

ABSTRACT

An efficient and reproducible protocol for callus mass production for *Withania coagulans* (Stocks) Dunal using different explants was optimized. Seeds germination was achieved in culture jars on simple basal MS medium under darkness of 2 days. Response of different explants; cotyledon, hypocotyl and root was tested on MS medium supplemented with varying levels and combinations of plant growth regulators (PGRs) such as auxins and cytokinins. The evaluated parameters for callus induction included, percentage of callus induction, callus index, number of days for callus induction and callus morphology. Cotyledon explant from *in vitro* grown seedlings showed the best results for callus induction in MS medium supplemented with 2.0 mg/L NAA + 1.0 mg/L BAP, 1.0 mg/L NAA + 1.0 mg/L BAP, 2.0 mg/L 2,4-D and 2.0 mg/L NAA. Minimum number of callus cultures were produced from root explant. *In vitro* indirect shoot regeneration from callus cultures of cotyledon was achieved in 3-4 weeks. Cotyledon explant showed the best response for indirect regeneration in MS medium supplemented with 2.0 mg/L 2, 4-D. The callus cultures were dried and extracted by employing polar and nonpolar solvents. Maximum percentage yield was achieved in aqueous extract of cotyledon callus. Extracts were administered orally to experimental animals for the evaluation of antidiabetic and anti-inflammatory potential. Maximum anti diabetic potential i.e. 122.16 ± 1.55 mg/dL blood glucose level was assessed in Chloroform extract of cotyledon callus and maximum anti-inflammatory potential i.e. 0.16 ± 0.02 mm paw oedema was recorded in methanol extract of cotyledon callus. The *in vitro* cultures of medicinal plants may be the alternate source of phytochemicals to support biodiversity conservation.