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Original Article

Seed Dormancy In Caesalpina Bonducella (l) Roxb.

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ABSTRACT

Caesalpinia mainly grown for immense medicinal value. The plant seeds are useful in ethano medicines to treat cancer, eye sores, tuberculosis, asthma, toothaches and fever. The plant seed extract have antioxidant, anti tumor, anti microbial, anti diabetic, anti pynetic activities. In nature the population of *caesalpinia bonduc* (L) Roxb dwindling due to longer duration of seed dormancy, overutilization of plant for medicinal purpose and destruction of habit at the *Coesalpinia bonduc* (L) Roxb plant species become threatened. The Plants play a important role in human health care system. *C. bonducella* shows poor germination and low seedling, establishment information on seed biology and germination behavior and dormancy pattern of this valuable species is lacking therefore it was dicided to investigate the germination behavior of this species one year old seeds were used for laboratory testing at times fail to germinate properly the failure may be due to the state of seed dormancy different treatment were tried to find out the best treatment to break the dormancy. The seeds were pre treated with H2So4 2% for 45 & 60 min H202 1% 10 sec, KNo3 0.50% & 0.75%, GA3 250ppm & 500 ppm, hot water 24 & 48 hrs and, mechianical scarification is also tried treatment with H2So 47% 60 min, mechianical scarification is also tried treatment for 48 hrs resulted better germination up to 80%. The study proved that seed treatments are necessary to overcame the seed dormancy.

Keywords:

Clesalpinia bondu (L) Roxb, dormancy, growth regulator, scarification,

Introduction:

Caesalpinia bonduce (L) Roxb. is hard seeds legume belongs to the family caesalpiniaceae *C bonduc* (L) Roxb. b' is woody liane with a spiny stem the plant in threatered and very sparsely distributed in deciduorls forest of western ghats area. The leaves are bipinnate up to 1 m long. The plant is propagated through round marble big sized seeds. Each pod is containing two seeds. The seeds are hard, frost- tolerant require very long time for germination. Seeds of *C bonduc* (L) Roxb shows dormancy viability is very poor and it does not germinate in less scarification action of microbes insects rodents takes place which slowly break the seed coat and make it permeable for water and gaseous exchange. In nature the plant population is reduced due to longer period of dormancy and utilization of plant for medicinal purposes and deforestation (Hutton- 2001) The plant species *C bonduc* is thereatend, Gaur *et al*, 2008, *C. bonduc* is an important medicinal plant which is widly distributed in tropical and subtropical regions of the Asia. This plant is abundant in western ghat area. The different part of the plant is used in folk medicines for the treatment of variety diseases. It has been reported that the seeds of the plant posess anti diarrhoel anti filarial antiviral, antibacterial, anti microbial, anti fungal, anti diabetic, anti tumar, analgesic, anti inflammatory, immunomo dulatory, adoptogenic, anticonvulsant, antipasmodie, nootropic, antimocbic, diuretic, properties. (Gupta *et al* 2004, Danthu *et al*, 1998, Grover *et al* 2002, Kannur *et al* 2006).

The phytochemical analysis of *C. bonducella* (L). has revealed the presence of alkaloids, flavo, glycosides, saponine, tannins, and triterpenoid fruits having anlidiarrhoeal activity and the nutritional value of Legume grains is increased now a days due to the presence of bio active compounds in their seeds & leaf. The health beneficial role of such bio active compound has been explored by a large number of research studies and these bio active compounds posesses many medicinal properties (Said 1970, Simi *et al* 2000 and Vidyaratnam 1994). As a consequence of health benefit effects preserve of such bio active compound in the diet has been viewed very seriously

to know their nutritional potential. The legume like C banducella used in the management of various cronic diseases. The information on seed germination and dormancy pattern are scanty. Therefore the present inrestigations were performed to break the seed dormancy and to enhance the seed germination of *Caesalpinia bondcella* (L) Rox. (Lerson 1962, Archana *et al* 2005, coving 1980, Clemens 1977.)

Materials and Methods

The seeds of *Caesalpinia bonducella* (L)Roxb. were collected from western ghat area with the help of forest dept and forest research garden Pune and after removing immature and damaged seeds the mature seeds were dried under shaded condition for 2 days. The plant material and seeds were authenticated by Botanical survey of India Pune. The seeds were stored in gunny bags. Here after the seeds were treated with $Hgcl_2$. Solution for 8 min followed by 3 to 4 times wash with sterilized distilled water in subject to germination.

The seeds of *C bonduc* (L) Roxb given various treatments like mechanical scarification by sand paper techniques and hot water treatment for 24 & 48 this treatment with GA_3 250 ppm & 500ppm H_20_2 1% H_250_4 2% 15 min & 45 min Kno3 0.50 % and 0.75% each treatment include five replicates. The seeds were sown in pots filled with mixture of soil, sand and peat. Each pot container 25 seeds and of mixture of soil, sand & peat 1:2:1. The seeds were placed in five replicates at room temperature at 25c ±2 c. The seeds were observed daily for redile emergence and count were taken after 10 days enterval up to 120 days water soaked seeds were served as control ISTA (1976).

Table – 1 Effect of different Treatments on seed germination of *caesalpinia bonducella*

Name of the species	Treatment	Time & conantration	6	12	18	24	30
C. banducella (L) Roxb.	Control H_250_4	Water 2% 45 Min 2 % 60 mit	00 12 ±0.47 15 ±0.47	00 34 0.2 36 ±0.2	00 50 ±0.8 53 ±0.2	00 63 ±0.2 67 ±0.6	00 70 ±0.6 80 ±0.4
C. banducella (L) Roxb.	H_2O_2	1 % 10 HC	10 ±0.4	35 ±0.4	55 ±0.67	60 ±0.8	68 ± 0.4
C. banducella (L) Roxb.	K N O_3	0.50 % 0.75 %	11 ± 0.6 12 ±0.6	31 ±0.6 33 ±0.8	48 ±0.47 57 ±0.6	60 ±0.8 63 ±0.47	35 ±0.2 71 ±0.6
C. banducella (L) Roxb.	GA_3	250 ppm 500 ppm	10 ±0.4 11 ±0.6	32 ±0.6 34 ±0.4	49 ±0.4 52 ±0.4	59 ±0.4 62 ±0.4	67 ±0.6 69 ±0.2
C. banducella (L) Roxb.	Hot water	24 hrs 40 hr	11 ±0.2 12 ±0.8	33 ±0.47 34 ±0.4	48 ±0.2 49 ±0.47	67 ±0.8 64 ±0.2	70 ±0.47 72 ±0.8
C. banducella (L) Roxb.	Mechanical Scarification	Sand Paper few min	19 ±0.8	34 ±0.47	52 ±0.2	61 ±0.4	75 ±0.2

(1) Each value in mean of five replicates (2) Figures to right indicate standard deviation (S.D)

Result and Discussion

Among the different experiments tried with different chemicals growth hormone and physical treatments given like mechanical scarification to break the seed dormancy in *Caesolpinia bonducella* (L) Roxb. treatments given with H_2S0_4 2% for 45 min and 60 min shows better germination as compared to control up to 80% seeds were germinated as compared to control nil. The another treatment is given with H_20_2 1% for 10 seconds 68% seed were germinated as against zero percent in control similarly treatment given with $KN0_3$ 0.50% and 0.75 % showed better germination in 30th day of treatment and total germination percentage increased significantly. This may be due to the presence of hard seed coat which may be impermeable for water and the seeds given treatments with different chemicals make the seed coat permeable . This type of dormancy may cause due to both exogenous and endogermous factors the seeds germinate at 25c ± 2 c temperature have thermodormancy and germinate only when soil temperature is warm the seed coat impermeable due

to the presence of physical dormancy in *Caesalpinia bonducella* (L) Roxb. Physical impermeable layers develops during maturations and drying of seeds this impermeable layer prevent the seed from taking up water or gases. As a result the seed of *Coesalpinia bonducella* (L) Roxb. is prevented from germination until the dormancy is broken the different treatments were given to the dormant seeds and germination percentage improve. significantly and plants established successfully. In *Caesalpinia bonduc* (L) Roxb. which belongs to family fabaceae shows specialized structures, which function as a water gap may be associated with impemeable layers of seed to prevent water up take. Treatments given to break these structures and seed coat becomes water permeable (Nalwadi et al 197, Newman & Garg 2007).

The treatment given with GA_3 increased the percentage of germination significantly this may be due to the physiological dormancy *C bonducella* (L) and due to the application of GA_3 chemical changes occur which may be inhibitors that often retard the growth to the point where it is not strong enough to break through the seed coat or other tissues (Rolston 1978, Robriques *et al* 2008, Said 1970, Simi *et al* 2000)

The treatment gives with hot water for 24 & 48 and mechanical scarification by sand paper techniques also improve the overall germination on percentage and 70 to 75% seed were germinated as compared to control nil. This may be due to the hot water treatment & scarification inbibitions taken place faster rate the seed coat becomes adequately soften to absorb water 48 hrs treatment with hot water was found more significant. The scarified seeds shows better germination as compared to unscarified seeds. It may be due to the fact that mechanical scarification help in physically breaching impermeable layer in the seed coat allowing water and oxygen to enter in the seed coat and permit the embryo to overcome the mechanical restriction of surroundings tissue. This agrees with the result of (Harsh et al 2000) mechanical scarification combined with effect of hot water rendered seed coat more permeable this resulting higher germination percentage in *Cosalpinia bonducell*a (L) (Takogiy et al 1986).

Conclusion

This study develop an efficient method to break the dormancy. The treatment given to break the seed coat dormancy in *Caesalpinia borducella* (L) was necessary. The treatment with H_2S0_4 followed by H_20_2, GA_3 hot water & scarification were found very effective and overall germination percentage increased significantly.

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