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EFFECT OF DIFFERENT PRE-SOWING TREATMENTS ON SEED GERMINATION OF *PROSOPISJULIFLORA* LINE

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ABSTRACT:

The seeds of *Prosopisjulifloraline* shows poor germination in controlled condition. *Prosopisjulifloraline* is multipurpose plant species. The experiments were conducted to improve the seed germination of *Prosopisjulifloraline* including scarification treatment and treatment with sulfuric acid 5 & 10 min, KNO_3, 2%, GA_3 500ppm and Kinetin 500ppm. The result shows that the treated seeds shows better seed germination as compared to control.

The treatment also given with dry heat and electrical conductivity 10 and 39 megahertz were found significant to enhance the total germination percentage of *Prosopisjulifloraline* seeds. After treatment 78% seeds were germinated against 40% in control. The treatment with dry heat 80^{0}C for 24 hrs also enhancedthepercentage of germination to 72% seeds were germinated against 40% in control. The Mechanical scarification by sand paper technique for 5 minutes also gave satisfactory result about 82% seeds were germinated. Treatment with H_2SO_4 2% for 15 minutes, KNO_3 2% and

Thiourera 2% for 15 minutes were also found very significant and around 95 to 98% seeds were germinated and the result were quite satisfactory to enhance the overall germination percentage and to break seeds dormancy Prosopisjulifloraline.

KEY WORDS: Seed germination dormancy, *Prosopisjulifloraline*, Sulfuric acid, KNO_3, GA_3, 1AA and Kinetin, dry heat, electrical conductivity.

INTRODUCTION:

Prosopisjulofloraline is small size tree are of great importance for the developing countries. Tree can be used as fuel wood for cooking and heating as timber for construction and fencing, food for animals as a shad from the sun and shelter from the wind and for stabilization of soil. Unfortunately the potential of forestry in rural areas, marginal environments has often been neglected due to incomplete understanding of management practices for multipurpose tree species that could utilize to be the benefit of the rural poor *Prosopisjuliflora* lineis growing in arid and semiarid regions of the world. Environmental changes and depletion will increases the ecological fragility and contribute to gradual degradation of forest recourses.It has become necessity to initiate both conservation and artificial regeneration programs to grow multipurpose tree at the rural community level.(Felker& Peter 1979, Griffith, 1945, Ballard, 1973 and Arreghini, 1972).

Prosopisjulifloraline is introduced in India from Mexico and flower twice a year feb-march and aug-sept. The *Prosopisjulifloraline* belongs to the family mimosodeacea. The major environmental problem is desertification now a days. The *Prosopisjulifloraline* is adopted to the condition of arid and semiarid conditions and important species to control the desertification. The *Prosopisjulifloraline* is considered a valuable species of the desert ecosystem. The plant is highly adaptable for desert condition. *Prosopisjulifloraline* is a multipurpose tree and grow in dry land agro forestry system and also play a role in conversation of soil by stabilizing sand dunes, improving soil fertility, reducing soil salinity, providing fuel energy resources supplying feed and forage for grazing animals, furniture wood and supplement food for human and helpful in honey production.(Lahri and Gaur, 1969, Martin et al, 1974). The *Prosopisjulifloraline* is an exotic species grows in salines soil Ph10 germination does not occur easily because of its hard seed coat and dormant seeds(Cavang, 1980, Clemeanset al 1977, Christiansen, 1959 and 1960, Doyle *et a*l 1952, Hegarty, 1970 and Henckle, 19641). The present study is based on different treatment which were used to break the seed dormancy.Thus the main objective of this study is to find the suitable method for breaking the seed dormancy .

MATERIALS AND METHODS:

The fruit if the *Prosopisjulifloraline* are indehiscent and the pod which may be short and coiled 3 to 30 cm in length hanging on small stalls in clusters of up to 12. Then outer covering is exocarpcolours of the Pod are radish brown in colour fresh pods were collected without any weevil infestation. Seed are separated from the pulpy mesocarp and endocarp. Seed materials collected from the forest area with the help of forest research garden pune and stored in dry atmosphere to protect them. The seeds were sterilized with 1% $HgCl_2$ and washed with running tap water and kept in peri dished lined with a cotton and circle of filter paper what man no. 42. The emergence of 2mm radical is treated as index for germination (Anonymous 1976,1978 and ISTA, 2008). The seeds were moistened with 15 ml of sterile water every day. The seed were soaked in sulfuric acid 5 and 10 min. Hot water 5, 10 & 15 minutes GA3 250 ppm and 500 ppm for Thiourea 1% & 2% and KNO_3 1% & 2% for 10 & 15 minutes. Mechanical scarification by sand paper technique for 5 min. Dry heat treatment 600c to 80^0c for 24 hrs. Electrical

conductivity treatment for 10 megahertz and 39 megahertz is given. The germination count was started after seven days intervals up to 42 days after the treatment. The values were expressed is

Table – IEffect of different pre-sowing treatments on Seed germination of *Prosopisjulifloraline*

Sr No	Treatment		Days after Treatment & Present Germination					
			7	14	21	28	35	42
1	Control		12 ± 0.2	16± 0.6	20 ± 0.47	23 ± 0.1	28 ± 0.2	40 ± 0.6
2	Hot water 5 min Hot water 10 min Hot water 15 min		25 ± 0.2 29 ± 0.6 30 ± 1.2	28 ± 0.8 32 ± 0.2 35 ± 0.6	38 ± 1.2 42 ± 0.6 47 ± 0.47	55 ± 0.47 62 ± 0.2 68 ± 0.8	65 ± 0.2 67 ± 0.8 72 ± 0.47	75 ± 0.8 89 ± 0.6 85 ± 0.2
3	$H_2SO_4$5 min $H_2SO_4$10 min		32 ± 1.8 35 ± 0.2	39 ± 1.2 42 ± 0.6	49 ± 1.2 52 ± 0.2	68 ± 0.6 72 ± 0.2	71 ± 0.2 80 ± 0.2	93 ± 0.8 98 ± 0.6
4	$KNO_3$1% 10 min $KNO_3$2% 15 min		31 ± 0.2 32 ± 0.8	37 ± 0.2 39 ± 0.2	45 ± 1.2 46 ± 0.6	65 ± 0.6 68 ± 0.47	70 ± 0.2 75 ± 0.2	92 ± 0.6 95 ± 0.6
5	Thiourea1% 10min Thiourea2% 15min		31 ± 0.6 36 ± 0.8	37 ± 0.8 40 ± 0.6	46 ± 1.2 47 ± 0.2	66 ± 0.6 67 ± 0.2	70 ± 0.6 72 ± 0.6	90 ± 0.2 91 ± 0.8
6	GA_3 250 ppm GA_3 500 ppm		34 ± 0.12 35 ± 1.6	41 ± 1.2 42 ± 1.2	52 ± 0.6 53 ± 0.6	70 ± 1.2 71 ± 0.8	78 ± 0.8 79 ± 0.6	97 ± 0.8 98 ± 1.8
7	1AA 250 ppm 1AA 50 ppm		36 ± 0.2 32 ± 0.6	41 ± 1.8 36 ± 0.2	46 ± 0.2 47 ± 0.6	66 ± 0.6 67 ± 0.2	70 ± 1.2 74 ± 0.4	92 ± 1.6 95 ± 0.2
8	Kinetin 250 ppm Kinetin 500 ppm		31 ± 0.6 37 ± 0.6	38 ± 1.8 39 ± 0.2	49 ± 0.6 52 ± 1.6	68 ± 0.47 65 ± 0.6	71 ± 0.2 69 ± 1.2	90 ± 0.8 96 ± 1.8
9	Mechanical Scarification by sand paper 5 min		28 ± 1.2 29 ± 1.6	32 ± 0.6 32 ± 1.2	43 ± 1.2 43 ± 0.6	63 ± 1.2 61 ± 0.2	68 ± 1.8 57 ± 0.2	80 ± 1.8 82 ± 0.2
10	Dry heat treatment	60^0c 24 hrs 80^0c 24 hrs	26 ± 0.2 27 ± 0.47	29 ± 0.6 32 ± 0.2	37 ± 0.6 42 ± 0.6	52 ± 0.8 56 ± 1.2	64 ± 0.6 70 ± 0.8	75 ± 0.2 78 ± 0.2
11	Electro magnetic field treatment	10 Megahertz (MHZ) 39 Megahertz (MHZ)	24 ± 0.2 25 ± 0.8	33 ± 1.2 37 ± 0.2	42 ± 1.2 39 ± 0.47	47 ± 0.6 49 ± 0.2	66 ± 0.6 67 ± 0.2	70 ± 0.2 72 ± 0.2

NB:- 1) Each value is mean of five replicates.2) (±) indicate for standard deviation

percentage of total number of seeds. Each experiment was repeated twice with five replicates each time seeds were distributed is each petridish and then mean values were represented. The experiments were kept at room temp. 27^0c ± 2^0c

RESULTS AND DISCUSSION:

The results were given in table-I. The percentage of seed germination was significantly increased as compared to control. The seeds were treated with hot water for 15 min. gave significant result and about 85% seeds germinated against 40% in control. The hot water help in breaking the dormancy and impermeable layer in seed coat allowing the water and oxygen to enter the seed coat and permit the embryo to overcome. The treatment with sulfuric acid for 10 min. was found effective and 98% seeds were germinated 42 (Griffith 1945, Gupta 1972) days after the treatment. The treatment with $GA_3$500 ppm and 1AA 500 ppm and Kinetin 500 ppm were also found very significant and total percentage of germination was increased about 96% seeds were germinated. Similarly treatment with dry heat 60^0&80^0c 24 hrs found significant and 78% seed were germinated(Mohnot*et al* 1978). The mechanical scarification by sand paper for 5 min. 82% seeds were germinated was also found quite satisfactory. The Electrical conductivity treatment 10mhz and 39mhz was also found useful to break the seed dormancy and about 72% seeds were germinated. It may be due the various types of inhibition caused by seed envelop impermeability to water and oxygen, mechanical barrier to radical emergence etc. can result dormancy of seeds to overcome dormancy seed must be scarified scratching of seed coat to aid germination and enhanced the germination percentages as compared to control (Barton 1965, Bajpai 1976) pre-treatment seed of Prosopis seed before sowing classified into different categories such as mechanical treatment dry heat treatment chemical treatment, (Nalwadi (1997) Treatment with growth hormones and electromagnetic field treatment. The treatment with sulfuric acid attributed to softening of seed coat which shows overall better germination percentage as compared to control. The lower germination in control was possibly due to reduced permeability of seed coat to water and dissolve gases of inhibitory substances (Ballard 1973, Berrie&Drennan, 1971)). Although the role of growth regulators GA_3, 1AA and Kinetin for breaking dormancy was very prominent. This was possibly due to stimulating effect of imbibitions on subsequent seed germination caused by increased water absorbing capacity resulting in increased enzyme activity. It is evident from the table – I that soaking of seeds with growth regulators resulted significant increase in over all percentage of germination. (Larsen, 1962, Magnani*et al*, 1993, Polloce, 1972, Rolsten, 1978, Rodrigues, 2008, Steel &Takogiy*et al*, 1986, Woodstock, 1969 &Waldhood 1956).$GA_3$and IAA treatment is often attributed to be the mobilization of stored reserves, the finding indicate the presence of combined dormancy (chemical + endogenous) Gibberellins are the group of plant hormones which occurs naturally in plant. GA_3 treatment can overcome dormancy in different seeds that have hard seed coat of dormant embryo *Prosopisjuliflora linesurvival* percentage increased after pre treatment with gibberellic acid IAA and kinetin 500 ppm . the result of the influence of growth hormones presented in the table –I on seed germination.

CONCLUSION:

Therefore, on the bases of above results it can safely be inferred that the problem faced in seed testing laboratories during testing the *Prosopisjuliflora lineseeds* due to the presence of hard seed coat can easily be over come by mechanical scarification by sand paper technique. Treatment with hot water sulfuric acid growth hormones may also significantly increased the over all germination percentage of *Prosopisjulifloraline*

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