EFFECT OF PRE-SOWING SEED TREATMENT OF SELECTED ORGANICS AND BOTANICAL ON GROWTH, SEED YIELD AND YIELD ATTRIBUTTING TARITS OF MAIZE (*Zea mays.*L) Var. VNR-4226

ABSTRACT

The field experiment was conducted during Kharif season in the year 2021- 2022 at post graduate Crop research farm, Department of Genetics and Plant Breeding, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, in order to study the different Pre-sowing seed treatments of selected Organics and Botanicals on growth, Seed yield and yield attributing traits of Maize (Zea mays L.) Var. VNR-4226 The experiment was laid out in Randomized Block Design (RBD) with 13 treatments and 3 replications. In order to standardization method of seed treatment to specific maize crop and they were evaluated by screening a range of duration and concentration Viz T0-Control, T1 - Panchagavya 5% (12Hrs), T2 - Panchagavya 10% (12Hrs), T3 - Panchagavya 15% (12Hrs), T4 - Moringa Leaf Extract 5% (12Hrs), T5 - Moringa Leaf Extract 10% (12Hrs), T6 - Moringa Leaf Extract 15% (12Hrs), T7 - Vermiwash 5% (12Hrs), T8 - Vermiwash 10% (12Hrs), T9 – vermiwash 15% (12Hrs), T10 – Moringa leaf extract 5% (12Hrs), T11 - Moringa leaf extract 10% (12Hrs), T12 - Moringa leaf extract 15% (12Hrs). To find out effect of different seed treatment on growth , yield and seed quality parameters of maize showed that significant treatment for Rate of Field emergence , Plant height (30,60,90 DAS), Number of leaves (30,60,90), Days to 50% Tasselling, days to50% Silking, days to 50% Maturity, Number of cobs in a plant, cob length, cob grith, Number of rows in a cob, Number of Kernels in a row, Total number of kernels in a cob, seed yield per plot, Biological yield, Stover yield, Harvesting Index and economics were significantly recorded highest inT12 (Neem leaf extract 15% for 12hours) followed by T2- Panchagravya (10%) whereas minimum was observed in T0(control).

KEYWORDS: -Maize Seeds, Treatment, Organics, Botanicals, Economics and RBD (Randomized block Design)

INTRODUCTION:

Maize (Zea mays. L) is an important annual cereal crop of the world belonging to the family Gramineae/Poaceae. Due to its cosmopolitan nature and highest genetic yield potential among the cereals it is called as “Queen of cereals”. It is considered as a staple food in many parts of the world. It is a third leading crop of the world after rice and wheat (Sandhu, singh and Malhi 2007). The crop is native of central America and Mexico by origin (pursglove 1972). Maize is a widely cultivated crop and it’s grown throughout the world in tropical, subtropical and temperate climate under irrigated and semi-arid conditions.

In India maize principally grown in two seasons, kharif and rabi. Kharif maize represents around 83% of maize area, while rabi maize corresponds to 17% maize area in India. In recent

past spring maize area is also growing quite fast in north-western parts of the country, in the states of Punjab, Haryana, and Uttar Pradesh.

Among the maize growing countries India ranks 4th in area and 7th in production, representing around 4% of the world's maize area and 2% of total production. During 2018-2019 in India, the maize area has reached to 9.2 million ha. During 1950-1951 India used to produce 1.73 million MT maize, which has increased to 27.8 million MT by 2018-2019, recording approximately 16 times increase production. The average productivity during the period has increased by 5.42 times from 547 kg/ha to 2965 kg/ha while the area increased by 3 times. Among Indian states Madya Pradesh and Karnataka has highest area under maize (15% each) followed by Maharashtra (10%), Rajasthan (9%), Uttar Pradesh (8%), and others. After Karnataka and Madya Pradesh, Bihar produces most of the maize whereas Andhra Pradesh leading for highest production.

In 2020, Maize production for Uttar Pradesh was 1.78 million tonnes. Through Uttar Pradesh maize production fluctuated in recent years, its tended to increase through 2017-2018 period ending at 1.78 million tonnes in 2020. These are the major producing districts in Uttar Pradesh like Meerut, Ghaziabad, Bulandshahr, Farrukhabad, Gonda, Jaunpur, Etah, Firozabad and Manipuri. Manipuri is the largest producer of maze in the Uttar Pradesh.

Maize grains contains about 70% Carbohydrates, 10% protein, 4% Oil, 2.3% crude fibre, 10.4% albuminoids and 1.4% ash. Maize also contains significant quantities of nicotinic acid, riboflavin and vitamin A, with high contents of carbohydrates, protein, fats, vitamins and minerals.

Importantly, seed priming has shown its effectiveness in improving seed germination, seedling growth and crop stand against the negative impacts brought about by stress in the field. Seed priming is a hydration treatment of seed prior to sowing in the soil **(Farooq, 2009).** Thus, seed priming can be defined as it is a seed treatment that involves the controlled hydration of seed to allow core-germinative metabolic events to take place, but insufficient to allow radical protrusion through the seed coat **(Heydecker, 1973)** or soaking in solution of low water potential. The seeds are then dried down closer to the original moisture level. The procedure prepares the seeds for sowing later in the soil for rapid germination **(Farooq, 2006).**

Panchagravya means "Mixture of five products (Dung, Urine, milk, ghee, and curd) of the cow" of these the direct constituents are cow dung, urine, milk and the two derived products are ghee and curd, its is used as a fertilizer and pesticides in agriculture operations. Panchagravya plays an important role in the quality of fruits and vegetables. Its is used as foliar spray, soil application along with irrigation, as well as a seed treatment. For the preparation of panchagravya first mix thoroughly the fresh cow dung and ghee then incubate it for two days, after incubation add cow urine and 5 litres of water and mix properly in morning and evening for one week, then add gram powder (500gm) along with cow milk and curd and mix it properly in the morning and evening for two weeks, after two weeks panchagravya is ready and can be used directly **(Krishna Kumar, 2020).** Panchagravya is used for maintaining the genetic diversity of the crop and the environment, to encourage the biological cycle within farming system by using microbe, to promote the sustainable use of natural resources, to maintain the ecological balance between crop production and livestock, to assess the efficiency of panchagravya in vegetable crops, to produce high quality yield in enough quantity by using panchagravya **Suraj Kumar,2020.**

Moringa (*Moringa oleifera*) is well known as a miracle tree. Its has been reported that moringa leaf extract has antioxidant properties. In addition, the moringa leaf is also rich in many plant growth promoters such as cytokinin and Zeatin. Zeatin stimulates cell division and cell elongation, it boosts several enzymes and antioxidants properties and protects the plants cell from adding effects of the reactive oxygen species. Disease- free leaves with no more than 40 days old are suitable for leaf extraction because it contains higher number of bioactive materials than older once **Nouman,2012.**

Vermiwash is the liquid extracted from vermicompost, which is prepared by feeding earthworms with raw materials using vermipits, arrangements of layer performed from bottom to top, pebbles or coconuts shell filled on the bottom layer to absorb excess water from the composting pit that added from top. The second layer filled with sandy soil to prevent accumulation of extra water in the medium, and third layer filled contains organic soil and old compost inoculated with earthworms. Cow dung and leaf litter blended at the ratio of 1:2 and added to the pit in the fourth layer. Finally, on the top layer the coconut fronds used to cover the pit to prevent from direct sun light and keep the medium moist enough. After 30 days of the composting process, vermiwash started to collect as demonstrated by **Tharmaraj,2011.**

Neem leaves are also used as a good priming agent containing flavonoids, steroids, carbohydrates, glycosides, antiquinone, terpenoides and alkaloids, these alkaloids, phnenolic and saponins compounds protect the plants against pathogens and produce antioxidants activity. It was shown that neem leaf extract has antifungal effects and can be used as fungicidal seed treatments for the control of seed borne diseases and for increasing seed germination and seedling emergergence. Neem leaf extract was prepared using following method, the fresh neem leaves were collected separately and dried under shade. The shade dried leaves are powdered using mortar and pestle or electric grinder **Rapheal,2012.**

Coconut water 50% proved to be the best in enhancement germination and organo priming with panchagavya 5 per cent, vermiwash 25 per cent and starter solution 10% were also effective in enhancing germination level significantly over control. **Alex albert *et al.*, 2004.** The seeds are soaked in 5 different concentrations 1- 5% of panchagavya along with distilled water soaking in different time duration of 8, 16 and 24 hours. After the required period of soaking the seeds are taken out and transferred to planting media. The media used in this study was soil, sand, and organic matter with the ratio of 1:1:1. Among the various concentration of panchagavya used, 2% with 24 hours soaking showed maximum percentage of germination 86%, shoot length 14 cm and root length 4 cm reported by **S Kumar,2020.** For several crops, like cereal seeds, seed priming has been presented promising and produced even unexpected results in which organic priming with plant extract is used after that drying, such as Neem leaf extract, Curry leaf extract, Tulsi leaf extract for maize. **Bradford, 1986** used neem leaf extracts for seed treatment of rice before sowing and reported that seedlings from seed treated with neem showed greater vigor and higher root or shoot growth indexes and dry weights as compared to those germinated from control or unprimed seed **Kareem et al., 1989.** reported that, among plant extracts, neem leaf extract 5%, Ocimum canum L. leaf extracts 5% and Bougainivillea sp. leaf extracts were found to be effective in controlling both Alternaria blight and rust **Amaresh et al., 2000.** evaluated the efficacy of seed treatment with neem leaf, garlic clove, allamonda leaf, ginger rhizome, kalijira seeds, bel leaf, turmeric rhizome, katamehedi leaf and onion bulb against damping-off. They observed that all treatments were significantly reduced per cent damping-off in tomato, eggplant, and chilli. The highest seed germination of tomato (86.67%), eggplant (86.33%) and chilli (90.33%) were

recorded after seed treatment with neem leaf extract. Neem leaf extract showed the best effect on reducing damping-off and increasing germination as well as growth characters of vegetable seedling. Garlic clove extract and allamonda leaf extract showed the better result followed by neem leaf extract in reducing percent damping-off of tomato, eggplant, and chilli seedling. **Islam and Faruq et al., 2012.**

Applications of various chemical and other inorganic inputs for seed treatment will enhance the production of the crops with high yield. The over usage of these chemicals may affect the production as food which are produced by these methods lead to toxin accumulation throughout the food chain which is dangerous for human consumption. For a chemical free crop production Botanicals and organics were selected which are eco-friendly for nature and soil. Botanicals and organics which contain anti-fungal properties, enzymes and micronutrients which help in crop growth and yield of the plant.

The present study intended to the following objectives:

To evaluate the effect of selected organics and botanical seed treatments on growth, yield, and yield attributing traits of maize.

To find out the suitable pre-sowing seed treatment favorable for maize.

To estimate the cost of Cultivation and benefit cost ratio.

MATERIALS AND METHODS

The present study on Pre-sowing seed treatment of selected Organics and Botanicals on Growth, Seed yield and yield attributing traits of maize (*Zea mays.* L) was made to identify the effects of seed treatment of different kinds of seed quality parameters of maize and to find out suitable seed treatment method for maize. For this purpose, the experiment was laid out in Randomized Block Design (RBD) with 13 treatments including control and 3 Replications on maize seed variety VNR-4226 was used to study under field conditions during kharif 2021-2022. The treatments were T0- Control, T1 - Panchagavya 5% (12Hrs), T2 - Panchagavya 10% (12Hrs), T3 - Panchagavya 15% (12Hrs), T4 - Moringa Leaf Extract 5% (12Hrs), T5 - Moringa Leaf Extract 10% (12Hrs), T6 - Moringa Leaf Extract 15% (12Hrs), T7 - Vermiwash 5% (12Hrs), T8 - Vermiwash 10% (12Hrs), T9 – vermiwash 15% (12Hrs), T10 – Moringa leaf extract 5% (12Hrs), T11 - Moringa leaf extract 10% (12Hrs), T12 - Moringa leaf extract 15% (12Hrs). the maize seeds were treated with above different treatments agents with different concentration for 12 hours. After treating seeds were dried to initial moisture content at room temperature under shade. Data was recorded for the following characters.

Pre-harvest characters Viz., Rate of Field emergence, Plant height at 30, 60 and 90 DAS (CM), number of leaves at 30, 60 and 90 DAS, Days to 50% tasselling, Days to 50% Silking and Days to maturity.

Post-harvest characters Viz., Number of cobs per plant, Cob length, Cob grith, Number of rows in a cob, Number of kernels in a row, Total number of kernels in a cob, Seed yield per plot (kg), Biological yield (Q/ha), Stover yield (Q/ha), Harvest index (%). Which were highly significant at 5% level of significance indicating presence of good amount of variability among the treatments for these characters.

Economics Viz., Cost of Cultivation, Gross returns, Net returns and Benefit Cost Ratio.

RESULT AND DISCUSSION

Growth attributes:

Rate of field emergence: -

At 4th, 7th and 10th DAS Treatment with Neem leaf extract at 15% (T12) showed significantly higher rate of germination over all other treatments with 49.35, 59.48, 708.143 followed by treatment with panchagravya at 10% (T2) with 48.41, 58.68, 67.9 and lowest was recorded in control plot (T0) with 39.28, 50.76, 62.14. Similar results were also observed by **Ahmed et al., (2014)** He observed increased germination percentage in rice seeds, when treated with neem extract (1:1).

Plant height at 30th, 60th and 90 DAS (cm): -

The mean performance of plant height ranged from 46.3 to 67.9 with mean value of 51.90. Significantly, maximum height of plant at 30th,60th and 90th DAS was recorded by T12- Neem leaf extract 15% (12hrs) with 67.9,171.5,205.5 respectively and it was followed by T2- Panchagravya 10% (12hrs) 53.7,163.8, 197.1 respectively whereas lowest was recorded in control plot T0 with 46.3, 131.4, 154.8 respectively. Similar results were observed by **Janardhan (2014)** in urdbean.

Number of leaves at 30th, 60th and 90th DAS: -

The mean performance of Number of leaves ranged from 3.5 to 6.5 with mean value of 4.76. Significantly, maximum Number of leaves at 30th, 60th and 90th DAS was recorded by T12- Neem leaf extract 15% (12hrs) with 6.5, 12.2, 12.5 respectively and it was followed by T2Panchagravya 10% (12hrs) 6.3, 11.9, 11.6 respectively whereas lowest was recorded in control plot T0 with 3.5, 8.1, 9.5 respectively.

Reproductive Attributes:

Days to 50% Tasseling: -

The mean performance of Days to 50% tasseling was ranged from 52.0 to 58.3 with mean value of 10.69. Significantly, maximum Days to 50% tasseling was recorded by T12- Neem leaf extract 15% (12hrs) with 52.0 and it was followed by T2- Panchagravya 10% (12hrs) 52.3 and lowest was recorded in control plot T0 with 58.3. **Janardhan (2014)** also noted that treatment with botanical extract including neem leaf extract taken 2-3 days less from control to flowering.

Days to 50% Silking: -

The mean performance of Days to 50% silking was ranged from 52.7 to 63.0 with mean value of 58.6. Significantly, maximum Days to 50% silking was recorded by T12- Neem leaf extract 15% (12hrs) with 55.7 and it was followed by T2- Panchagravya 10% (12hrs) 56.7 and lowest was recorded in control plot T0 with 63.0. **Janardhan (2014)** also noted that treatment with botanical extract including neem leaf extract taken 2-3 days less from control to flowering.

Days to Maturity: -

The mean performance of Days to Maturity was ranged from 97.7 to 103.7 with mean value of 100.54. Significantly, maximum Days to maturity was recorded by T12- Neem leaf extract 15% (12hrs) with 97.7 and it was followed by T2- Panchagravya 10% (12hrs) 98.0 and lowest was recorded in control plot T0 with 103.7. Similar results were also founded by **Kumar et al., (2017)** in Ground nut

Yield attributes: -

Number of cobs per plant: -

The mean performance of Number of cobs per plant was ranged from 1.6 to 2.2 with mean value of 1.66. Significantly, maximum Number of cobs per plant was recorded by T12- Neem leaf extract 15% (12hrs) with 2.2 and it was followed by T2- Panchagravya 10% (12hrs) 1.9, T10- Neem leaf extract 5% (12 hrs) 1.6 and lowest was recorded in control plot T0 with 1.5. **Shinde (2012)** and **Janardhan (2014)** have also found the similar results in seed treatment with neem leaf extract for increased seed yield per plants in rice.

Cob length(cm): -

The mean performance of Cob length was ranged from 13.3 to 17.3 with mean value of 15.45. Significantly, maximum cob length was recorded by T12- Neem leaf extract 15% (12hrs) with 17.3 and it was followed by T2- Panchagavya 10% (12hrs) 16.4, T10- Neem leaf extract 5% (12 hrs) 16.3, and lowest was recorded in control plot T0 with 13.3. Similar results of increased yield parameters were reported by **Narayanan et al. (2015)** in mung bean.

Cob grith (cm): -

The mean performance of Cob grith was ranged from 10.2 to 12.8 with mean value of 11.30. Significantly, maximum cob grith was recorded by T12- Neem leaf extract 15% (12hrs) with 12.8 and it was followed by T2- Panchagavya 10% (12hrs) 12.2, T10- Neem leaf extract 5% (12 hrs) 12.0 and lowest was recorded in control plot T0 with 10.2.

Number of rows in a cob: -

The mean performance of Number of rows in a cob was ranged from 10.0 to 13.7 with mean value of 12.08. Significantly, maximum Number of rows in a cob was recorded by T12- Neem leaf extract 15% (12hrs) with 13.7 and it was followed by T2- Panchagavya 10% (12hrs) 13.3, T10- Neem leaf extract 5% (12 hrs) 13.1 and lowest was recorded in control plot T0 with 10.0.

Number of kernels in a row: -

The mean performance of Number of kernels in a row was ranged from 26.9 to 35.2 with mean value of 31.17. Significantly, maximum No of kernels in a row was recorded by T12- Neem leaf extract 15% (12hrs) with 35.2 and it was followed by T2- Panchagavya 10% (12hrs) 32.9, T10- Neem leaf extract 5% (12 hrs) 32.4 and lowest was recorded in control plot T0 with 26.9.

Total number of kernels in a cob: -

The mean performance of total Number of kernels in a cob was ranged from 271.3 to 432.2 with mean value of 345.0. Significantly, maximum total no of kernels in a cob was recorded by

T12- Neem leaf extract 15% (12hrs) with 432.2 and it was followed by T2- Panchagavya 10% (12hrs) 424.4, T10- Neem leaf extract 5% (12 hrs) 30.4.8 and lowest was recorded in control plot T0 with 271.3.

Seed yield per plot: -

The mean performance of seed yield per plot was ranged from 3.1 to 4.4 with mean value of 3.73. Significantly, maximum seed yield per plot was recorded by T12- Neem leaf extract 15% (12hrs) with 4.4 and it was followed by T2- Panchagavya 10% (12hrs) 4.2, T10- Neem leaf extract 5% (12 hrs) 4.1 and lowest was recorded in control plot T0 with 3.1. **Pradhan et al., (2015)** also revealed that neem leaf treated seeds of paddy have outstanding seed yield.

Biological yield (Q/ha): -

The mean performance of biological yield was ranged from 102.4 to 142.7 with mean value of 120.99. Significantly, maximum biological yield was recorded by T12- Neem leaf extract 15% (12hrs) with 142.7 and it was followed by T2- Panchagavya 10% (12hrs) 133.0, T10- Neem leaf extract 5% (12 hrs) 130.4 and lowest was recorded in control plot T0 with 102.4. Similar results were also observed by **Bhateshwar et al., (2020)** for yield parameters in lentil.

Stover yield (Q/ha): -

The mean performance of stover yield was ranged from 71.4 to 93.3 with mean value of 81.60. Significantly, maximum stover yield was recorded by T12- Neem leaf extract 15% (12hrs) with 93.3 and it was followed by T2- Panchagavya 10% (12hrs) 89.5, T10- Neem leaf extract 5% (12 hrs) 85.5 and lowest was recorded in control plot T0 with 71.4.

Harvest index (Q/ha): -

The mean performance of harvest index was ranged from 30.3 to 34.1 with mean value of 31.16. Significantly, maximum harvesting index was recorded by T12- Neem leaf extract 15% (12hrs) with 34.1 and it was followed by T2- Panchagavya 10% (12hrs) 31.4, T10- Neem leaf extract 5% (12 hrs) 31.2 and lowest was recorded in control plot T0 with 30.3. Similar results of increased yield parameters were reported by **Sathiya Narayanan et al. (2015)** in mung bean.

Economics: -

The economics of maize for benefit cost ratio was ranged from 0.91 to 1.63 with mean value of 31.16. Significantly, maximum benefit cost ratio, cost of cultivation, gross returns and net returns was recorded by T12- Neem leaf extract 15% (12hrs) with 1.63 and it was followed by T2- Panchagavya 10% (12hrs) 1.54, T10- Neem leaf extract 5% (12 hrs) 1.49, T6- Moringa leaf extract (15%) (12hrs) 1.45, and lowest was recorded in control plot T0 with 0.9

Sno	Treatment	Field emergences			Rate of Field emergences	Plant height (cm)			No of leaves			Day to 50% tasseling	Days to 50% silking	Days to Maturity
		4th DAS	7th DAS	10th DAS		30DAS	60 DAS	90 DAS	30 DAS	60 DAS	90 DAS			
1	$T_{0\ =control}$	39.28	50.76	62.14	1351	46.3	131.4	154.8	3.5	8.1	9.5	58.3	63.0	103.7
2	$T_{1=Panchagravya\ 5\%}$	43.93	53.937	75.49	2701	50.4	138.1	167.1	4.5	9.9	10.6	54.3	58.0	100.7
3	$T_{2=\ Panchagravya\ 10\%}$	48.41	58.68	67.9	2763	53.7	163.8	197.1	6.3	11.9	11.6	52.3	56.7	98.0
4	$T_{3=\ Panchagravya\ 15\%}$	46.93	57.68	72.56	2865	51.0	142.4	170.1	4.5	10.3	10.6	55.3	59.0	101.0
5	$T_{4=MLE\ 5\%}$	43.57	53.3	66.43	2895	51.6	143.9	171.9	4.8	10.6	10.6	56.0	59.3	101.7
6	$T_{5=MLE\ 10\%}$	44.783	55.53	68.71	2923	52.0	145.3	170.0	4.9	11.0	10.6	56.3	60.0	100.0
7	$T_{6=MLE\ 15\%}$	47.34	58.17	73.443	3074	52.1	140.2	167.6	4.9	11.3	10.9	56.3	60.3	101.3
8	$T_{7=Vermiwash\ 5\%}$	42.19	51.51	62.69	2455	48.0	132.9	161.4	3.6	8.5	9.6	54.7	56.7	100.7
9	$T_{8=vermiwash\ 10\%}$	45.087	56.35	69.62	2533	48.6	134.5	162.8	4.2	9.1	10.3	53.7	57.7	99.0
10	$T_{9=vermiwash\ 15\%}$	44.49	54.90	67.107	2655	50.0	136.3	161.7	4.3	9.5	10.3	54.3	57.7	99.7
11	$T_{10=NLE\ 5\%}$	43.43	52.07	64.513	3075	52.8	161.1	192.4	5.5	11.3	11.3	57.3	60.7	101.3
12	$T_{11=NLE\ 10\%}$	45.963	57.39	70.967	3232	50.4	150.1	180.8	4.5	9.6	11.6	57.7	61.0	102.3
13	$T_{12=NLE\ 15\%}$	49.35	59.48	78.143	3393	67.9	171.5	205.5	6.5	12.2	12.5	52.0	55.7	97.7
Significance		S	S	S	S	S	S	S	S	S	S	S	S	S
SEm		1.55	1.93	2.85	0.440	0.806	1.430	2.960	0.125	0.175	0.202	0.602	1.112	0.715
SE d		2.19	2.73	4.03	0.622	1.140	2.022	4.186	0.180	0.247	0.286	0.851	1.572	1.011
CD 5%		4.525	5.641	8.325	1.291	2.368	4.198	8.691	0.374	0.513	0.594	1.766	3.264	2.098
Max		**49.35**	**59.48**	**78.143**	**3393**	**67.9**	**171.5**	**205.5**	**6.5**	**12.2**	**12.5**	**58.3**	**63.0**	**103.7**
Min		**39.28**	**50.76**	**62.14**	**1351**	**46.3**	**131.4**	**154.8**	**3.5**	**8.1**	**9.5**	**52.0**	**52.7**	**97.7**

MLE- moringa leaf extract, NLE- neem leaf extract

Table 1: -Effect of treatments on the mean performance of maize for growth parameters

Sno	Treatments	No of cobs Per plant	Cob Length (cm)	Cob Grith (cm)	No of Rows/cob	No of Kernels/row	Total no of Kernels cob	Seed yield Per plot (Kg)	Biological Yield (Q/ha)	Stover Yield (Q/ha)	Harvest Index (Q/ha)
1	**T_{0} =control**	1.5	13.3	10.2	10.0	26.9	271.3	3.1	102.4	71.4	30.3
2	**T_{1}=Panchagravya 5%**	1.6	15.3	11.0	11.7	30.6	326.8	3.6	118.0	78.2	30.8
3	**T_{2}= Panchagravya 10%**	1.9	16.4	12.2	13.3	32.9	424.4	4.2	133.0	89.5	31.4
4	**T_{3}= Panchagravya 15%**	1.6	15.6	11.1	11.9	31.3	348.4	3.7	120.6	81.4	31.0
5	**T_{4}=MLE 5%**	1.6	15.6	11.2	12.1	31.6	357.9	3.8	123.0	83.5	31.0
6	**T_{5}=MLE 10%**	1.6	15.6	11.3	12.5	31.9	386.3	4.0	124.3	85.0	31.1
7	**T_{6}=MLE 15%**	1.6	16.1	11.8	12.6	31.9	392.2	4.1	130.4	85.5	31.2
8	**T_{7}=Vermiwash 5%**	1.6	14.3	10.5	11.4	29.4	292.3	3.2	105.3	73.5	30.6
9	**T_{8}=vermiwash 10%**	1.6	14.7	10.9	11.5	29.7	296.1	3.3	110.6	76.3	30.6
10	**T_{9}=vermiwash 15%**	1.6	15.0	11.0	11.5	30.4	318.7	3.5	113.3	77.4	30.7
11	**T_{10}=NLE 5%**	1.6	16.3	12.0	13.1	32.4	304.8	4.1	130.3	85.5	31.2
12	**T_{11}=NLE 10%**	1.6	15.3	11.0	11.8	31.1	333.7	3.6	118.9	80.3	31.1
13	**T_{12}=NLE 15%**	2.2	17.3	12.8	13.7	35.4	432.2	4.4	142.7	93.3	34.1
Significance		S	S	S	S	S	S	S	S	S	S
SEm		0.049	0.188	0.172	0.167	0.391	28.429	0.073	0.583	0.143	0.456
SE d		0.069	0.266	0.243	0.237	0.553	40.204	0.103	0.825	0.202	0.645
CD 5%		0.144	0.552	0.504	0.492	1.149	83.472	0.215	1.712	0.420	1.340
Max		**2.2**	**17.3**	**12.8**	**13.7**	**35.2**	**432.2**	**4.4**	**142.7**	**93.3**	**34.1**
Min		**1.5**	**13.3**	**10.2**	**10.0**	**26.9**	**271.3**	**3.1**	**102.4**	**71.4**	**30.3**

MLE- moringa leaf extract, NLE- neem leaf extract

Table 2: -Effect of treatments on mean performance of maize for seed yield parameters

Table 3: -Effect of treatments on Economics of maize (*Zea may. L*)

Sno	Treatments	Seed yield (Q/ha)	Cost of Cultivation (Rs/ha)	Additional cost of Cultivation	Total cost of cultivation (Rs/ha)	Gross Returns (Rs/ha)	Net returns (Rs/ha)	Benefit cost Ratio
1	**T_0- Control**	31	30000	0	30000	57350	27350	0.91
2	**T_1-Panchagravya 5%**	36	30000	400	30400	66600	36200	1.19
3	**T_2 -Panchagravya 10%**	42	30000	600	30600	77700	47100	1.54
4	**T_3 -Panchagravya 15%**	37	30000	800	30800	68450	37650	1.22
5	**T_4-Moringa leaf extract 5%**	38	30000	600	30600	70300	39700	1.30
6	**T_5- Moringa leaf extract 10%**	40	30000	700	30700	74000	43300	1.41
7	**T_6- Moringa leaf extract 15%**	41	30000	1000	31000	75850	44850	1.45
8	**T_7-vermiwash 5%**	32	30000	500	30500	59200	28700	0.94
9	**T_8- vermiwash 10%**	33	30000	700	30700	61050	30350	0.99
10	**T_9- vermiwash 15%**	35	30000	900	30900	64750	33850	1.10
11	**T_{10}-Neem leaf extract 5%**	41	30000	500	30500	75850	45350	1.49
12	**T_{11}- Neem leaf extract 10%**	36	30000	700	30700	66600	35900	1.17
13	**T_{12}- Neem leaf extract 15%**	**44**	**30000**	**900**	**30900**	**81400**	**50500**	**1.63**

CONCLUSION

It is concluded from the present study that the pre-sowing seed treatment with selected organics and botanicals exhibited significant effect on growth, seed yield and its contributing characters under field conductions of maize. Seed treatment with T12- Neem leaf extract (15%) was recorded highest for rate of field emergence, plant height, Number of leaves, days 50% tasselling, days to 50% silking, days to 50% maturity, Number of cobs per plant, cob length, cob grith, number of rows in a cob, number of kernels in a cob, total number of kernels in a cob, seed yield per plot, biological yield, stover yield, harvest index followed by seed treatment withT2- Panchagravya (10%) whereas lowest was recorded in control plot T0- Control Highest B:C ratio was also found in T12- Neem leaf extract (15%) 1.63 followed by T2- panchagravya (10%) 1.54 Whereas lowest was recorded in T0- Control 0.91.

Neem leaf extract (15%) is a suitable Pre-sowing seed treatment for growth, seed yield and yield attributing traits of maize (Zea mays. L).

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