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# HYDROPRIMING ENHANCED GERMINATION IN ENDANGERED MEDICINAL PLANT SHENDRI (*MALLOTUS PHILIPPINENSIS* MUELL. ARG.)

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**ABSTRACT:**
*Mallotus philippinensis Muell. Arg.* belongs to family Euphorbiaceae. It is one of the endangered medicinal plants used in indigenous system of medicine. In Ayurveda it is used in treatment of dermal problems, abdominal illness, jaundice, malaria etc. Various parts of the plants are rich in different secondary metabolites. It also possesses anti-oxidant, antimicrobial, anti-malarial, antitumor, antiviral and Hepatoprotective Activity. In spite of its important activities there is non-availability of planting materials. Seeds germinate in more than 30 days with rate of germination up to 5% in natural conditions due to hard seed coat. To enhance germination seeds were treated to imbibe water for different period of time. Priming with water proved to increase germination and decrease days to germinate in present experiment.

**Keywords:** *Mallotus philippinensis, germination, Hydropriming.*

## INTRODUCTION:

*Mallotus philippinensis* Muell. Arg. member of Euphorbiaceae, is a perennial tree species which grows up 20 to 30 m in height. Vernacular name for this species is Kamala tree, well known in Maharashtra as Shendri or Kumkum phal. It is associated with more than 100 common names which vary with geographical location and languages. (Kumar et al., 2020). Leaves are bitter, cooling and appetizer. Glands and hairs on the capsules or fruits are purgative, anthelmintic, detergent, maturant and carminative (Tripathi et al. 2017). The name kumkum phal is derived from the colored hairs glands on the fruit which resembles Kumkum. Kamala tree is one of the nesting, resting and feeding spot for Malabar Giant Squirrel locally known as Shekharu which is endemic to Western Ghats. Mallotus is capable of producing fatty oil, cosmetics and pant-varnish. Due to non-availability of quality planting materials seed, seedlings, bark and leaves limitations are faced as in natural conditions seeds germination is about 5% in 65-82 days. Plantation can be only achieved through seeds and but the reproduction rate is only 30% due to hard seed coat Sharma and Verma (2011). Reproduction may also take place through root suckers but the growth is very slow and often attacked by several wood rotting fungi (Dhaker, et al., 2014). To overcome cultivation barriers efforts to increase germination and reproductively can be achieved by seed conditioning techniques like Hydropriming. Hydropriming is presoaking of seed in water. Priming technique allows seeds to carry out imbibitions stage of germination without radicle appearance, Bhosale and Inamdar (2020). After water imbibition, seeds are dried to their original weight. This technique is used to help crops

overcome environment stress (Nakao, et al., 2018).

**MATERIAL AND METHODS:**

Research was conducted in department of Botany ACS, College, Narayangaon. Seed material was collected from mature fruits exposing seeds at Shinoli village in Ambegaon Block of Pune district. Seeds were sun dried. For priming seeds were presoaked to imbibe water and go through the first stage of germination avoiding radicle emergence for different period. After imbibition of water seeds were dried to their original weight. Further primary germination studies were carried out as follows.

**Germination percentage:** emerging seeds were counted, and germination was calculated in percentage.

**Days to germinate:** No of days including priming hours were recorded for germination to take place on initiate.

**RESULT AND DISCUSSION:**

Experiment carried out in laboratory condition showed that pre-soaking or hydro priming for partial imbibition with respect to time of soaking have remarkable effect on germination percentage as well as days to germinate. In *Mallotus philippinensis* Muell. Arg. Hydro priming for 18 to 20 hrs showed doubled germination. As span of treatment increased to 18 hours from 8 hours, days to germinate decreased gradually. Whereas, above 18 hours priming the germination percentage declined rapidly which may be due to radicle emergence before drying after priming.

Primed seeds germinate immediately after sowing reducing time required for germination same results were observed by (Nakao, et al., 2018); Bhosale and Inamdar (2020). Due to hydropriming seeds imbibe before sowing initiating the process of embryo metabolism for early germination at higher rate. Similar observation was made by (Ramón, et al., 2015). Hydropriming and biopriming may show different results. In study conducted by Venkatasubramanian and Umarani (2007) hydropriming and biopriming improved germination rate for several plant species under greenhouse condition. Due to hydropriming seed were capable of pre seasonal germination in adverse environmental conditions (Mal, et al., 2019) similarly reported this technique supportive for cultivators facing drought and weed competence.

**CONCLUSION:**

Hydropriming in endangered plant *Mallotus philippinensis* Muell. Arg. may be useful for many researchers, students and plant producers to achieve better rate of germination and rapid growth to overcome scarcity of planting material. Plantlets could be produce in adverse environment before plantation in rainy season which may strengthen plants before plantation and improve survival rate. Hydro priming or any seed priming technique with standard protocol and optimal time period will prove to be conserve endangered plants like (Kumkum phal) *Mallotus philippinensis* Muell. Arg. This technique is and aid to promote germination in dormant seeds and plants with seasonal germination. Present research was successful in evaluating the optimal time required for hydropriming of *Mallotus philippinensis* Muell. Arg.

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**Fig.1**: Flowering, fruiting and seeds of *Mallotus philippinensis* Muell. Arg.


a:Inflorescence, b:Fruit, c:dehised fruit and d:seeds of *Mallotus philippinensis* Muell. Arg.

**Table 1:** Effect of hydropriming on seed germination and days to germinate in *Mallotus philippinensis* Muell. Arg.

| Period (Hours) | Germination in Percentage | | | Mean Germination % (± SE) | Avg. Days to germinate |
|---|---|---|---|---|---|
| | Set I | Set II | Set III | | |
| Control | 5.1 | 4.2 | 3.2 | 4.1 ± 0.2 | 54 |
| 8 | 8.5 | 8.3 | 8.3 | 8.3 ± 0.02 | 52 |
| 10 | 8.9 | 9.3 | 9.8 | 9.3 ± 0.1 | 52 |
| 12 | 10.1 | 10.2 | 10.8 | 10.3 ± 0.01 | 48 |
| 14 | 10.9 | 11.3 | 11.5 | 11.2 ±0.02 | 33 |
| 16 | 11.7 | 11.9 | 11.9 | 11.8 ± 0.02 | 24 |
| 18 | 12.9 | 13 | 13.2 | 13.0 ± 0.03 | 21 |
| 20 | 15.2 | 14.4 | 15.2 | 14.9 ± 0.1 | 13 |
| 22 | 12.6 | 12.8 | 12.9 | 12.7 ± 0.03 | 12 |
| 24 | 11.4 | 11.1 | 11.2 | 11.2 ± 0.07 | 12 |

**Fig 2:** Effect of hydropriming on seed germination and days to germinate in *Mallotus philippinensis* Muell. Arg.