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EFFECT OF VARIOUS TREATMENTS ON SEED GERMINATION AND DORMANCY BREAKING IN *CASSIA MARGINATA* ROXB.

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ABSTRACT

The aim of this study was to evaluate the methods of breaking seed dormancy which were subjected to following treatments for physical breaks and physiological dormancy. Scarification with sandpaper technique , Treatments with sulfuric acid and growth regulator GA_3, 1AA, kinetin and Glutathione On all experiment observation were recorded after 10 days interval for experiment with hot water treatments for 12 hrs. has resulted in better germinations similarly treatment with sulfuric acid for 5 min and 10 min showed better result as compared to control Treatment with Gibbrelline acid ,kinetin & glutathione also gave significant increase in overall germination percentage, Mechanical scarification by sand paper technique was also found significant, the study proved that seed treatments are necessary to overcome dormancy in Cassia marginata Roxb. seed However, further experiments should also be conducted to draw satisfactory conclusion regularly on seed germination

KEYWORDS: *Cassia marginata Roxb. Seed germination, mechanical scarification, hot water soaking, sulfuric acid, growth regulators, kinetin, glutathione.*

INTRODUCTION

Cassia marginata Roxb. is native of & east India It is a small medium sized tree, growing up to 8 m to constantly arranged overhanging branches, green leave with thickened leaf margins flowers of this species are more of a salmon pink than other *Cassia* and each petal in delicately veined with green pink becoming deeper on the flower ages. The Brach of the basses of the flower stalls and pale green in colour and the calyces pink each leaf beans five pairs of small leaflet oblong and blunt ended *Cassia magination* Roxb. Plant prefers a rich moist well drained soil in a summy situation it is used as draught and frost tender *Cassia marginata* Roxb. Seed pods cylindrical and about 8- 12 inches long propagation taken place by seed seeds can be sown most of the year but the best sown in spring and autumn to avoid coldest and hotest month of the year. Seeds of *Cassia marginata* Roxb. have a hard outer seed coat and showing problem in germination *Cassia_marginata* Roxb. is a ornamental with medicinal value this study aims to investigate the effect of different chemical and physical pre sowing treatments and identify the best method to break seed dormancy and promote germination of *Cassia marginata* Roxb.

MATERIAL AND METHODS

Mature fruits of *Cassia marginata* Roxb. were collected from a number of trees in the months of oct. to December the fruit were first dried under the sunlight and then were grated by hand in over to break them and separate the seeds sieving and flotation were used to them the seeds flotation and insect damaged seeds the clean seeds were stored upon filter paper and left to dry. After drying the seeds were

stored in glass containers in the refrigerator

The seeds germination experiments were conducted in the laboratory at room temperature seeds were subjected to different physical chemical and mechanical treatments were performed through soaking the *C. marginata* seeds in cold water 3 volume of water for each volume of seeds at room temperature approximately for 12 to 24 hrs.(18-20^0 C) and the seeds were immersed in hot water (Just boiled) water and allowed to soak overnight 12 hours. Retreatment will be given to the seeds which were swollen in hot water condition and them left to cool at 25^0 C temperature.

Chemical scarification was carried out by soaking the seeds in concentrated sulfuric acid (98% H_2SO_4) and gently stereo periodically the duration of immersion of seeds in acid were 1, 2 and 3 min. after the treatment the seeds were removed from acid seeds washed thoroughly in running tap water to remove the trace of acid before being tested for seeds germination Mechanical scarification was achieved by vigorously rubbing the seeds between two sheets of fine grind sand paper to remove the test a without injuring the embryo (Perez Gracia & Gonzales Benito 2006) to control fungal infection during seed germination seeds were surface sterilized in 20% Clorox for ten minutes. The 100 seeds were distributed in five replication of 20 in each Petridish lined with absorbent cotton and a circle of filter paper moistened with 15 ml of distilled water emergence of radical 2 mm was treated as index for germination the seeds were also treated with 250 ppm and 500 ppm of Gibberellic acid for 24 hours in each concentrations the seeds were sterilized twice with distilled water the seeds were also treated separately with kinetin 250 ppm & 500 ppm and glutathione with 100 ppm and 200 ppm mechanical scarification was done by sand paper technique for 5 min the seeds were placed in absorbent cotton in petridishes lined with what man no. 1 filter paper the germination count was started after 10 days of treatment the value were expressed in percentage of total numbers of seeds each experiments was repeated twice with five replicates each time seeds were distributed in petridishes and the mean value were represented the experiments were kept at room. temperature after the treatment a control application in also designed with non pretreated seeds . Treatment were arranged in a completely randomized design with five replicate seed germination count was started 10 days after the treatment up to sixty days. Seed germination was defined an the appearance of a radical at least 2 mm long, according to the rules of the international seed testing association (ISTA 1996 & 1999) Petri dishes were watered as needed with distilled water to ensure adequate moisture for seed germination.

RESULT AND DISCUSSION

The efficiency of dormancy breaking treatments on germination of *Cassia marginata* Roxb. are shown in (Table – 1) the data demonstrated that the germination percentage of *C. marginata* seed were in encased significantly as compared to control. The germination percentage of *C marginata* (72%) was obtained by hot water treatment and mechanical scarification following sulfuric acid treatment (75%) the germination of *C. marginata* was improved (Gupta, 2003 and kyauk *et al* 1995) by treatment with Gibberellic acid 500 ppm 90% kinetin 500 ppm 84% and glutathione 200 ppm 80% as well as IAA 80% seed were germinated this was probably done to the stimulating effect of imbibitions on subsequent seed germination caused by increase water absorbing capacity resulting increase enzyme activity Nanda & Purohit 1964, Seth and Mathaude 1959, Singh 1984 & Snedecor 1967) it is evedent from table 1 hot water help in breaking the seed dormancy and make the seed coat permeable allowing water and oxygen to enter the seed coat (Benetido *etal* 2008 Christiansen, 1959 Bruz & Carva 2006) the also permit the embryo to overcome treatment with chemical H_2So_4 and mechanical scarification treatment the seed observed to exhibit physical dormancy that need to overcome before germination begins this maybe day to hard and impermeable seed coat. (John and Aman.1977) The seeds may be dormant due to tegument impermeability (Krishnamoorthy,1975, Nanda & Purohit 1964) which can be overcome by chemical or physical scarification. Cruz *et al* and David 2007 The sulfuric acid and sandpaper treatments used promoted seed tegument rupturing facilitation the entrance of water varies and consequently favoring germination. The rate of absorption depend on the number of pores distributed on the surface of seed coat, water availability, temperature, and contact area of seed water, chemical and seed quality, therefore the imbibitions is essentially a physical process related to the characteristics of seed coat permeability and properties of colloids of seed, whose hydration is one of its first consequences (Ballard, 1973 and Baskin 1098). The

treatment of dormancy breaking tegumentary seed were efficient because they promoted the rapture of the impermeable layer in the case of physical scarification or distributing pores in the integument when the sulfuric acid used, (Bewiley 1982 Christiansen 1959) thus, enhance the water absorption be seed and triggering the germination process (Nadjafi 2006) seed with this form of dormancy process seed this form of testa, pericarps or other structures that impose high mechanical resistance on no dormant embryo, or block water uptake of influx of oxygen into the internal parts of the seeds. (Rolston, 1978) For the *Cassia marginata* Roxb mechanical and chemical scarification resulted in improved germination parameter compared to un scarified seed (Khanduri and Negi, 2010) The Sulfuric acid treatment created or enlarge pores in the seed (Masamba, 1994) enabling the water in the seed and directly confact the embryo and than accelerate the germination process The positive effect of soaking in boiling water on seed germination may be due to the breaking dormancy and increased imbibitions (Soliman and Abbas, 2013, Bechi 2012, David 2007, Merou *et al*., 2011 & Amusa, 2011).

CONCLUSION:-

The present result confirmed that seeds of *Cassia marginate* Roxb. exhibit dormancy due to the hard seed coat which can be broken effectively by each mechanical or chemical scarification treatment or by treatment with hot water and growth regulations GA_3, Glutathione and I.A.A.

All the methods were found useful to break the, seed dormancy and enhance the germination percentage of seeds. The sad coat was barrier to the seed germination and the treatments induce germination due to the breaking of seed coat. The use of growth hormones was also found useful to the break the dormancy of seeds which given physiological response to treatment. (Farias *et al* 2013 & fowler and Bichi 2012 & Fernandez *et al* 2000.)

The described procedures have proved that seed treatment are necessary to overcome dormancy in *Cassia marginata* Roxb. Seeds. However, further experiments should also be conducted to draw a satisfactory conclusion regarding seed germination of *Cassia marginata* Roxb. Since germination is influenced by various

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Table – 1 Effect of various treatments on Germination and Dormancy Breaking of *Cassia marginata* Roxb.

Sr. No.	Treatments	Days after treatment & Percent Germination					
		10	20	30	40	50	60
1	Control	6 ± 1.2	13 ± 0.8	28 ± 0.6	39 ± 0.4	45 ± 0.6	50 ± 0.4
2	Hot water – 12 hr.	7 ± 0.2	15 ± 0.6	32 ± 0.6	45 ± 0.46	61 ± 0.4	72 ± 0.2
3	Sulfuric Acid 1% 5 Min	8 ± 0.6	17 ± 0.8	35 ± 0.8	47 ± 0.2	62 ± 0.46	74 ± 0.6
4	Sulfuric Acid 1% 10 Min	9 ±0.46	18 ± 0.6	36 ± 0.6	49 ± 0.4	65 ± 0.2	77 ± 0.8
5	Gibberallic Acid 250 PPM	11 ±0.8	19 ± 0.2	38 ± 0.8	51 ± 0.4	67 ± 0.2	78 ± 0.2
6	Gibberallic Acid 500 PPM	18 ±0.2	29 ± 0.8	49 ± 0.6	55 ± 0.2	15 ± 0.8	90 ± 0.2
7	Kinetin 250 PPM	13	20	40	53	69	76

		±0.4	± 0.6	± 0.8	± 0.2	± 0.2	± 0.6
8	Kinetin 500 PPM	14 ±0.6	22 ± 0.6	42 ± 0.64	56 ± 0.4	73 ± 0.6	84 ± 0.4
9	Indole Acetic Acid 100 PPM	13 ±0.2	20 ± 1.2	46 ± 02	48 ± 0.2	64 ± 0.46	73 ± 0.8
10	Indole Acetic Acid 200 PPM	15 ±0.1	22 ± 0.8	49 ± 1.2	50 ± 0.6	72 ± 0.8	80 ± 1.2
11	Glutalhione 100 PPM	9 ±0.4	18 ± 0.64	36 ± 1.4	48 ± 0.4	64 ± 0.6	75 ± 1.6
12	Glutathione 200 PPM	10 ±0.6	19 ± 0.8	37 ± 1.4	50 ± 0.4	66 ± 0.12	77 ± 0.8
13	Scarification by sand paper for 5 min	10 ±0.8	18 ± 0.6	35 ± 0.4	50 ± 0.6	66 ± 0.2	80 ± 0.6

N.B.:- 1) Each value is mean of five replicates ii) ± stand for standard deviation (S.D.)

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