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Changes in sugar metabolism in response to chilling in *Shorea robusta* seedlings

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SUMMARY
Aerial parts of the chilling sensitive young sal seedlings showed reduced / absolute cessation in dry mass accumulation as well as synthesis of total sugar due to corresponding low activity of its metabolic enzymes, sucrose synthase (SS) and sucrose phosphate synthase (SPS) in response to constant chilling exposure for 5 months {*i.e.* November to March, 9-14.1°C (night temperature)} in field conditions. Almost 332% and 249% reduction in accumulation of dry mass was estimated in leaves and shoots of chilling exposed seedlings in compared to protected (in greenhouse) seedlings (Temperature 30-32°C, Relative humidity 70-76%) and, this contention was also supported by 77% and 60% reduction in total sugar content of these tissues during same growth periods. On the other hand, roots of both chilling exposed (field) & protected (greenhouse) seedlings exhibited relatively high levels of dry mass and total sugar accumulation. The chilling exposed seedlings also showed striking weakening in the sucrose synthesizing enzyme system. The low temperature during November to March resulted in reduced activities of SS & SPS enzymes almost by 80-85% in leaves of field grown seedlings compared to protected (greenhouse) seedlings, which results in the reduced accumulation of total sugar / dry mass in these tissues. Our results indicated that, substantially low levels of dry mass and total sugar content along with drastic loss in its metabolic enzymes, SS and SPS, in chilling sensitive sal seedlings finally leads to irreversible cell damage and injury in leaves and shoots of these seedlings which is indicated by severe (80-86%) mortality of these seedlings.

Key words : *Shorea robusta*, sugar metabolism, sucrose synthase, sucrose phosphate synthase, chilling injury.

Sal is a dominant tropical tree which occupies 14.2%