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RESEARCH ARTICLE

DORMANCY BREAKING TREATMENTS ON *SIZE GRADED* SEEDS OF *STRYCHNOS NUX-VOMICA* LINN

***Dr. Karthiyayini, R.**

Assistant Professor, Department of Botany, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore-641043, Tamilnadu, India

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ABSTRACT

S. nux-vomica Linn. (Loganiaceae family) is one of the most important medicinal tree species in India. Present study was carried out to know the effect of pretreatment on seed germination and seedling growth parameters of size graded seeds viz. large, medium and small. The present result revealed that the H2SO4 (10 minutes) treated seedling was enhance the percentage of germination. However, with increase in the treatment time the seed germination percentage decreased in germination percentage other treatments.

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INTRODUCTION

Increasing demand for medicinal plants in the sector like pharmaceutical, health product companies and traditional medicines, necessitates the usage of both number of species and volume of plant material. Plant material collected from the wild is considered to have higher therapeutic benefits. An estimated 95% medicinal plants collected in India are gathered from the wild and about 70% is from destructive collections which include either the entire plant (16.5%), reproductive parts like fruits and seeds (22.0%) or tuber, root and stem (53.0%) (Vinay, 1996). Such destructive and non-sustainable collection methods coupled with low regeneration and habitat destruction have posed serious threat to the survival and availability of various medicinal plants. Seeds are the major units of trees linking with establishment of forest systems. The necessity for increased rates of tree planting emphasizes the need for good seed because seed quality has critical effect on the quality of tree established. Tree seeds are also required for both reforestation and *in-situ* and *ex- situ* conservation's of forest genetic resources (Schmidt, 2000). Success of any planting program depends on quality of seeds used and complete and uniform growth of nursery stock is essential for better survival and establishment of seedling in the field to achieve good plant population. Since the present study was carried out to find out the effectiveness of size graded seeds in various pretreatment methods to understand the behavior of seed germination and seedling growths of *Strychnos nux-vomica*. *Strychnos nux-vomica* Linn. (Loganiaceae) is commonly called as poison nuts or quaker buttons. It is a deciduous tree of 15-20m in height, naturally seen on wastlands and degraded forests of Eastern and Western Ghats of India. Traditionally *S. nux-vomica* seeds are used as a tonic, a stimulant to treat nervous, respiratory, stomach diseases (Sarcar and Sarcar, 1997). The leaves are used to cure ulcer, chronic wounds and the entire plant possess antitumor anti-inflammatory and analgesic (Grieve, 2007).

Corresponding author:* **Dr. Karthiyayini, R.
Assistant Professor, Department of Botany, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore-641043, Tamilnadu, India.

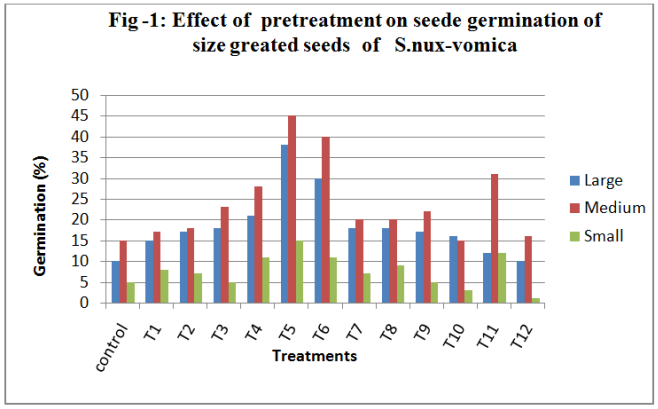
MATERIALS AND METHODS

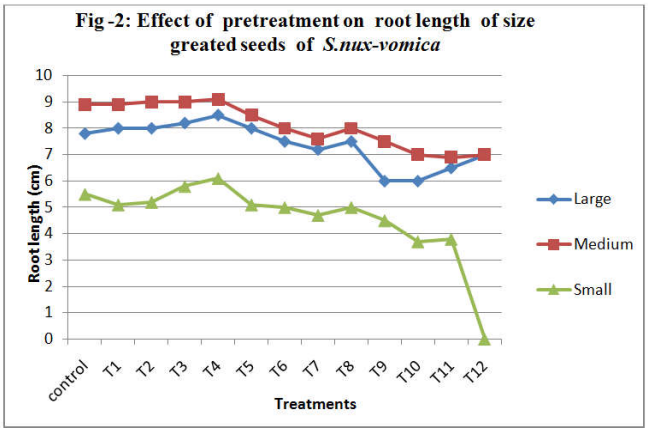
The freshly collected seeds of *S. nux-vomica* were sorted out into three groups namely large, medium and small on the bases of visual observation. The following treatments was given to the seeds

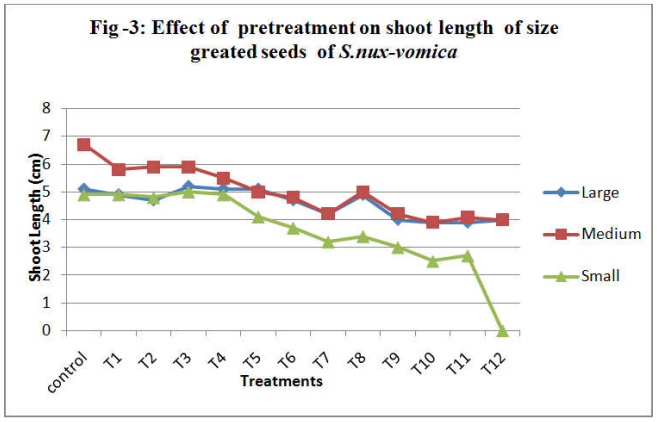
T0: Control (non-treated)
T1: Seeds were soaked in warm water (50-55°C) for 10 minutes,
T2: Seeds were soaked in warm water (50-55°C) for 15 minutes,
T3: Seeds were placed under running tap water for 12 hours,
T4: Seeds were placed under running tap water for 24 hours,
T5: Seeds were soaked in concentrated sulfuric acid for 10 minutes,
T6: Seeds were soaked in concentrated sulfuric acid for 20 minutes,
T7: Seeds were soaked in concentrated sulfuric acid for 1 hour,

T8: Seeds were soaked in concentrated nitric acid for 10 minutes,
T9: Seeds were soaked in concentrated nitric acid for 20 minutes,
T10: Seeds were soaked in concentrated nitric acid for 1 hour,
T11: Seeds were manually by rubbing on sand paper at the cotyledon ends,
T12: A small piece of seed coat was removed mechanically using razor blade.

After pretreatment by various methods (T1- T10), the seeds were thoroughly washed in tap water and were sown in 30cm X 11cm polythene bags containing sand medium kept at room temperature (28+2^{0}C). The germination studies were carried out with five replicates and each replication consisted of fifty seeds of uniform size. The mechanically scarified (T11 and T12) seeds are sown immediately. Watering was done daily and germination was recorded on alternate days during 90-day period for experimentation. The statistical analysis was done by the method of Duncan's Multiple Range Test (DMRT).







RESULTS AND DISCUSSION

Germination of *S. nux vomica* seeds significantly varied among the various pre-sowing treatments. Freshly harvested medium seeds had 15% germination and presowing treatment applied to break dormancy to improve germination over control (Fig I). Among the chemical treatments, the size-graded seeds treated with concentrated H_2SO_4 (10 minutes) enhanced seed germination compare to other treatment. However, with increase in the treatment time, the seed germination percentage was decreased. The increase in germination due to treatment with sulphuric acid is generally attributed to the softening of the seed coat by oxidation and increasing the permeability of air and water through the seed coat (Efollit and Thames, 1983). Similar observation were reported by Rai (1976) on *Atrocarpus fraxinifolium* (10minuts), Bhagat and Singh (1995) *Rubus ellipticus* and Gopikumar (2002) on *Prosobis cineraria*, *Paraserianthus falcataria* and *Leucaenae leucocephala.* Negative effect of a longer duration of Sulphuric acid treatment is observed in the present study, could be due to the damage caused to embryo. This observation is correlated the study of Gopikumar (2002) in some farm forest trees. Srimathi *et al.* (2002) observed the concordant results in *Cassia fistula*. They observed that the seeds soaked in H_2SO_4 90 minutes gave highest germination whereas the germination was nil in 15 minutes soaked seeds and untreated seeds. Seedling growth of *S.nux- vomica*, the root growth was exhibited high in tap water treated large seedlings followed by medium and small when compare to other treatment. Whereas there was no significant shoot length was observed in all treatment when compare to Control. The better performance of medium and large sized seeds might be due to accumulation of more food reserves than the small. (Asbhy, 1936)

Conclusion

The present study concluded that the problem of germination in *S. nux-vomica* is due to hard seed coat, the germination can be increased by Sulphuric acid scarification, and the medium size seeds produced more germinated than other seeds

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