Original Research Article

EFFECT OF DIFFERENT TREATMENTS AND PACKAGING MATERIAL ON GERMINATION AND SEED QUALITY CHARACTERISTICS OF FOXTAIL MILLET (*Setaria italica*) UNDER AMBIENT STORAGE CONDITION (Variety-SiA-3088)"

ABSTRACT

The current study was conducted in 2021 at the Lab Experimentation Center at the Genetics and Plant Breeding Department of the Naini Agricultural Institute at the Sam Higginbottom University of Agriculture, Technology, and Sciences in Prayagraj. Four replications and thirteen different treatments, including T0-control, T1: Cow urine at 2% for 6 hours; T2: Cow urine at 4% for 12 hours; T3: Cow urine at 8% for 24 hours. T4: 0.25 percent seaweed extract for 12 hours; T5: 0.50 percent seaweed extract for 12 hours; T6: 0.75 percent seaweed extract for 12 hours. T7- Tulasi leaf extract at 5% for six hours, T9: Tulasi leaf extract 15% for 24 hours, T8: Tulasi leaf extract 10% for 12 hours T10 has a 2 percent moringa leaf extract, T11 a 4 percent moringa leaf extract, and T12 an 8 percent moringa leaf extract. and three different types of packaging P1: polythene bag, P2: gunny bag, and P3: hermetic container taken for the second and fourth months of 2020–21, respectively. Analysis of variance data from the lab experiment was laid out in completely randomized block design showed that the foxtail millets seeds variety produced superior results for all of the characters under study, including germination percentage, shoot length, root length, seedling length, seedling fresh weight, seedling dry weight, and seed vigour index -1 and -2. Among the three packaging materials, the variety Sia-3088 treated with cow urine (T1-cow urine 2%) was found to be beneficial in all seedling features. Seeds were shown to be effectively stored in polythene bags with high percentage of germination under ambient storage conditions.

Key words: foxtail millet seeds, cow urine, sea weed extract, tulasi leaf extract, moringa leaf extract,

I. INTRODUCTION

Foxtail millet (Setaria italica (L.) P. Beauv.) (Alternative name Panicum italicum L.), is a diploid plant with nine chromosomes (2n = 18), belonging to the family Paniceae/Poaceae, subfamily Panicoideae, and tribe Chloridoideae. However, it shares a close relationship with Setaria species that are tetraploid and polyploid (Benabdelmouna et al., 2001). One such millet, foxtail millet, is among the earliest crops known to have been domesticated and has been ranked as the sixth highest yielding grain in terms of global production. Importantly, the majority of millets' seeds may be kept in storage for longer periods of time without being harmed by pests. It is the most significant millet species in East Asia and the second most extensively planted millet species overall. The second-most widely grown millet in India, it is also called as "Korralu" in Andhra Pradesh, "Thinai" in Tamil Nadu, "Kang" or "Rala" in Maharashtra, and "Kakum" in Hindi (Lata et al., 2011).

Millets are incredibly nutrient-dense, non-glutenous, and acid-free meals. They are therefore calming and simple to stomach. They are regarded as the least allergic and most easily absorbed grains on the market. 8% protein and 4% fat are both present in millets. They are a plentiful source of minerals and vitamins. Calcium is very abundant in millets. Millets also include anti-nutritional elements including phytate and polyphenols, however these are mainly found in the seed coat, and milled millets are often free of these elements. (Kumar, 2010). Most crops can benefit from the seed treatment known as "seed bio-priming," which increases rate, quick emergence, uniformity of emergence, and crop establishment (Rawat et al., 2011). The major components of seed priming with organics are cow dung, cow urine, lime, and water in certain ratios (A. Kumar et al., 2017). These organic materials, when employed as a source of priming agents, include beneficial microorganisms that are essential for the seedling's successful establishment during the early stages of development (Jayanth Kumar et al., 2017). Based on botanical components, botanical seed treatments are derived from naturally available sources. It is a liquid formulation that promotes early and uniform seed germination as well as early crop stage pest and disease tolerance. Biofertilizers are microbial inoculants of bacteria, algae, and fungi that are biologically active products (Gurusinghr, et al., 2001). Cow urine is recognized to improve germination and other aspects of plant growth, including number of grains, number of tillers, grain weight, and yield factors such as leaf area and number of leaves (G. Nayak et al., 2015). It has been explained by the presence of growth regulators, nutrients, and trace elements in cow urine, which are physiologically active chemicals. Most earlier researches claimed that using fermented cow urine to improve soil fertility and utilize it as a liquid fertilizer and crop pesticide (C. Mini et al., 2006). One of the most vital marine resources in the world is seaweed. A wide range of plant growth regulators, including auxins and cytokinin's, have been identified through chemical analysis of seaweeds and their extracts in varied concentrations (Zhang and Ervin, 2008) When used as a foliar spray, the liquid seaweed fertilizer made from seaweed extract encourages faster growth and yield in green and fleshy vegetables, fruits, orchards, and horticultural plants. Numerous research has shown that applying seaweed extract to plants has a variety of advantageous impacts. The seaweed concentrations are sprayed on crops' leaves, soaked into the soil, or dipped into their roots. Seaweed concentrates work well as bio stimulants in a variety of crops, including grains, trees, flowers, and vegetables (Stirk et al., 2004). As a bio-stimulant, moringa leaf extract (MLE) contains macro- and micronutrients, amino acids, ascorbic acids, minerals, and growth-promoting properties (Makkar et al., 2007). Hermetic technology is used in a number of additional ways, such as the de-infestation of durable goods during or before shipment and the quarantine vacuum treatment of imported crops including geophytes, onions, and potatoes following acceptance (Villiers, 2010). Because there is no complete control over the seeds' ability to absorb moisture, polyethylene is not ideal for the long-term storage of conventional seeds for genetic preservation. It delivers good results and is ideally suited for short- or medium-term storage. Although they are impervious to moisture, over time there will be a steady flow of water vapour through them that will work to balance the relative humidity within and outside the container.

II. MATERIALS AND METHODS

The Department of Genetics and Plant Breeding at SHUATS in Prayagraj, Uttar Pradesh, which is situated at 25°39'42"N, 81°67'56"E, and 98 m above mean sea level, undertook a lab experiment during the Rabi season of 2020. Four replications and thirteen different treatments, including T0-control, T1: Cow urine at 2% for 6 hours; T2: Cow urine at 4% for 12 hours; T3: Cow urine at 8% for 24 hours. T4: 0.25 percent seaweed extract for 12 hours; T5: 0.50 percent seaweed extract for 12 hours; T6: 0.75 percent seaweed extract for 12 hours. T7: Tulasi leaf extract at 5% for six hours; T8: Tulasi leaf extract at 10% for twelve hours; T9: Tulasi leaf extract at 15% for twenty-four hours. T10: 2 percent moringa leaf extract for two hours; T11: 4 percent moringa leaf extract for four hours. T12- 8 hours of 8% moringa leaf extract with three types of packaging P1: a polythene bag, P2: a gunny bag, and P3: a hermetic container, all taken during the Rabi 2020-21. Foxtail millet seeds were cleaned, dried at a lower moisture level, and given the aforementioned treatments. The cleaned, dried, and treated seeds were then packed in various packing materials, including a polythene bag (P1), a gunny bag (P2), and a hermetic container (P3), and kept for a period of four months at room temperature. The germination test was carried out in a lab utilising between-paper methods in accordance with ISTA, and 100 seeds were placed in the germination chamber with four replicates. Observations on seed germination were taken at intervals of two months. On the seventh day of incubation, the seeds were assessed, and the cumulative percentage of germination was expressed using a standard seedling. The key differences between the treatments were calculated at 5% significance in the statistical analysis of the experiment's data using factorial CRD.

III. RESULTS AND DISCUSSION

The germination percent at 2nd and 4th months of storage ,polythene bag packing material of T1- Cow urine 2% - 6hrs (94.00%) , polythene bag T1- Cow urine 2% - 6hrs(90.00%) and, hermetic bag T1- Cow urine 2% (90.5%) at 2nd month. was recorded, while value of germination (T0-Control- 70.5%(Gunny bag),70.25%(Polythene bag) and 70% (Hermetic bag) at 2nd month and T0-control(83.00% - Gunny bag, 79.00% -polythene bag, 70% Hermetic bag) at 4th month. The root length at 2nd and 4th months of storage ,the Polythene bag packed seeds recorded significantly higher values of root length T1- Cow urine 2% with 6 hrs (6.37cm and 6.325 cm) of 2nd & 4th month under ambient storage, which was superior over all other treatments followed by T4 –Sea weed extract 0.25% with 12Hrs and lower value of root length (5.725 cm and 6 cm) was recorded in gunny bags kept under room temperature, which was also on par with gunny bag at room temperature (6.3 cm and 5.83cm) of 2nd & 4th month followed by T4 –Sea weed extract 0.25% with 12hrs (6.275 and 5.925cm) of 2nd & 4th month and lower value of root length T0-(5.7 and 5.425). hermetic bags at room temperature (6.1 cm and 5.975cm) of 2nd & 4th month followed by T4 –Sea weed extract 0.25% with 12hrs (5.975 and 5.875cm) of 2nd & 4th month and lower value of root length T0-(5.425 and 5.3) from the above results, it is clear that polythene bag packed seeds could be maintained the higher root length over high density gunny bags at all the stages of storage. Similar results were found in Meena et al., (2017).

The shoot length at 2nd and 4th months of storage ,the polythene bag packed seeds recorded significantly higher values of shoot length T1- Cow urine 2% with 6 hrs (3.95cm and 3.825 cm) of 2nd & 4th month under ambient storage, which was superior over all other treatments followed by T4 –Sea weed extract 0.25% with 12hrs (3.825 cm and 3.75 cm) of 2nd & 4th month and lower value of root length (3.3cm and 3.175cm) T0- control was recorded in polyethene bags kept under room temperature, which was also on par with gunny bags at room temperature T1 – cow urine 2% (3.825 cm and 3.75cm) of 2nd & 4th month followed by T4 – Sea weed extract 0.25% with 12hrs (3.65cm and 3.575 cm) of 2nd & 4th month and lower value of root length T0-(3.075cm and 2.95cm) from the above results, and hermetic bags at room temperature T1 – cow urine 2% (3.675 cm and 3.55cm) of 2nd & 4th month followed byT4 – Sea weed extract 0.25% with 12hrs (3.55cm and 3.5 cm) of 2nd & 4th month and lower value of root length T0-(2.925cm and 2.85cm) from the above results , it is clear that polythene bag packed seeds could be maintained the higher root length over high density polythene bags at all the stages of storage. Similar results were found in Radha B.N et al.,(2018).

The seedling length at 2nd and 4th months of storage ,the polythene bag packed seeds recorded significantly higher values of seedling length T1- Cow urine 2% with 6hrs (10.325cm and 10.15 cm) of 2nd & 4th month under ambient storage, which was superior over all other treatments followed by T4 –Sea weed extract 0.25% with 12hrs (10.225 cm and 9.8 cm) and lower value of Seedling length (9.15cm and 8.85cm) was recorded in polythene bags kept under room temperature, which was also on par with gunny bags at room temperature (10.075 cm and 9.95cm) of 2nd & 4th month followed by T4 –Sea weed extract 0.25% with 12hrs (9.7cm and 9.625 cm) of 2nd & 4th month and lower value of Seedling length T0-(8.775cm and 8.375 cm) from the above results and gunny bags at room temperature (9.775 cm and 9.725cm) of 2nd & 4th month followed by T4 –Sea weed extract 0.25% with 12hrs (9.525cm and 9.45 cm) of 2nd & 4th month and lower value of Seedling length T0-(8.525cm and 8.25 cm) from the above result it is clear that polythene bag packed seeds could be maintained superior. Similar results were found in Kumar *et al.*, (2017).

The fresh weight at 2nd and 4th months of storage, the polythene packed seeds recorded significantly higher fresh weight T1- Cow urine 2% with 6hrs (0.073 mg and 0.072) at room storage, as compared to other treatments and followed by T4 –Sea weed extract 0.25% with 12hrs (0.069mg and 0.068mg). Lower fresh weight T0- (0.06 and 0.065) was recorded in polythene bags at room temperature, and it was on par with gunny bags at room temperature (0.069mg and 0.069 mg) followed by T4 –Sea weed extract 0.25% with 12Hrs (0.066mg and 0.066mg) and Lower fresh weight T0- (0.059 and 0.058) and with hermetic bags at room temperature (0.064mg and 0.064 mg) followed by T4 –Sea weed extract 0.25% with 12Hrs (0.062mg and 0.061mg) and Lower fresh weight T0- (0.058 and 0.057. It is clear from the results that the Polythene packed seeds could maintain superior. Similar results were found in Kumar *et al*., (2017).

The dry weight at 2nd and 4th months of storage, the polythene packed seeds recorded significantly higher dry weight T1- Cow urine 2% with 6hrs (0.029mg and 0.025 mg) at room storage, as compared to other treatments and followed by T4 –See weed extract 0.25% with 12Hrs (0.031mg and 0.025mg). Lower seedling dry weight T0- (0.028

and 0.023) was recorded in polythene bags at room temperature, and it was on par with gunny bags at room temperature T1- Cow urine 2% with 6hrs (0.0267mg and 0.024 mg) at room storage, as compared to other treatments and followed by T4 –Sea weed extract 0.25% with 12Hrs (0.0275mg and 0.024mg). Lower dry weight T0- (0.0265 and 0.026) and hermetic bags at room temperature T1- Cow urine 2% with 6hrs (0.026mg and 0.023 mg) at room storage, as compared to other treatments and followed by T4 –See weed extract 0.25% with 12Hrs (0.0275 mg and 0.022mg). Lower seedling dry weight T0- (0.025 and 0.024) It is clear from the results that the polythene bag packed seeds could maintain superior. Similar results were found in Radha B.N et al., (2018).

The Vigour index -I at 2nd and 4th months of storage ,polythene packed seeds recorded significantly higher vigour index- I T2-Cow urine 6% with 24hrs (944.85 and 911.88) over all other treatments, followed T4 –Sea weed extract 0.25% with 12hrs (881.08 and 820.45). Lower vigour index –I T0- (644.9 and 586.33) was recorded in polythene bags at room temperature, and it was on par with gunny bags at room temperature T1- Cow urine 2% with 6hrs (943.9 and 768.15) at room storage, as compared to other treatments and followed by T4 –See weed extract 0.25% with 12hrs (845.4 and 822.43). Lower Vigour index – I T0- (614.18 and 596.78) and hermetic bags at room temperature T1- Cow urine 2% with 6hrs (941.58 and 880.03) at room storage, as compared to other treatments and followed by T4 –See weed extract 0.25% with 12hrs (847.4 and 796). Lower Vigour index – I T0- (614.18 and 577.55) It is clear from the results that the polythene bag packed seeds could maintain. Similar results were found in Meena et al., (2017).

The Vigour index -II at 2nd and 4th months of storage, polythene packed seeds recorded significantly higher vigour index- II T1-Cow urine 2% with 6hrs (2.73 and 2.33) over all other treatments, followed T4 –See weed extract 0.25% with 12hrs (2.61 and 2.37). Lower vigour index –II T0- (1.99 and 1.85) was recorded in polythene bags at room temperature, and it was on par with gunny bags at room temperature T1- Cow urine 2% with 6hrs (2.43 and 2.42) at room storage, as compared to other treatments and followed by T4 – See weed extract 0.25% with 12hrs (2.19 and 2.17). Lower seed Vigour index – II T0- 1.92 and 1.61) and hermetic bags at room temperature T1- Cow urine 2% with 6hrs (2.49 and 2.33)at room storage, as compared to other treatments and followed by T4 –See weed extract0.25% with 12hrs (2.37 and 2.05). Lower Vigour index – II T0- 1.85 and 1.47) It is clear from the results that the polythene bag packed seeds could maintain. Similar results were found in T. Vange et al., (2016).

Table 01. Mean Table of Seed Quality Control Under 2 Months Storage with Polythene Bag

Sl.no	Treatment	Germination %	Root length	Shoot length	Seedling length	Fresh weight	Dry weight	Vigour index - I	Vigour index - II
2	**T0**	70.5	5.72	3.3	9.15	0.060	0.0282	644	1.99
3	**T1**	94	6.37	3.95	10.32	0.072	0.029	848	2.73
4	**T2**	91.5	6.32	3.9	10.22	0.068	0.027	944	2.52
5	**T3**	89.5	6.27	3.82	10.1	0.068	0.029	915.	2.64
6	**T4**	87.25	6.25	3.77	10.02	0.068	0.03	881	2.61
7	**T5**	85.5	6.17	3.67	9.85	0.068	0.03	857	2.56
8	**T6**	83.5	6.15	3.6	9.75	0.068	0.029	822	2.49
9	**T7**	81.5	6.07	3.55	9.62	0.068	0.027	794	2.42
10	**T8**	79.5	6.05	3.5	9.55	0.067	0.022	765	2.32
11	**T9**	77.5	6	3.45	9.45	0.067	0.029	740	2.29
12	**T10**	75.5	5.95	3.42	9.37	0.066	0.029	713	2.19
13	**T11**	73	5.9	3.4	9.3	0.066	0.029	684	2.12
14	**T12**	72.5	5.77	3.37	9.02	0.062	0.028	674	2.05
15	**Grand mean**	**81.63**	**6.07**	**3.59**	**9.67**	**0.066**	**0.029**	791.	2.38
16	**CD 5%**	3.19	0.1404	0.113	0.154	0.004	0.025	34.27	0.21
17	**SE(m)**	1.11	0.049	0.039	0.0524	0.0015	0.088	12.00	0.076
18	**SE(d)**	1.16	0.07	0.06	0.06	0	0.002	18.13	0.11
19	**CV**	3.16	2.05	2.546	3.62	5.325	7.0077	3.50	7.41

Table 02 .MEAN TABLE OF SEED QUALITY CONTROL UNDER 4th MONTHS STORAGE WITH POLYTHENE BAG

Sl.no	Treatment	Germination %	Root length	Shoot length	Seedling length	Fresh weight	Dry weight	Seed vigour index -I	Seed vigour index -II
2	**T0**	70.25	**5.7**	3.07	8.77	0.059	0.0265	621	1.92
3	**T1**	93.00	**6.3**	3.82	10.07	0.069	0.029	943	2.23
4	**T2**	90.50	**6.27**	3.8	9.95	0.067	0.026	909	2.18
5	**T3**	88.25	**6.2**	3.75	9.82	0.067	0.025	873	2.19
6	**T4**	86.25	**6.17**	3.65	9.7	0.066	0.023	845	1.87
7	**T5**	84.50	**6.1**	3.6	9.57	0.066	0.028	817	2.09
8	**T6**	82.50	**6.05**	3.52	9.45	0.066	0.025	791	1.93
9	**T7**	80.50	**6.02**	3.42	9.25	0.066	0.028	760	1.91
10	**T8**	78.50	**5.9**	3.3	9.15	0.065	0.028	731	1.89
11	**T9**	76.75	**5.9**	3.25	9.02	0.065	0.025	710	1.87
12	**T10**	74.50	**5.8**	3.22	8.97	0.064	0.027	681	1.87
13	**T11**	72.50	**5.77**	3.2	8.9	0.064	0.027	657	1.81
14	**T12**	71.50	**5.72**	3.17	10.12	0.063	0.0263	636	1.75
15	**Grand mean**	**80.73**	**5.99**	**3.44**	**9.44**	**0.065**	**0.027**	767	**1.96**
16	**CD 5%**	3.85	0.134	0.113	0.21	0.0386	0.00277	34.12	0.20
17	**SE(m)**	1.33	0.047	0.039	0.07	0.0013	0.00971	11.95	0.071
18	**SE(d)**	1.71	0.07	0.06	0.11	0.0003	0.0023	18.09	0.11
19	**CV**	3.30	1.98	2.66	1.80	4.97	8.16	3.59	8.38

Table 03. Mean Table of Seed Quality Control Under 2nd Months Storage with Gunny Bag

Sl.no	Treatment	Germination %	Root length	Shoot length	Seedling length	Fresh weight	Dry weight	Vigour index - I	Seed vigour index -II
2	**T0**	70.00	**5.42**	2.95	8.52	0.058	0.025	614	1.85
3	**T1**	93.00	**6.1**	3.65	9.775	0.064	0.0275	941	2.49
4	**T2**	90.50	**6.07**	3.7	9.755	0.060	0.026	911	2.40
5	**T3**	88.50	**6**	3.65	9.65	0.060	0.022	880	2.52
6	**T4**	86.25	**5.97**	3.55	9.52	0.062	0.025	847	2.37
7	**T5**	84.50	**5.9**	3.5	9.4	0.060	0.027	819	2.41
8	**T6**	82.50	**5.92**	3.45	9.35	0.061	0.025	790	2.28
9	**T7**	80.50	**5.87**	3.35	9.2	0.060	0.024	760	2.25
10	**T8**	78.50	**5.85**	3.15	9	0.060	0.022	726	2.20
11	**T9**	76.50	**5.8**	3.15	8.92	0.058	0.021	700	2.10
12	**T10**	74.50	**5.67**	3.12	8.8	0.060	0.024	672	2.05
13	**T11**	72.00	**5.65**	3.1	8.77	0.059	0.025	646	1.96
14	**T12**	71.50	**5.52**	3	8.35	0.055	0.0242	636	1.89
15	**Grandmean**	**80.67**	**5.83**	**3.32**	**9.15**	**0.059**	**0.025**	**765**	**2.21**
16	**CD 5%**	3.13	0.41	0.125	0.224	0.0035	0.025	35.82	0.24
17	**SE(m)**	1.097	0.049	0.043	0.0785	0.0010	0.0911	12.55	0.084
18	**SE(d)**	1.66	0.08	0.05	0.08	0.0005	0.003	18.94	0.13
19	**CV**	3.14	1.94	3.05	1.979	4.10	8.40	3.78	8.80

Table 04. MEAN TABLE OF SEED QUALITY CONTROL UNDER 4th MONTHS STORAGE WITH GUNNY BAG

Sl.no	Treatment	Germination %	Root length	Shoot length	Seedling length	Fresh weight	Dry weight	Vigour index - I	Vigour index - II
2	**T0**	70	**5.67**	3.17	8.85	0.065	0.023	586	1.47
3	**T1**	91.5	**6.32**	3.82	10.15	0.072	0.025	910	2.33
4	**T2**	88.5	**6.3**	3.75	10.05	0.070	0.025	873	2.17
5	**T3**	87.25	**6.22**	3.67	9.9	0.070	0.024	855	2.09
6	**T4**	85.25	**6.2**	3.6	9.8	0.069	0.024	820	2.05
7	**T5**	83.75	**6.15**	3.52	9.67	0.069	0.023	793	1.97
8	**T6**	81.5	**6.1**	3.5	9.6	0.069	0.023	754	1.85
9	**T7**	79.5	**6**	3.45	9.45	0.069	0.023	731	1.83
10	**T8**	77.75	**5.92**	3.4	9.32	0.069	0.023	699	1.81
11	**T9**	75.75	**5.87**	3.37	9.25	0.068	0.023	676	1.72
12	**T10**	73.5	**5.85**	3.3	9.15	0.066	0.022	648	1.64
13	**T11**	71.5	**5.8**	3.27	9.07	0.067	0.022	618	1.57
14	**T12**	70.75	**5.7**	3.2	8.9	0.067	0.021	599	1.52
15	**Grand mean**	**79.73**	**6.0**	**3.46**	**9.45**	**0.068**	**0.023**	**736**	**1.85**
16	**CD 5%**	3.07	0.126	0.113	0.174	0.0030	0.00262	32.42	0.17
17	**SE(m)**	1.077	0.044	0.0396	0.061	0.0010	0.00918	11.36	0.06
18	**SE(d)**	1.63	0.07	0.06	0.09	0	0.0025	17.18	0.09
19	**CV**	3.11	1.69	2.64	1.491	3.56	9.066	3.56	7.65

Table 05. MEAN TABLE OF SEED QUALITY CONTROL UNDER 2nd MONTHS STORAGE WITH HERMETIC CONTAINER

Sl.no	Treatment	Germination %	Root length	Shoot length	Seedling length	Fresh weight	Dry weight	Seed vigour index -I	Seed vigour index -II
2	**T0**	70	5.42	2.95	8.37	0.061	0.026	596	1.61
3	**T1**	92	6.2	3.75	9.95	0.069	0.024	768	2.42
4	**T2**	90	6.17	3.7	9.87	0.066	0.024	879	2.34
5	**T3**	87.5	6.15	3.65	9.8	0.066	0.024	855	2.23
6	**T4**	85.25	6.05	3.57	9.62	0.066	0.024	822	2.17
7	**T5**	83.5	5.97	3.5	9.47	0.065	0.023	795	2.21
8	**T6**	81.5	5.82	3.42	9.25	0.065	0.023	766	2.04
9	**T7**	79.5	5.8	3.4	9.2	0.065	0.023	743	1.93
10	**T8**	77.5	5.7	3.3	9	0.065	0.023	713	1.92
11	**T9**	75.5	5.65	3.27	8.92	0.064	0.022	679	1.79
12	**T10**	73.5	5.62	3.2	8.82	0.064	0.022	655	1.84
13	**T11**	71	5.5	3.15	8.65	0.063	0.022	624	1.72
14	**T12**	70.5	5.45	3.02	8.47	0.063	0.021	618	1.77
15	**Grand mean**	**79.70**	**5.80**	**3.37**	**9.18**	**0.064**	**0.0230**	**732.23**	**2.00**
16	**CD 5%**	3.122	0.125	0.114	0.1717	0.002253	0.02092	31.54	0.22
17	**SE(m)**	1.094	0.043	0.040	0.060	0.00079	0.00733	11.05	0.077
18	**SE(d)**	1.66	0.07	0.06	0.09	0	0.00031	16.69	0.12
19	**CV**	3.16	1.74	2.7530	1.512	2.816	7.328	3.48	8.89

Table 06.MEAN TABLE OF SEED QUALITY CONTROL UNDER 4th MONTHS STORAGE WITH HERMETIC CONTAINER

Sl.no	Treatment	Germination %	Root length	Shoot length	Seedling length	Fresh weight	Dry weight	Seed vigour index -I	Seed vigour index -II
2	**T0**	70	**5.3**	2.85	8.25	0.057	0.024	577	1.47
3	**T1**	90.5	**5.97**	3.55	9.72	0.064	0.025	880	2.33
4	**T2**	87.5	**5.95**	3.5	9.67	0.062	0.023	846	2.17
5	**T3**	86.25	**5.95**	3.5	9.6	0.062	0.022	828	2.09
6	**T4**	84.25	**5.85**	3.45	9.45	0.063	0.022	796	2.05
7	**T5**	83	**5.77**	3.47	9.27	0.063	0.021	769	1.97
8	**T6**	81	**5.72**	3.25	9.15	0.063	0.021	741	1.85
9	**T7**	79	**5.7**	2.92	9.1	0.062	0.021	718	1.83
10	**T8**	76.75	**5.57**	3.12	8.87	0.060	0.020	681	1.81
11	**T9**	74.75	**5.55**	3.07	8.85	0.061	0.020	661	1.72
12	**T10**	72.75	**5.52**	3.05	8.72	0.060	0.022	634	1.64
13	**T11**	70.5	**5.4**	2.95	8.55	0.060	0.020	602	1.57
14	**T12**	70.25	**5.37**	2.9	8.4	0.059	0.019	590	1.52
15	**Grand mean**	**78.96**	**5.67**	**3.20**	**9.04**	**0.061**	**0.0215**	**717**	**1.85**
16	**CD 5%**	3.00	0.136	0.185	0.174	0.0026	0.0022	29.36	0.17
17	**SE(m)**	1.054	0.477	0.64	0.0612	0.00092	0.000794	10.28	0.06
18	**SE(d)**	1.60	0.07	0.10	0.010	0	0.00023	15.59	0.09
19	**CV**	3.08	1.944	4.68	1.563	3.475	8.62717	3.30	8.55

Conclusion:

From the present investigation it is concluded that treating seeds with different organic treatments enhance seed germination of Foxtail millet. Seeds treated with cow urine (T_1-cow urine 2%) found effective in all the seedling characteristics among the three packaging materials followed by T_2 and control was found lowest in all the packaging materials. Storage of seeds in polythene bag was found to be effective with high germination percentage under ambient storage. It can be concluded that the seedling characters could be improved through organic seed treatments like cow urine and also storage in polythene bags was effective among three packaging materials.

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