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EFFECT OF SEED PELLETING BY VERMICOPOST ON SESAME SEEDS (*SESAME INDICUM*)

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Abstract

Seed pelleting is the process of packaging effective quantities of foreign materials to increase a standard size, shape and weight of the seed, used for precision sowing/mechanical sowing. It can be used to pack an inoculants, growth regulators, protectants, nutrient, herbicide and hydrophilic substance as well as to increase supply of oxygen. Pellet can have a colour so that birds and small animals cannot recognize the seeds. The laboratory experiments were conducted on seed pelleting in SVPR 1 sesame variety by using vermicompost of 10g, 15g, 20g, 40g as organic pelleting by using maida gruel as an adhesive material. The germination was taken by roll towel and sand tray method . The seedlings were analysed for parameters like root length, shoot length, germination%, vigour index and the seeds pelleted with vermicompost show increase in their shelf life, root length and shoot length.

Keywords: Germination percentage, Seed pelleting, Sesame (SVPR1) variety, Vermicompost, Vigour index.

Introduction

Sesame (*Sesamum indicum*) is a flowering plant and it is a cultivated type originated in India. Numerous wild relatives occur in Africa and a smaller number in India. It is widely naturalized in tropical regions around the world and is cultivated for its edible seeds, which grow in pods. Most wild species of the genus *Sesamum* are native to sub-Saharan Africa. Productivity is about 18.8%. The world's largest exporter of sesame seeds was India and Japan the largest importer. Its fruit is a capsule, normally pubescent, rectangular in section and typically grooved with a short triangular beak. The fruit naturally splits open (dehisces), depending on the varietal cultivar. The degree of dehiscence is of importance in breeding. And sesame seeds are small and the size, form and colours vary with the thousands of varieties now known. Typically, the seeds are about 3 to 4 millimeters long by 2 millimeters wide and 1 millimeter thick. The seeds are ovate, slightly flattened and somewhat thinner at the eye of the seed (hilum) than at the opposite end. The weight of the seeds is between 20 and 40 milligrams. The seed coat (testa) may be smooth or ribbed. Sesame seeds come in many colours depending on the cultivar harvested. The most traded variety of sesame is off-white coloured. However, it requires adequate moisture for germination and early growth. While the crop survives drought as well as presence of excess water. Moisture levels before planting and flowering impact yield. Initiation of flowering is sensitive to photoperiod and to sesame variety. The photoperiod also impacts the oil content in sesame seed; increased photoperiod increases oil content. The oil content of the seed is inversely proportional to its protein content. Commercial sesame crops require 90 to 120 frost free days. After harvesting, the seeds are usually cleaned and hulled. Sesame oil is one of the most stable vegetable oils, with long shelf life, because of the high level of natural antioxidants (sesamin, sesamolin, and sesamol) (Bhardwaj *et al*., 2013). Oil from the seed is used in cooking, as salad oils and margarine, and contains about 47 percent oleic and 39 percent linoleic acid. Sesame seed is rich in Omega 6 fatty acids, but lacks Omega 3 fatty acids and also rich in protein, at 25 percent by weight.

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The flour that remains after oil extraction is between 35 to 50 percent protein, has good effective carbohydrates, and contains water-soluble antioxidants (sesaminol glucosides) that provide added shelf-life to many products. This flour, also called sesame meal, is an excellent high-protein feed for poultry and livestock.

Materials and methods

A study was undertaken in Department of Seed Science and Technology in Vanavarayar Institute of Agriculture, Manakkadavu, and Pollachi during the year 2015-16. The monthly mean maximum temperature ranges from 28^0C to 37^0C during January and May respectively. The mean minimum temperature ranges from 16^0C to 24^0C during December and May respectively. Uniform size and quality of SVPR 1 variety sesame seeds pelleted with vermicompost (organic pelleting). A samples 3 replicates of sesame seeds of 50g were weighed and then the vermicompost of 10g, 15g, 20g, and 40g weighed. Maida gruel is used as an adhesive material by adding drops while pelleting the sesame seeds with vermicompost (fig. 2). It is allowed to shade dry for two days. For analysis of germination roll towel method was used, selected seeds from each of the replications were placed in the germination sheet (15×20cm) (Issa *et al.,* 2011). The germination sheets with the seeds were rolled and placed in small bucket containing water up to its one third. And sand tray method also used thus selected seeds from each of the replications were placed in the tray containing sand. The number of seeds germinated was counted each day and the count of total number of seeds germinated was taken after 14 days and the final germination was determined (Kamdi *et al.,* 2012).

The number of seeds germinated was counted each day and the count of total number of seeds germinated was taken after 14 days and the final germination was determined (Hridya *et al*., 2015). Final count of the emerged seedlings was taken at the second week from the start of emergence with respect to each treatment and calculation was done in relation to the number of seeds which were put for germination and the percentage value was obtained by using the formula mentioned below.

$$\text{Germination}(\%) = \frac{\text{Number of normal seedlings}}{\text{Number of seeds}} \times 100$$

The root length was measured at 14 days after the seeds were put for germination by using a 30 cm ruler. Shoot length was measured at 15 days after the seeds were put for germination by using a 30 cm ruler. And vigour index was calculated by using the formula given below:

Vigour index = Germination (%) × (Root length +Shoot length)

Results and discussion

The sesame seed pelleted with vermicompost 10g, 15g, 20g, 40g and by using maida gruel as an adhesive. We evaluated the germination percentage and vigour index by roll towel method and sand tray method. The observations were undertaken under ambient room **Analysis on effect of seed pelleting in sesame seeds by vermicompost.**

Table 1: Analysis of germination %

METHOD	ROLL TOWEL		SAND TRAY		MEAN	SD	CV
Treatment	1month	3month	1month	3month			
Control	40	33.3	53.3	17	35.9	15.09	42.0
10g	34.6	29.3	58.6	74.6	49.2	21.15	42.9
15g	16	13.3	46.6	60	33.9	23.00	67.7
20g	34.6	38.66	52	45.3	45.64	7.64	17.9
40g	40	33.3	53.3	36.6	40.8	8.77	21.4

Table 2: Analysis of root length

METHOD	ROLL TOWEL		SAND TRAY		MEAN	SD	CV
Treatment	1month	3month	1month	3month			
Control	17	20.3	2.4	4.2	10.9	8.9	81.9
10g	16.9	20.1	4.26	4.43	11.4	8.2	72.4
15g	17.8	17	3.6	5.63	11.0	7.4	67.5
20g	18.4	16.48	4.03	4.53	10.8	7.4	70.3
40g	17.6	17.9	3.5	3.33	10.5	8.2	78.2

Table 3: Analysis of shoot length

METHOD	ROLL TOWEL		SAND TRAY		MEAN	SD	CV
Treatment	1month	3month	1month	3month			
Control	3	3	2.4	3	2.8	0.3	10.5
10g	3.96	3.63	5.26	7.16	5.0	1.6	32.0
15g	4.13	4.19	5.8	7.8	5.4	1.7	31.5
20g	4.23	3.4	3.9	3.5	3.7	0.3	10.1
40g	4.03	4	4.6	4.66	4.3	0.3	8.2

Table 4: Analysis of vigour index

METHOD	ROLL TOWEL		SAND TRAY		MEAN	SD	CV
Treatment	1month	3month	1month	3month			
Control	683	152.2	467	540	460.5	224.2	48.7
10g	683	677	339.6	475.6	543.8	166.8	30.6
15g	152	124.9	561	590	356.9	252.8	70.8
20g	787	136	370.6	169	365.6	299.4	81.8
40g	867.6	111.6	402	175.3	389.1	342.4	88.0

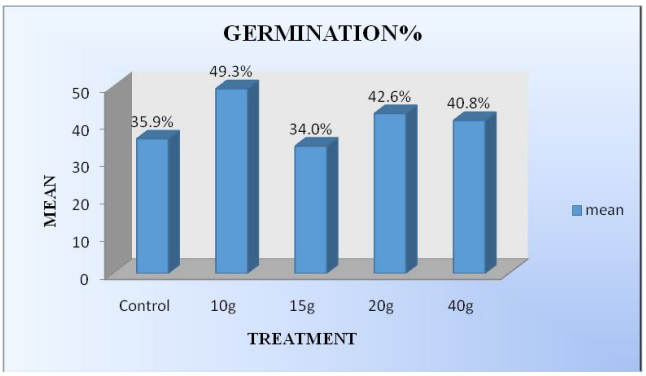

Fig.1: Analysis of germination % of sesame seeds pelleted with vermicompost.

Conclusion

Generally the seed pelleting produces bigger, rounder and smoother seed pellets, allows for precision drilling, ideal carrier of some crop protection treatments, uniform size of pelleted seed, ability to handle even the finest seed. After pelleting the sesame seeds with 10g vermicompost (organic pelleting) pelleted seed show high germination percentage and vigour index when compared to the control.

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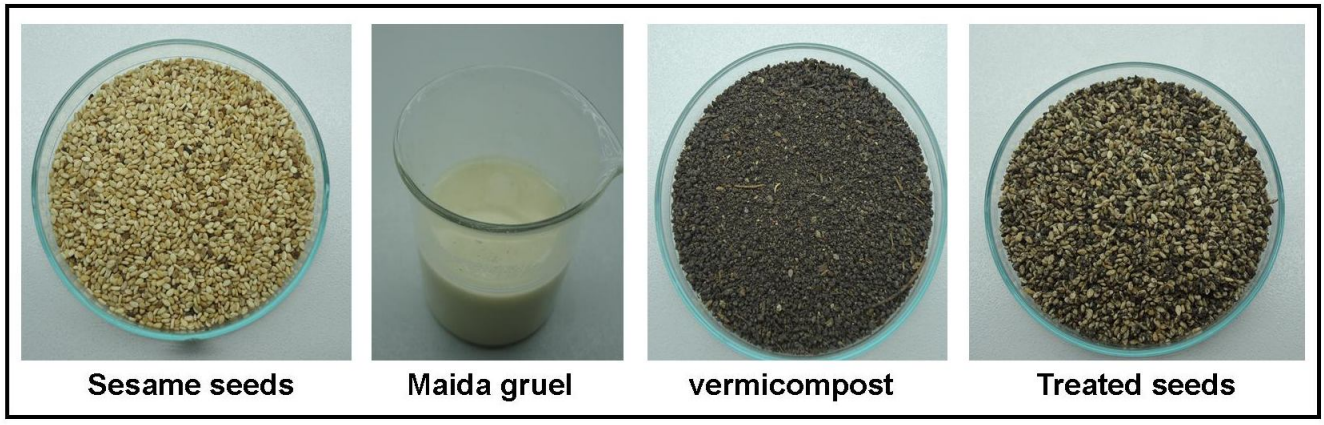

Fig 2:.Sesame seeds pelleted with vermicompost by using maida gruel as an adhesive.

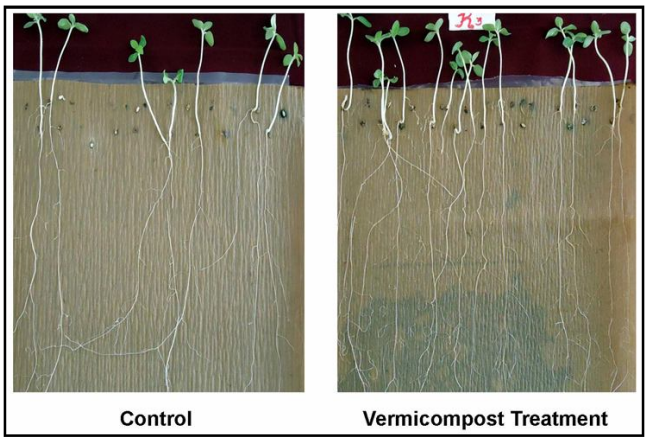

Fig 3: Comparison of control and sesame seeds treated with 10g of vermicompost

conditions (RH 95 ± 2 % and 25 ± 2^{0}C) (Kiran Rana *et al*., 2014). Based on mean, the root length and shoot length it was maximum with 10g and 15g vermicompost pelleted seeds (table 2 & 3). For germination percentage it was maximum with 10g followed by 20g vermicompost pelleted seeds (fig. 1) and for vigour index 10g recorded high vigour index followed by 40g pelleted seeds (Lukman Ahmad *et al*., 2016) (table 1 & 4). By this while compared to control, in both the methods 10g of vermicompost pelleted sesame seeds result in high germination percentage and vigour index (fig. 3).