The influence of methyl jasmonate, cholesterol and L-arginine on solasodine production in hairy root culture of Solanum mammosum

ABSTRACT

The increasing demand of diosgenin for high-revenue synthesis of steroid hormones by the pharmaceutical industries has driven researchers to look for other alternatives. Solasodine which was reported to be present in Solanum mammosum is known to be a potential source. The present study highlighted that added methyl jasmonate, cholesterol and l-arginine into the modified liquid full-strength Murashige and Skoog (MS) medium (with ammonium to nitrate ratio 10.3 mM: 39.4 mM, and 4% (w/v) sucrose) could influence the solasodine production in the hairy roots of S. mammosum. The findings showed that both hairy root line-ATCC31798 and line-A4 (which were separately induced by Agrobacterium rhizogenes strain ATCC31798 and A4) acquired solasodine productivity of 4.5 mg/g dry weight roots with average dry biomass of 190 mg after 32 days culture, when using 50 mg fresh weight roots as initial inoculum size, with 100 mM cholesterol, 1000 εM l-arginine and 300 εM methyl jasmonate added simultaneously into the culture medium on day 20 of culture. The amount of solasodine obtained was five times higher than those without both the elicitor and precursor treatment. The improved solasodine production with a high-biomass growth could reduce the production cost of steroid synthesis in the long run.

Keyword: Elicitor; Hairy roots; Precursor; Solanum mammosum; Solasodine