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 present investigation was entitled, "Effect of different seed treatments and packaging material on germination and seed quality characteristics of foxtail millet under six months storage condition(Variety-Sia-3088)" were carried out at Lab Experimentation Centre at department of Genetics and Plant Breeding Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during 2021 .The experiment were laid with four replications and thirteen treatments viz., T0-control, T1 – Cow urine 2% for 6hrs, T2- Cow urine – 4% for 12hrs, T3- Cow urine - 8% for 24hrs,T4 – Sea weed extract 0.25 % for 12hrs, T5- Sea weed extract 0.50 % for 12hrs %, T6- Sea weed extract 0.75 for 12hrs, T7- Tulasi leaf extract 5% for 6hrs, T8- Tulasi leaf extract 10% for 12hrs, T9- Tulasi leaf extract 15% for 24hrs, T10- Moringa leaf extract 2% for 2hrs, T11- Moringa leaf extract 4% for 4hrs, T12- Moringa leaf extract 8% for 8hrs and three different packing materials P1- polythene bag, P2- gunny bag, P3- hermetic container taken2nd and 4th month duration respectively during 2020-21. Analysis for the data in lab experiment revealed significance mean sum of squares due to seed priming treatments for all the characters under study, germination percent, shoot length, root length , seedling length, seedling fresh weight, seedling dry weight , seed vigour index -1, seed vigour index -2 was observed superior result of foxtail millets seeds variety Variety-Sia-3088 treating 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 %.

Key words: foxtail millet seeds, cow urine, sea weed extract, tulasi leaf extract,moringa leaf extract,polythene bag, gunny bag, hermetic container

I. INTRODUCTION

Foxtail millet (*Setaria italica (L.) P. Beauv*.) (Synonym Panicum italicum L.), family Paniceae/Poaceae, subfamily Panicoideae, tribe Chloridoideae, is diploid with nine chromosomes 2n =18. It is, however, closely related to tetraploid and polyploid species of Setaria (Benabdelmouna *et al.*, 2001).Foxtail millet is one such millet known to be the oldest cultivated crops, which has been identified as the sixth highest yielding grain in terms of worldwide production.. Importantly, seeds of most millets can be stored for longer period and are not affected by storage pests. Nutritionally, millets are several times superior to other cereal crops such as rice and wheat (Lata et al., 2013). It is an annual grass grown for human food. It is the second-most widely planted species of millet, and the most important in East Asia. It is the second-most cultivatedmillet (also known as ― Korralu" in Andhra Pradesh and "Thinai" in Tamil Nadu and ―Kang" or ―Rala" in Maharashtra, ―Kakum" in Hindi) in India (Lata et al., 2011).

Millets are highly nutritious, non- glutinous and non-acid forming foods. Hence they are soothing and easy to digest. They are considered to be the least allergenic and most digestiblegrains available. Millets contain about 8 per cent protein and 4 per cent fat. They are rich source of vitamins and minerals. Millets are especially rich in calcium. Anti-nutritional factors such as phytate and polyphenols are also present in millets but they are mostly confined to the seed coat and the milled millets are generally free from the anti-nutritional factors. (Kumar, 2010). The seed bio-priming is an effective seed treatment to increase the rate, rapid emergence, uniformity of emergence and crop establishment in most of the crops (Rawat *et al*., 2011). Seed priming with organics mainly contains the ingredients as cow dung, cow urine, lime and water in fixed proportions (A. Kumar *et al.*, 2017). These organics when used as a source of priming agents they contain useful microbes that are needed for the well establishment of the seedling in the initial stages of the development (Jayanth Kumar *et al.*, 2017). Botanical seed treatment is extracted from naturally occurring sources based on botanical ingredients. It is a liquid formulation, it has synergistic effect on early and uniform seed germination and enhance tolerance to pest and disease during early crop stage. Biofertilizers are biologically active products rmicrobial inoculants of bacteria, algae and fungi (Gurusinghr, *et al*., 2001). Microbes are effective in inducing plant growth as they secrets plant growth promoters (Auxins, Abscisic Acid, Gibberellic Acid, Cytokines, and ethylene) and enhance seed germination and root growth (Hattis *et al*., 2001). Cow urine known to have beneficial effect on germination, growth components *viz.*, plant height,

number of leaves, leaf area and yield components like number of grains, tiller number,grain weight and yield of crops (G. Nayak *et al.,* 2015). It has been attributed to the fact that cow urine contains physiologically active substances *viz.,* growth regulators, nutrients and trace elements. Most of the earlier researchers said that the use of fermented cow urine enhances soil fertility and it can also be turned into liquid fertilizers as a pesticide for crops (C. Mini *et al.,* 2006). Seaweeds are one of the most important marine resources of the world. Seaweed extracts (saps) have been marketed for several years as fertilizer additives and beneficial results from their use have been reported (Booth, 1965). Chemical analysis of seaweeds and their extracts have revealed the presence of a wide varietyof plant growth regulators such as auxins and cytokinins in varying amounts (Zhang and Ervin, 2008) The liquid seaweed fertilizer obtained from seaweed extract is used as foliar spray for inducing faster growth and yield in leafy and fleshy vegetables, fruits,orchards and horticultural plants. Numerous studies have revealed a wide range of beneficial effects of seaweed extract applications on plants. The seaweed concentrates are applied to crops as foliar sprays, soil drenches or root dips. Seaweed concentrates are effective biostimulant in many crops including vegetables, trees, flowering plants and grain crops (Stirk *et al.,* 2004). Moringa Leaf Extract (MLE) can be used as a bio- stimulant and contains macro and micronutrients, amino acids, ascorbic acids, minerals and growth- enhancing principles (Makkar *et al.,* 2007). Various other applications of hermetic technology includes the disinfestation of durable commodities during or before transportation, quarantine vacuum treatment for exported cropssuch as geophytes, onions, potatoes upon arrival or after acceptance (Villiers, 2010). Polyethylene is not suitable for long-term storage of orthodox seeds for genetic conservation, because there is no absolute control over moisture uptake by the seeds. It Is very much suitable for short or medium term storage and has give excellent results. These areresistant to the passage of moisture but over a long period of time, these will be a slow passage of water vapour tending to equilibrate the relative humidity inside and outside the container.

II. MATERIALS AND METHODS

The present investigation entitled, "Effect of different seed treatments and packaging material on germination and seed quality characteristics of foxtail millet under six months storage condition(Variety-Sia-3088)" carried out during 2020-2021.The experimental material consists of different priming treatments and seed of foxtail millets, which were provided by Lab Experimentation Centre at department of Genetics and Plant Breeding Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during 2021 .The experiment were laid with four replications and thirteen treatments viz., T0-control, T1 – Cow urine 2% for 6hrs, T2- Cow urine – 4% for 12hrs, T3- Cow urine - 8% for 24hrs,T4 –Sea weed extract 0.25 % for 12hrs, T5- Sea weed extract 0.50 % for 12hrs %, T6- Sea weed extract 0.75 for 12hrs, T7- Tulasi leaf extract 5% for 6hrs, T8- Tulasi leaf extract 10% for 12hrs, T9- Tulasi leaf extract 15% for 24hrs, T10- Moringa leaf extract 2% for 2hrs, T11- Moringa leaf extract 4% for 4hrs, T12- Moringa leaf extract 8% for 8hrs and three different packing materials P1- polythene bag, P2- gunny bag, P3- hermetic container taken respectively during Zaid 2020-21 SiA-3008 is popularly known as Suryanandi- 3088 , it is released in the year 2012 and developed by ANRAU suitable to grow in all kind of millet production areas. It matures at 70-75 days, the average yield is about 20-25Q/ha . Suryanandi-3088 is non-lodging type, early duration , less tolerant to drought and suitable for double cropping**.** Seeds of Foxtail millet variety SiA 3088 were cleaned, dried with safer moisture level and treated with above treatments and the treated seeds were packed in different packing materials viz., Polythene bag (P1), Gunny bag (P2), Hermetic container(P3), and stored for 4 months storage period under room temperature. Observation on seed germination was taken at an interval of 2 months and treated seeds are put for germination test, the germination test was conducted in laboratory using between paper methods as per ISTA, Hundred seeds of four replicates were placed in the germination chamber. The seeds was evaluated on 7 th day of incubation and cumulative percentage of germination was expressed based on normal seedling. The data obtained from the experiment was statistically analysed by using factorial CRD, the critical differences between the treatments were worked out at five percent significance

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, Hermatic 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% (Hermatic bag) at 2nd month and T0-control(83.00% - Gunny bag, 79.00% -polythene bag, 70% Hermatic 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 gunnybag 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). hermatic 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.

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 ploythene 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 hermatic 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.

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 6 Hrs (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.

The fresh weight at 2nd and 4th months of storage, the polythene packed seedsrecorded 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 gunnybags 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 hermatic 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.

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 hermatic 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.

The Vigour index -I at 2^{nd} and 4^{th} 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 hermatic 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.

The Vigour index -II at 2^{nd} and 4^{th} 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 hermatic 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.

Table no -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	Vigourindex -I	Vigourindex -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 No -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	**Grandmean**	**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 no- 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	Vigourindex -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 no – 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	Vigourindex -I	Vigourindex - 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	**Grandmean**	**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 no -05. MEAN TABLE OF SEED QUALITY CONTROL UNDER 2nd MONTHS STORAGE WITH HERMETIC CANTAINER

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	**Grandmean**	**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 no- 06.MEAN TABLE OF SEED QUALITY CONTROL UNDER 4th MONTHS STORAGE WITH HERMETIC CANTAINER

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	**Grandmean**	**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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