Research Paper
Impact Factor: 3.567
Peer Reviewed Journal

IJMDRR
E- ISSN –2395-1885
ISSN -2395-1877

EFFECT OF HARVESTING TIME AND POST HARVEST OPERATION ON QUALITY AND QUANTITY IN SESAME

Kalpna Tirkey* **Manisha Shyam***
**Department of Agronomy, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Madhya Pradesh.*

Abstract
The results indicated that maximum grain (502 kg ha-^{1}), oil content (48.25%) and oil yield (242.18 kg ha-^{1}) was recorded under treatment crop harvesting at optimum time (H_1) followed by crop harvesting 7 days before optimum time (H_2) had seed yield (475 kg ha-^{1}), oil content (47.99%) and oil yield (227.59 kg ha-^{1}) respectively. While, straw yield (2171 kg ha-^{1}) was maximum recorded under treatment harvesting time at 7 days before optimum time (H_2) at par with treatment crop harvesting at optimum time (H_1) and crop harvesting 7 days after optimum time (H_3). However the treatment double threshing (7 and 15 days after harvesting) (T_1) had obtained higher seed yield (500 kg ha-^{1}), straw yield (2136 kg ha-^{1}), oil content (47.99%) and oil yield (240.39 ha-^{1}) respectively followed by treatment of single threshing method (T_2), were seed yield, straw yield, oil content and oil yield was similarly differ by both drying methods D_1 and D_2. However the treatment of crop harvesting 7 days after optimum time (H_3) had reduced seed yield, oil content % and oil yield than rest of other treatments. Under all harvesting, threshing and drying methods B: C ratio were found low due to abnormal weather conditions in crop growth and maturity period. On the basis of above findings, it may be concluded that treatment (H_2) crop harvesting 7 days before OT , treatment (D_2) drying the produce in vertical bundles and treatment (T_2) threshing twice followed by treatment (H_1), (D_2) and (T_1) respectively are most effective and remunerative quantity and quality control methods for controlling the losses of seed yield of sesame.

Key Words: Sesame, Oil Content (%), Time of Harvesting, Methods of Drying, Harvested Material and Threshing Method.

Introduction

Sesame seed is one of the oldest condiments the human race has ever known. Sesame plant had been grown since age in various tropical areas of the world from prehistoric times and had been used as flavoring agent. Initially sesame seeds were known only for the use of condiments and for oil and wine. Its other uses as medicines or perfumes were discovered much later with time. Sesame contains 46-55% of high quality oil, 20-26% proteins, 14-6% sugar, 6-8% fiber and 5-7% minerals. The seeds are consumed as such and are also ingredient of many edibles. In India sesame is grown intensively in the states of Gujarat, Rajasthan, Uttar Pradesh, Madhya Pradesh, Karnataka and Tamil Nadu. West Bengal has the distinction of having the maximum productivity upto 929 kg ha^{-1}. Sesame occupies an area of 1.81 million hectare in India, the maximum among sesame growing countries with an annual production of o.64 tones/annum [2008-09] In spite of several qualitative aspects of the crop it has not popularly grown by farmers. There is some research carried out on the agronomy of the crop but some of the important points need so be evaluated *viz.* time of harvesting, methods of drying the harvested material and the threshing method which are directly affecting the seed yield. The degree of seed production and seed characters can only be measured by the time of harvest. Untimely harvest of this crop may lead to poor quality of oil besides low production because seed quality is achieved towards the mass maturity as physiological maturity denoted at optimum harvesting time. Therefore, the present study was conducted to find out significant study and suitable technique for increase the production.

Materials and Methods

The experiment was conducted during Kharif season (June- December) of 2010-11. The mean annual rainfall of this region is 1284, mostly concentrated. 90% rainfall is received during June to sep. with occasional rains. The maximum and minimum temperature between 29.30C to 43.2 0C; and 15.30C to 25.20C, respectively. The relative humidity ranged from 41 to 93% in morning and 23 to 75 %in the evening hours. The mean sunshine hours varied between 16 hour per day during mid July to 8.7 hour per day during crop season. The soil of the experimental field was clay loam in texture, neutral in reaction (pH 7.20) and analyzed low in organic carbon (0.46%) as well as low in available N 204 kgha-1, medium available P 18.6 kgha-1 and high in available K 321.6 kg ha-1 contents with normal electrical conductivity. The soil moisture content at field capacity and permanent wilting point was 18.8 and 6.5%, respectively with bulk density 1.40Mg/m3 of 0-30 cm layer. The experiment was laid out in randomized block design with 12 treatments combinations were made with 3 factors viz. (A) Harvesting times (3) -(a) Harvesting at optimum time-(OT)- H1, (b) Harvesting at 7 days before OT H2, (c) Harvesting at 7 days after OTH (B). Drying methods (2)-(a) Drying directly on threshing floor in horizontal bundles- D1 , (b) Drying directly on threshing floor in vertical bundles- D2 , (C)Threshing methods (2)- (a)Single threshing at 15 days after harvesting- T1, (b) Double threshing at 7 and 15 days after harvesting-T2. The sesame variety Phule Til-1 was sown at 30 row spacing with length of rows 5.0 m with Seed rate 5 kg ha-1. The recommended dose of fertilizers (RDF) of 60 kg N + 40 kg P2O5 + 20 kg K2O ha-

1 was given in the form of Urea, Single Super Phosphate and Murate of Potash. The full dose of phosphorus and potash with half quantity of nitrogen were given at sowing time .Top dressing of remaining nitrogen was done after 30 DAS.

Results and Discussion

The crop was harvested at OT (Optimum Time), (7 days before optimum time) and it was compared with 7 days late or harvesting the crops at optimum time. There was a chance to produce under sized or immature seeds due to early harvesting of crop but early harvested crop produced normal seeds with maximum seed yield which gave an indication that sesame can be harvested safely at physiological maturity stage with regard to this character.

Effect on Seed and Straw Yield

Different timings of harvesting causes an adverse affect on the seed yield kg ha^{-1}.Seed yield significantly varied due to the effect of different harvest time as well as method of threshing. The crop harvested at Optimum time (H_1) had maximum seed yield (502 kg ha^{-1}), among the harvesting time. The crop harvested at 7 days after OT had the minimum seed yield, which was significant lower than H_1 and H_2. Seed losses due to shattering caused in lesser yields due to harvesting at 7 days later. Also different method of threshing affect the seed yield of sesame.The significant variation was observed among the treatment of the threshing method. Double threshing (7 and 15 days after harvesting) had obtain higher seed yield (500 kg ha^{-1}) than single threshing seed yield (456 kg ha^{-1}). While different drying method remains unaffected by vertical or horizontal drying of bundles to seed yield. A similar trend of result was observed in straw yield as in seed yield. A significant adverse affect on straw yield kg ha^{-1} was observed at different time of harvesting and threshing method. Straw yield was maximum in the harvesting time at 7 days before OT (H_2) which was 2171 kg ha^{-1}, which was maximum among all the treatment and minimum yield was produce by the treatment of harvesting at 7 days after OT. Straw yield had significant reduction in yield as the crop maturity period increased. Different method of threshing was also affected straw yield significantly.Here also double threshing had also obtained higher yield than single threshing method. Although the straw yield remain unaffected by the drying method.

Effect on Harvest Index, Oil Content (%) and Oil Yield (kg ha^{-1})

Harvest Index of different time of harvesting, method of drying and method of threshing did not affect significantly. Maximum and minimum harvest index value was recorded in the treatment of threshing method i.e. aximum value was obtain by double threshing method (7 and 15 DAH) and minimum value was obtain by single threshing. Both seed oil content (%) and oil yield kg ha^{-1} mean comparison indicate that differ significant difference were present in different time of harvesting, method of drying and method of threshing.Harvesting at OT had obtain maximum oil content and oil yield among all the treatment of harvesting time which recorded to be 48.25% and 242.18 kg ha^{-1}.While other two treatments were at par with crop harvesting at 7 days before OT and harvesting at 7 days after OT.

Effect on NMR and B:C Ratio

Data presented in Table.1, indicate that the maximum NMR of. 6143 Rsha-1 fetched from harvesting at 7 days after OT (H2) was followed by 4981 Rsha-1 from harvesting at 7days after OT (H1) and.4230 Rsha-1 from harvesting at 7 days after OT (H3). All the three values were at par among each other. Drying the produce in vertical bundles (D2) resulted in higher NMR of 5209 Rsha-1 than 5027 Rsha-1 D1 (drying in horizontal bundles). There was no significant difference between the two NMR values. Threshing twice T2 recorded the NMR of 5865 Rsha-1 against 7037 Rsha-1 from threshing once (T1). The two treatments did not show variation in NMR to the level of significance. Following the pattern of the NMR and B:C ratio as affected by different treatment were seen to be at par in all treatments. The maximum B:C ratio of 1.40 found from harvesting at 7 days before OT was next to 1.32 computed for harvesting at OT and 1.27 from harvesting 7days after OT. Drying in verticle bundles had the B:C ratio of 1.34 while drying in horizontal bundles had 1.32, obviously showing no variation to the level of significance. Double threshing resulted in the B:C ratio of 1.38 while single threshing in 1.28. The two values were at par to each other.

References

1. Bal,S. And Ojha.T.P. (1975). Determination of biological maturity and effect of harvesting and drying condition on milling quality of paddy. *Journal of Agricultural Engineering Research.,* 20: 258-561.
2. Bhattacharya.P., Samul.R.C, Dasgupta.S.K., Chandrasekar,R.T. and Laximnarayana, G., (1982). Effect of date of sowing and harvesting on characteristic and fatty acid composition of sunflower seed. *Journal of Food Science and Technology. India* **9** (6):246-248.

3. Abdel, Hamid, M.F., EL. Hady, S., Ibrahim, M.E. and Ibrahim, F. (2005). Effect of harvesting time on the production and chemical composition of tulsi leaves essential oil. *Annauls of Agricultural Science*, Cario, 50(1): 3-13.
4. Tickoo, Sanjay and Singh, H.B. (2005). Estimation of yield losses due to abiotic stress during post harvest processing of rapeseed mustard. Losses due to shattering and during threshing cleaning and transportation. *Farm Science Journal*, 14 (2):59-60.
5. Smarah, N.H, Mullen, R.E., Goggi, S. And Gaul, A. (2009).Effect of drying treatment on soybean seeds quality during maturation .*Seed Science Technology*, 37,469-473.
6. Shivankar, R.S., Zode, N.G., Shivankar, S.K., Patil, V.N. and Khatod, J.P. (2001). Effect of time of harvest on seed quality and seed yield in soybean. [*Glycine max* (L.) Merrill] cultivars. *Journal of Oilseeds Research*, 18 (2): 283-284.

Table 1: Effect of Harvesting Time and Post Harvest Operations on Oil Content (%), Oil Yield (Kg Ha^{-1}), Seed and Straw Yield (Kg Ha^{-1}), Harvest Index (%) and B:C Ratio

Treatments	Oil Content (%)	Oil Yield (kgha-1)	Seed Yield (kg ha-1)	Straw Yield (kg ha-1)	Harvest Index (%)	Net Monetary returns (Rsha-1)	Benefit Cost Ratio
Harvesting Time (H)							
H1 – Harvesting at optimum time (OT)	48.25	242.18	502	2063	18.71	4980	1.32
H2 – Harvesting 7 days before OT	47.99	227.59	475	2171	18.78	6143	1.40
H3 – Harvesting 7 days after OT	47.98	220	457	2011	18.51	4230	1.27
SEm+	0.17	12.10	8.00	34.00	0.48	1485	0.09
CD (P=0.05)	NS	NS	24	106.00	NS	NS	NS
Drying Methods (D)							
D1 – Drying (in field) horizontal bundles	47.93	228.33	476	2051	18.83	5027	1.32
D2 – Drying (in field) vertical bundles	48.21	231.51	480	2112	18.51	5209	1.34
SEm+	0.14	9.88	13.00	33	0.39	1212	0.08
CD (P=0.05)	NS	NS	40.00	98	NS	NS	NS
Threshing Methods (T)							
T1 – Single Threshing	48.16	219.45	456	2027	18.35	4370	1.28
T2 – Double Threshing	47.99	240.39	500	2136	18.96	5865	1.38s
SEm+	0.14	9.88	13.00	33	0.39	1212	0.08
CD (P=0.05)	NS	NS	40.00	98	NS	NS	NS