Original Research Article

INFLUENCE OF PRESOWING SEED TREATMENTS WITH ORGANIC MANURES AND BOTANICALS ON PLANT GROWTH, YIELD AND YIELD ATTRIBUTING TRAITS OF YELLOW MUSTARD (*Sinapis alba*)

Variety (ISP -186)

ABSTRACT

The present investigation was conducted during *Rabi* season in the year (2021-2022) at post graduate Central Research Farm, Department of Genetics and plant Breeding , Naini Agriculture Institute, Sam Higginbottom University of Agriculture Technology And Sciences, PRAYAGRAJ-211007 (U.P) with a goal to evaluate the **INFLUENCE OF PRESOWING SEED TREATMENTS WITH ORGANIC MANURES AND BOTANICALS ON PLANT GROWTH, YIELD AND YIELD ATTRIBUTING TRAITS OF YELLOW MUSTARD (*Sinapis alba*) Variety (ISP -186)** and to find out suitable seed priming method for mustard under Randomized Block Design with 13 priming treatments which are replicated thrice. The results revealed that treatment T_6 Jeevamruth (7%) has recorded maximum Rate of emergence(97.52), plant height (131.07cm) ,Number of Branches (13.60),Days to 50% flowering(40.36) , Days to Maturity(99), Number of silique\plant (83.45), Number of seeds\silique (13.47), seed yield /plant (4.73),seed yield \plot(56.44), Biological yield (250.67),Harvest index (41.00).significance mean sum of squares due to seed priming treatments were observed for all the characters under study viz., Field emergence percentage, Plant height (30, 60, 90 DAS), Number of branches/plant, Days to maturity, Number of silique/plant, Number of seeds/plant, seed yield/plant (gm), Seed yield/plot (gm), Biological yield (gm), Harvest index (%) which were highly significant at 5% level of significance indicating presence of good amount of variability among the treatments for these characters.

Key words: Panchagavya, Jeevamruth, Beejamruth, Neem leaf extract.

INTRODUCTION:

Among various oilseed crops grown in India, rapeseed-mustard group of crops (*Brassica spp*., Family Brassicaceae) comprising Indian rape (toria), Indian mustard (raya), oilseed rape (gobhisarson), Ethopian mustard (African sarson), yellow sarson, brown sarson and taramira, are next to soybean in terms of area and production. Cultivation of these crops in 28 states of the country under diverse agro-ecological situations over an area of 6.51 million hectares to produce 8.18 million tonnes signifies its importance in vegetable oil scenario of the country **(FAO 2012).** In India and Asian countries, mustard is popularly used in cooking. India is number one in production of mustard oil. Mustard gives edible oil which is used as cooking. In World over Mustard seed is used as condiment in the preparation of vegetable and curries. Split mustard seed and oil is used for pickling. The leaves of the young plants are used as vegetable. It can be used as oil cake to feed cattle.

Mustard is an important Rabi oilseed crop of India. It occupies about 24.70 percent of area and 48.28 percent of production of the total oilseed production in India. Its area, production and productivity in the country is 5.43 M ha, 6.41 M tones and 1159 kg/ha, respectively. In Rajasthan state the total area under mustard cultivation is 2.84 M. ha with the estimated production of 3.5 MT and average productivity of mustard in the state is 1234 kg/ha. So far as concerned with the Jhunjhunu district of Rajasthan, total area under mustard cultivation is 78.0 thousand hectares with the productivity of 1308kg/ha.

Panchagavya is known to boost immunity and promote plant growth. Cow dung and cow urine are the key ingredients of the preparation. It is usually mixed with water and is used to irrigate the fields. It can also be used as spray. According to Hindu dharma, Panchagavya has high significance. It can be used as an Ayurvedic medicine and it has good potential as an organic fertilizer and pesticide **(Dharma *et al.* 2005; Kumar, 2005)**. Panchagavya also contains many vitamins, amino acids. It contains gibberlins and auxins which regulate the growth of plants.

Jeevamruth is low cost improvised preparation that enriches the soil with indigenous microorganism required for mineralization from native cow dung, cow urine, horse gram and jaggery (Gore,N.S. and Sreenivasa M.N.,2011). Jeevamruth serves as the rich source of micro organisms that fix nitrogen, solubilize phosphorous, also rich in source of of carbon, potassium, nitrogen and many micro nutrients (**Devakumar *et al*.,2014, Sreenivasa, M.N. *et al*.,2010**) Jeevamruth is applied to plants, the microorganism present in the jeevamruth

improves soil quality and helps plants to absorb nutrients present in the soil faster and improves plant grow.th and production.

Beejamruth, a mix of cow dung, cow urine, water, lime, and a handful of soil has been given importance in sustainable agriculture since age old days. It is also one such organic known to protect the crop from harmful soil borne and seed borne pathogens **(Vyankatrao *et al.*, 2019)**

The neem extract increased shoot height, number of leaves, number of buds and number of flowers. Mainly green neem leaves and water are the key ingredients of the preparation. This leaf extract can be used for nursey and kitchen gardens. Neem extract was found as most effective agent in controlling leaf spot (82.33%) and wilt (41.34%) in comparison to control under field conditions (**Prakash *et al.*, 2019)** Neem leaf extract acts as potential source for the management of severe diseases in addition to its positive effects on growth parameters.

MATERIALS AND METHODS:

The present investigation was carried out at Field Experimentation Centre of the Department of Genetics and Plant Breeding, Naini Agriculture Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (U.P.) during *Rabi 2021 - 2022*. The details material and methods used for the Influence of Pre sowing seed treatments with Organic Manures and Botanicals on Plant growth, Yield and Yield Attributing traits of Yellow Mustard (*Sinapis alba*) Variety – ISP – 186 was made to identify the effect of seed primimg of different kinds on seed quality parameters of mustard and to find suitable seed priming method for mustard. For this purpose , 13 priming treatments including control on yellow mustard seed variety ISP- 186 used to study under field conditions during , Rabi 2021-2022. The treatments were T0- Control, T1- Panchagavya (3%), T2- Panchagavya (5%), T3- Panchagavya (7%), T4- Jeevamruth (3%), T5- Jeevamruth (5%), T6- Jeevamruth (7%), T7- Beejamruth (3%), T8- Beejamruth (5%), T9- Beejamruth (7%), T10- Neem leaf extract (3%), T11- Neem leaf extract (5%), T12- Neem leaf extract (7%) The mustard seeds were primed with above different priming agents in above different concentrations and intensities for a given duration. After priming seeds were dried to initial moisture content at room temperature. After that the primed seeds were used to grow under field conditions. Field experiment was laid out in Randomized Block Design (RBD) with three replications during Rabi 2021-22. Data were recorded for 11 characters i.e.

Pre-harvest characters viz., Field emergence percentage, Plant height (30, 60, 90), number of branches (30, 60, 90), 50% of flowering and Days to maturity.

Post–harvest characters viz., number of silique/plant, number of seeds/silique, seed yield/plant (gm), seed yield/plot (gm), biological yield (gm), harvest index (%). Analysis of variance (Table-1.1) for the data revealed that significance mean sum of squares due to seed priming treatments were observed for all the characters under study viz., Field emergence percentage, Plant height (30, 60, 90), number of branches (30, 60, 90), 50% of flowering and Days to maturity, number of silique/plant, number of seeds/silique, seed yield/plant (gm), seed yield/plot (gm), biological yield (gm), harvest index (%). which were highly significant at 5% level of significance indicating presence of good amount of variability among the treatments for these characters.

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RESULT AND DISCUSSION GROWTH ATTRIBUTES:

Seed priming is a technique to reduce emergence time, accomplish uniform emergence time, better algometric (changes in growth of plant parts over time) attributes and provide requisite stand in many horticultural and field crops. Various pre-hydration or priming treatments have been employed to increase the speed and synchrony of seed germination. The treatments showed significant effect of pre-sowing seed treatment on Field emergence. The mean performance of field emergence ranged from 84.62 % to 97.52 % with the mean value of 91.52 %. The minimum field emergence was exhibited by treatment T0 [control] (84.62 %), while maximum field emergence was recorded in treatment T6 - Jeevamruth – 7 % (97.52) followed by T9 - Beejamruth 7% (94.32) and T12 – Neem leaf extract 7% (92.80) were significantly higher than other significant treatments. plant heightat 90 DAS. The mean performance of plant height at 90 DAS ranged from 111.97 cm to 131.07cm with the mean value of 123.19 cm. The minimum plant height was exhibited by treatment T0 - control (111.97 cm), while maximum plant height was recorded for treatment T6- Jeevamruth -7% (131.07 cm) followed by T9 - Beegamruth 7% (129.07 cm), T3 – Panchagavya 7% (125.20cm), T5 - Jeevamruth 5% (124.27 cm), T12 - Neem leaf extract 7% (123.93 cm), T11 - Neem leaf extract 5% (123.19 cm), T4 - Jeevamruth 3% (122.97cm), T2 – Panchagavya 5% (122.37 cm), T1 - Panchagavya 3% (121.93), T10 – Neem leaf extract 3% (121.53 cm), were at par to each other. The treatments showed significant effect of pre-sowing seed treatment on number of branchesat 90 DAS. The mean performance of number of branches at 90 DAS ranged from 9.00 to 13.60 with the mean value of 11.46. The minimum plant height was exhibited by treatment T0 - control (9.00), while maximum plant height was recorded for treatment T6- Jeevamruth 7% (13.60) followed by T9 - Beejamruth - 7% (12.83) and T5 – Jeevamruth – 5% (12.77) were at par to each other. The minimum 50% flowering was exhibited by treatment T6 - Jeevamruth (40.36), while maximum 50% flowering was recorded for treatment T0 - control (47.75) followed by T10 – Neem leaf extract 3% (45.44), T4 – Jeevamruth 3% (44.86), T1 – Panchagavya 3% (44.61), T3 - Panchagavya 5% (44..56), T7 - Beejamruth 3% (43.89) was at par to each other (CD 5%=2.68). The use of botanical extracts recorded less days to produce 50% flowers when compared to control. Janardhan (2014) also noted that

treatment with botanical extract including neem leaf extract taken 2-3 days less from control to flowering. The minimum Days to maturity was exhibited by treatment T6 – Jeevamruth 7% (99.51), while maximum Days to maturity was recorded for treatment T0 - control (118.56) followed by T7 – Beejamruth 3% (118.18) was significantly higher in comparison to other treatments.

Table 1.1 A: Mean performance of different treatments for pre harvest characters in yellow mustard (*Sinapis alba*) CV. ISP-186

Treatment Symbols	Treatments	Field Emergence(%)	PH DAS	No.of branches	50% flowering	Days to maturity
T0	Control	84.62	111.97	9.00	47.75	118.56
T1	Panchagavya (3%)	91.32	121.93	9.23	44.61	105.73
T2	Panchagavya (5%)	93.14	122.93	10.34	44.56	102.66
T3	Panchagavya (7%)	95.40	122.37	11.30	44.01	101.63
T4	Jeevamruth (3%)	88.41	125.20	11.97	44.86	111.67
T5	Jeevamruth (5%)	89.64	122.97	12.77	42.46	109.42
T6	Jeevamruth (7%)	97.52	124.27	13.60	40.36	99.51
T7	Beejamruth (3%)	91.55	131.07	11.63	43.89	118.18
T8	Beejamruth (5%)	92.10	119.37	11.93	42.43	111.96
T9	Beejamruth (7%)	94.32	120.63	12.83	40.80	107.96
T10	Neem leaf extract (3%)	88.71	129.07	10.40	45.44	113.69
T11	Neem leaf extract (5%)	91.82	121.53	11.40	42.75	109.37
T12	Neem leaf extract (7%)	92.80	123.93	12.60	41.01	101.93
	C.V.	2.16	1.35	1.97	3.64	2.50
	S.E.	1.14	0.96	0.13	0.92	1.57
	C.D.5%	3.34	2.80	0.38	2.68	4.58
	C.D.1%	4.52	3.79	0.52	3.63	6.21

Table 1.2.A: Mean performance of different treatments for postharvest characters in yellow mustard (*Sinapis alba)*

Treatment symbols	Treatments	No.of silique/plant	No.of seeds/siliqu e	Seed yield/plant (gm)	Seed yield/plo t (gm)	Biological yield (gm)	Harvet index (gm)
T0	Control	40.91	10.53	3.09	40.21	182.00	16.84
T1	Panchagavya (3%)	63.64	11.46	3.17	40.63	187.53	21.70
T2	Panchagavya (5%)	65.44	11.73	3.40	41.95	192.57	21.80
T3	Panchagavya (7%)	68.36	11.86	3.54	43.10	195.33	21.84
T4	Jeevamruth (3%)	68.05	12.47	3.33	43.60	204.87	23.49
T5	Jeevamruth (5%)	68.54	12.53	3.60	45.32	210.80	24.20
T6	Jeevamruth (7%)	83.45	13.47	4.73	56.44	250.67	41.00
T7	Beejamruth (3%)	65.04	11.67	3.25	40.37	196.17	18.40
T8	Beejamruth (5%)	66.55	12.07	3.36	44.36	198.83	22.56
T9	Beejamruth (7%)	75.88	12.67	4.24	47.34	221.83	26.77
T10	Neem leaf extract (3%)	62.85	11.53	3.21	40.34	202.93	17.83
T11	Neem leaf extract (5%)	66.71	12.06	3.42	43.33	206.23	21.96
T12	Neem leaf extract (7%)	68.03	12.33	4.08	44.14	212.97	25.90
	C.V.	3.50	1.83	10.88	5.55	6.21	11.69
	S.E.	1.35	0.13	0.22	1.41	7.34	1.58
	C.D.5%	3.93	0.37	0.65	4.13	21.42	4.61
	C.D.1%	5.33	0.50	0.89	5.59	29.03	6.25

YIELD ATTRIBUTES:

The mean performance of number of silique/plant ranged from 40.91 to 83.45 with a grand mean of 66.71. Among the significant treatments, T6 – Jeevamruth 7% (83.45) and T9 - Beejamruth 7% (75.88) and T5 – Jeevamruth 5% (68.54) T3 – Panchagavya 7% (68.36), T12 – Neem leaf extract 7% (68.03), T4 – Jeevamruth 3% (68.05), T11- Neem leaf extract 5% (66.71), T8 - Beejamruth 5% (66.55), T2- Panchagavya 5% (65.44) were significantly higher than other significant treatments. Number of seeds/silique were significantly higher in treatments, T6 – Jeevamruth 7% (13.47) and T9 - Beejamruth 7% (12.67). In treatments T6– Jeevamruth 7% (4.73) and T9 – Beejamruth 7% (4.24), T12 – Neem leaf extract 7% (4.08) and T3 – Panchagavya 7% (3.54) were significantly higher than other significant treatments in seed yield/plant. The effect of pre-sowing seed priming on seed yield per plant was found to be significant and similar results of seed yield per plant was observed by Somasundaran et al., The mean performance of number of seed yield/plot ranged from 40.21 to 56.44 with a grand mean of 44.14. Among the significant treatments, T6 – Jeevamruth 7% (56.44) and T9 - Beejamruth 7% (47.34), T5 – Jeevamruth 5% (45.32) and T – Jeevamruth 3% (43.60) were significantly higher than other significant treatments. The mean performance of biological yield ranged from 182 to 250.67 with a grand mean of 204.83 . Among the significant treatments, T6- Jeevamruth 7% (250.67), T9- Beejamruth 7% (221.83), T12– Neem leaf extract 7% (212.97), T5- Jeevamruth 5% (210.80), T8- Beejamruth 5% (198.83), were significantly higher thanother significant treatments. The mean performance of harvest index ranged from 16.84 to 41.00 with a grand mean of 23.41. Among the significant treatments, T1- Panchagavya (3%), T2- Panchagavya (5%), T3 - Panchagavya (7%), T4- Jeevamruth (3%), T5- Jeevamruth (5%), T7- Beejamruth (5%), T8- Beejamruth (7%), T9- Beejamruth (7%), T10 - Neem leaf extract (3%), T11- Neem leaf extract (5%), T12- Neem leaf extract (7%). Where significantly higher with T6 – Jeevamruth (7%).

CONCLUSION:

It is concluded from the present study that the seeds of yellow mustard (Variety- ISP 186) were treated with Jeevamruth – 7% (T6) showed significant increase in growth, yield and yield attributing traits followed by Beejamruth – 7% (T9) as compared to control (untreated) seeds. These recommendations are based on six months experimentation and therefore further investigation is needed to arrive at valid recommendation.

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