

Effect of H₂SO₄ on Seed Germination and Viability of *Canna indica* L. a Medicinal Plant

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Abstract: *Canna indica* roots are used for medicinal purpose. A decoction of the root with fermented rice is used in the treatment of gonorrhea and amenorrhea. The seed of canna is extremely hard, and needs to be "scarified" before sowing. The aim of the present investigation is to determine the hardness problem of the seed. The seed sample was collected from the IARI, New Delhi in 2008. The work consists of Physical purity, standard germination test, seed vigour test. Experimental results has shown that, seed sample recorded the purity of seed (97.55 %) and seed sample showed the maximum germination percentage 91% after three hrs. H₂SO₄ scarification. The maximum root length (7.51 cm), maximum shoot length (3.12 cm) and maximum seedling dry weight (0.203 gm) were observed at two hrs. H₂SO₄ scarification. The results indicated that H₂SO₄ scarification increase the germination percentage but it reduce the viability of the seed. [Journal of American Science 2010;6(6):24-25]. ISSN: 1545-1003).

Key words: *Canna indica*, Germination, Scarification, Vigour.

1. Introduction

Canna indica belongs to family cannaceae. *Canna indica* is a native of tropical America and is a very popular ornamental and Medicinal plant throughout the tropical world. *Canna indica* is an upright perennial rhizomatous herb. It having round, shiny black seeds. The seed of cannas is extremely hard, and needs to be "scarified" before sowing. Scarifying the seed can speed germination, especially if the seed has not swollen after being soaked. The seed are scarified generally with H₂SO₄. The seed usually germinates in 12days to 3 weeks.

The plant is used in the treatment of women's complaints. A decoction of the root with fermented rice is used in the treatment of gonorrhea and amenorrhea. The plant is also considered to be demulcent, diaphoretic and diuretic.

The main objective of the investigation was to determine the hard seed problem in canna and sulphuric acid scarification effect on germination.

2. Material and Methods

The investigation was conducted at the Seed Testing Laboratory of Division of Seed Science and Technology, Indian Agricultural Research Institute, New Delhi.

The selected seed lot of *Canna indica* L. divided into four replication. The work consists of standard germination test, seed vigour test. Standard germination test was conducted on a 100 seeds per replicate at 25°C for 16 days in germinator by using towel paper as a substratum.

Seedling length was taken after the completion of germination period (16 days) in randomly selected ten seedlings from each

replication. The dry weight of the ten randomly selected seedlings for each replicate was measured after it was dried on oven at 80°C for 18 hrs.

3. Result and Discussion:

Water impermeability of the testa is a physical exogenous dormancy according to Nikolaeva (1969). Concentrated sulphuric acid has been used for many years for softening of hard seed coats. (Hopkins, 1923). Germination test are based on pure seed components, this has been shown by the observations recorded and that purity analysis and germination tests compliment each other.

Table 1: Mean value of physical purity analysis of the *Canna indica* L. seed lot.

IM (gm)	OS (gm)	PS (gm)	P%
0.27	2.18	97.55	97.55

Acronym used: IM= Inert matter, OS = Other seed, PS= Pure seed, P= Purity

Table 2: Mean value of analysis by different tests methods of *Canna indica* L. seed germination, root length, shoot length and seedling dry weight. In the table seed lot recorded maximum germination in three hours H₂SO₄ scarification treatment.

Treatment	G%	RL (cm)	SL (cm)	SDW (gm)

Control	NE	-	-	-
One hr. H_2SO_4 scarification	76	6.61	2.53	0.173
Two hrs.	79	7.51	3.12	0.203
Three hrs.	91	7.21	2.62	0.190
Four hrs.	73	7.17	2.58	0.183

Acronym used: G= Germination, NE= No emergence, RL= Root length, SL= Shoot length, SWD= Seedling dry weight.

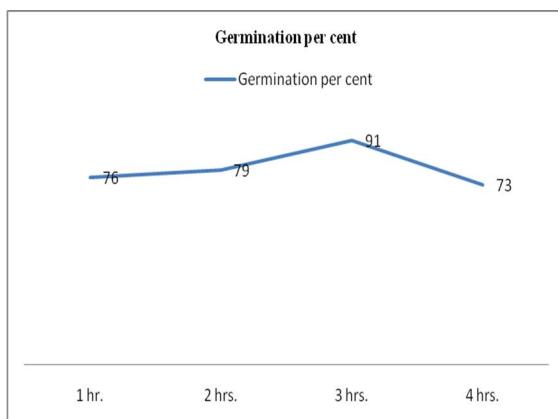


Fig.1. Graphical representation of *Canna indica* seed germination after different duration of H_2SO_4 treatment.

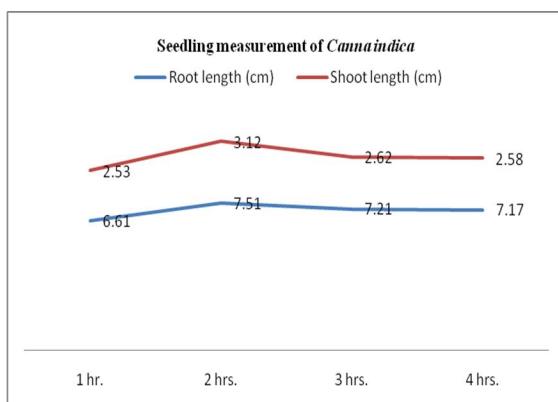


Fig.2. Seedling measurement of *Canna indica* after different duration of H_2SO_4 treatment.

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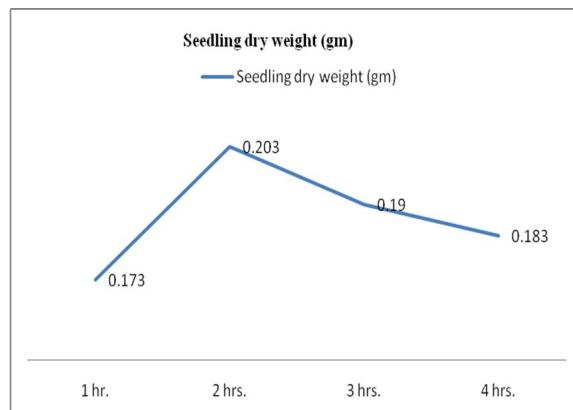


Fig.3. Graphical representation of *Canna indica* seedling dry weight.

Recorded experimental finding (Table 1) showed that the purity percentage of the seed lot is 97.55% and (Table 2) showed that the germination percentage was observed maximum 91% in three hrs. H_2SO_4 scarification treatment. The root length (7.51cm), Shoot length (3.12 cm) and seedling dry weight (0.203 gm) was recorded maximum in two hrs. H_2SO_4 treatment.

Thus, from the discussion it may be concluded that the seed lot of *canna indica* L. showed good response in three hrs. H_2SO_4 treatment followed by two hrs. The results indicated that H_2SO_4 scarification increase the germination percentage but it reduce the viability of the seed.

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References

1. Hopkins, F.F. (1923). The behavior of hard seeds of certain legumes when subjected to conditions favorable to germination. Proc. Assoc. off. Seed Analysts, N. Amer, 14: 46-48.
2. Nikolaeva, M.G. (1969). Physiology of deep dormancy in seeds. IPST Press, Jerusalem, 220 pp.