

Effects of lignosulfonates on callus proliferation and shoot induction of recalcitrant indica rice

ABSTRACT

In vitro culture of recalcitrant indica rice cultivar through intervening callus is difficult due to long regeneration period. Therefore, this study was undertaken to evaluate the growth promoting effects of lignosulfonate (LS) on callus proliferation and shoot induction of Malaysian recalcitrant indica rice cv. MR219. LS is a by-product of wood industry, commonly used as a plant growth enhancer. Seed derived calli were proliferated on Murashige and Skoog (MS) medium supplemented with different ion-chelated LS (calcium LS: CaLS and sodium LS: NaLS) at 50, 100, 150, and 200 mg/L. MS supplemented with 100 mg/L CaLS significantly increased the callus proliferation rate and adventitious root formation. In shoot induction study, both LSs did not enhance the shoot induction efficiency as compared to the control. However, the formation of albino shoot increased in MS fortified with 100 mg/L CaLS. Further chlorophyll and molecular analyses showed that, albino shoots induced from 100 mg/L CaLS had severe reduction in total chlorophyll content and expression of both chlorophyll-associated genes, chlorophyll a/b-binding protein 1 (OsCAB1R) and young seedling albino (OsYSA). Taken together, LS improves callus proliferation rate and modulate different physiological responses during plant growth of recalcitrant indica rice.

Keyword: Albino; Callus proliferation; Indica cv. MR219; Lignosulfonate; Regeneration