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Comparative Analysis of Pre-Sowing Seed Treatments on Germination and Growth Metrics of *Santalum album* L.

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Abstract

The natural populations of Indian sandalwood (*Santalum album* L.) have drastically declined over the past three decades due to overexploitation. One of the major challenges in raising sandalwood seedlings in nurseries and establishing plantations is the species poor and staggered germination. We examined the effects of seed collection timing, location and pre-sowing seed treatments on the germination, growth and biomass of *Santalum album* L. seedlings in nursery conditions. Seeds were collected from three separate locations: Jawalaji (Kangra), Dholra (Bilaspur) and Dhaulakuan (Sirmour) between October 2020 and April 2021. Ten different pre-sowing treatments were tested, including control, hot water, acid scarification, hormone treatments and organic solutions. The results indicated that seeds treated with Gibberellin 500 ppm (T₈) exhibited the highest germination percentage (56.85%), germination capacity (68.15%), total seedling length (69.44 cm) and premier dry biomass (4.27g). Additionally, organic treatments such as Cow Urine (T₉) and Beejaamrit (T₁₀) also enhanced germination and biomass production (4.23g and 3.77g). The germination performance of seeds collected in September and October was superior to that of seeds collected in March and April. These results highlight the need of pre-sowing treatments and seed collecting timing optimization for better nursery propagation of *Santalum album* L.

Keywords: *Santalum album*, Pre-sowing treatments, Germination behavior, Growth of the seedling, Biomass of the seedlings