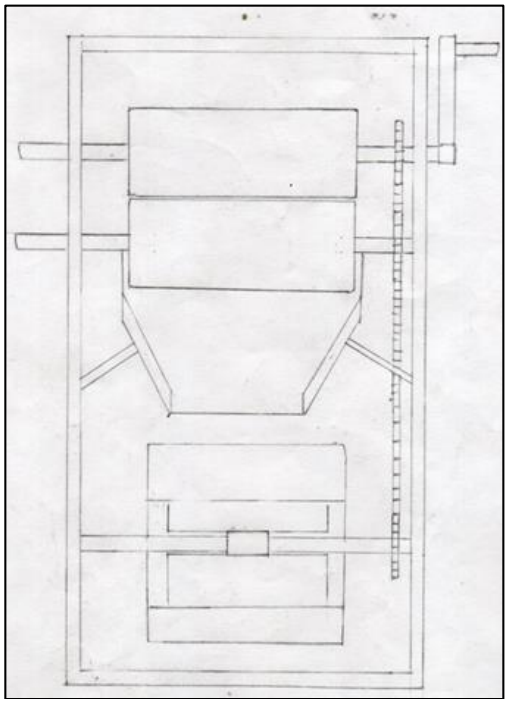

Fig 1: Front view of linseed thresher

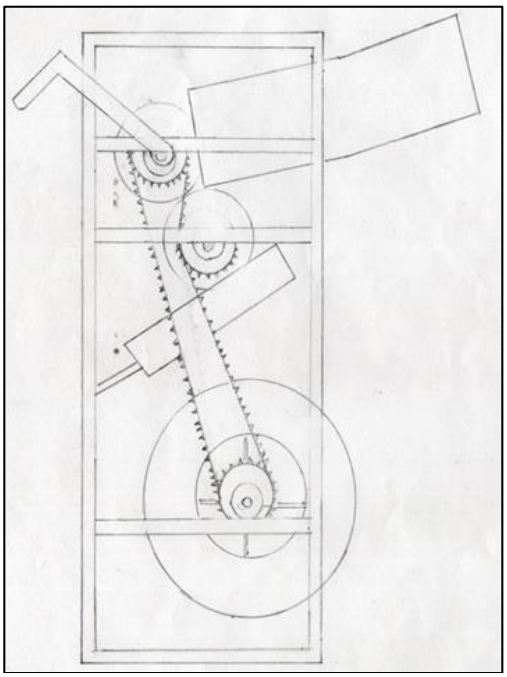

Fig 2: Side view of linseed thresher

Fig 3: Front view of linseed thresher

Fig 4: Side view of linseed thresher

3. Results and Discussions

3.1 Performance of Linseed Thresher

Manually operated linseed thresher performance is shown in the table. The threshing of the linseed crop in thresher. It takes the total wt. of linseed crop 1, 3 & 5 kg. And sample in R1, R2 & R3.The performance of the linseed thresher in table 3.1 shown.

Table 3.1 Performance of linseed thresher

S. No.	Total wt. of linseed crop (kg)	Sample	Time duration (min.)	Ave. time duration (min.)	Wt. of grain (gram)	Ave. wt. of grain (gram)
1	1	R_1	2.12	2.28	267	267.33
		R_2	2.28		275	
		R_3	2.45		260	
2	3	R_1	5.13	5.03	531	545.3
		R_2	4.58		545	
		R_3	5.04		560	
3	5	R_1	7.45	7.44	823	834.66
		R_2	7.38		836	
		R_3	7.51		845	

3.2 Machine capacity of linseed thresher

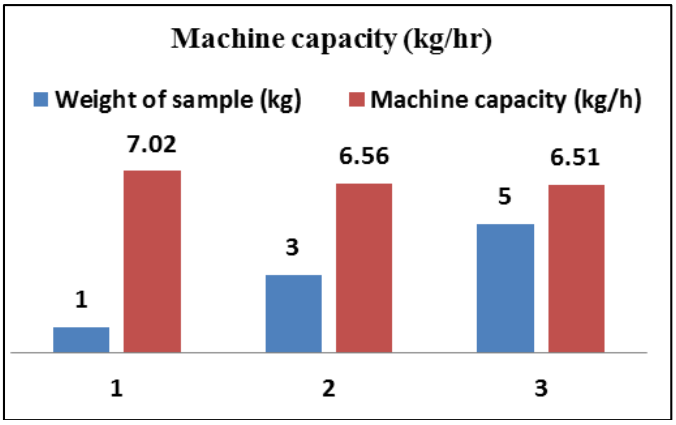

Fig 5: Machine capacity of linseed thresher

The machine capacity show that the capacity is decreases when the weight of sample is increases. We found the maximum capacity is 7.02 kg/h at 1.0 kg of sample. We found the minimum capacity is 6.52 kg/h at 5.0 kg of sample.

3.3 Threshing efficiency of linseed thresher

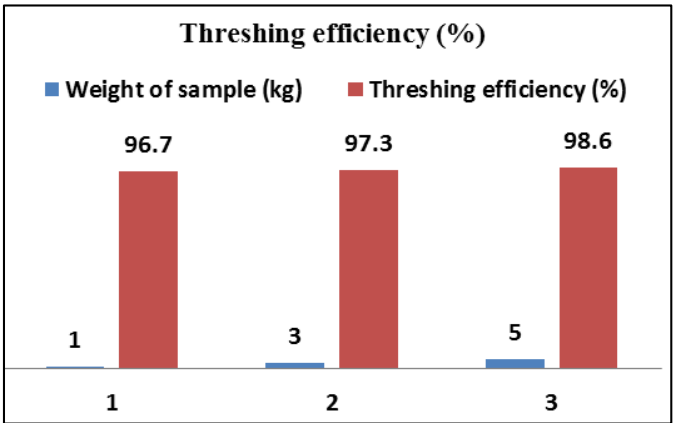

Fig 6: Threshing efficiency of linseed thresher

The threshing efficiency show that the efficiency is increases when the weight of sample is increases. We found the threshing efficiency is maximum at 98.6% at 5 kg of sample. We found minimum threshing efficiency at 96.7% at 1 kg of sample.

3.4 Grain damage of linseed thresher

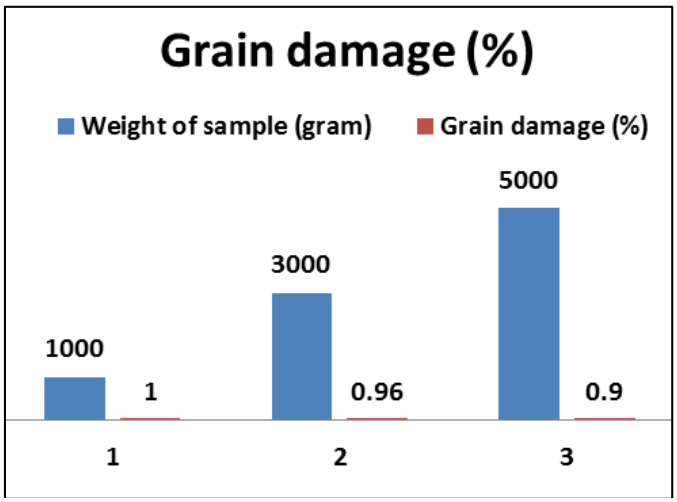

Fig 7: Grain damage of linseed thresher

The chart of grain damage is show that the damage of grain is minimum 0.90% at 5 kg of sample and the maximum damage is 1% at 1 kg of sample. The grain damage is decreases when the weight of sample increases.

4. Conclusions

From the study it was concluded linseed thresher take almost half of time and increase working efficiency and reduce seed loss. Machine capacity of thresher was found as maximum of 7.02 kg/h. The threshing efficiency of thresher was found as maximum of 98.6%. The grain damage of thresher was found as minimum of 0.90%. The result is show that the machine capacity decreases when the weight of sample was increases.

5. References

1. Asli-Ardeh EA, Abbaspour-Gilandeh Y, Abbasi S. Study of performance parameters of threshing unit in a single plant thresher. American Journal of Agricultural and Biological Sciences. 2009; 4(2):92-96.
2. Alizadeh R, Bagheri I. Field performance evaluation of different rice threshing methods, International Journal of Natural and Engineering Sciences. 2009; 3(3):155-159.
3. Harrington. Thresher principles confined with a multi-crop thresher. Journal of Agricultural Engineering. 1970; (2):49-61.
4. Ramteke, Sirohi *et al*. Studies on design parameter for linseed crop thresher. Journal of Agricultural Engineering. 2003; 40:2.
5. Singh. Design and development of motorised wire loop paddy thresher for hilly region, journal of Agricultural Engineering. 2003; 40(4):71-74.
6. Sinha JP, Dhaliwal IS, Sinha SN. Effect of threshing parameters on threshing quality for seed crop of chickpea, Journal of Agricultural Engineering. 2009; 46(4):1-10.