



ABSTRACT

Our problem in commercial industry is meager seed germination and survival. The present research work was proposed to optimize the conditions for seed germination, callus formation and to evaluate antioxidant and antimicrobial activity in *in vitro* callus cultures of *Citrullus colocynthis*.

It was analyzed that presoaked manual decoated seeds produced 100% germination within 3 days in 4" petriplates having 15ml of distilled water at 30°C temperatures when seeds were surface sterilized with 70% ethanol for 40sec and with HgCl₂ for 2 minutes followed by rinsing with sterile distilled water at least three times. Explants (plumule, cotyledon and root) were inoculated in MS medium supplemented with different hormones NAA+BAP at 2.0mg/l and 3mg/l concentration and BAP+NAA at 3mg/l and 2.0mg/l produced best callus from cotyledon and root explant within 36 days whereas maximum callus from plumule explant were observed at 1.5mg/L BAP. But maximum calli were obtained from the cotyledon explant. Calli were obtained having white or greenish in colour with friable and compact textures. Hot air oven was used to dry the calli at 40°C for 24 hours and grinded with the help of mortar and pestle. Polar and non-polar solvents, *i.e.* methanol, distilled water, n-hexane and chloroform were used to get the extracts.

The assessment of antioxidant activity was carried out by DPPH assay. Plumule and cotyledon callus extract of *Citrullus colocynthis* showed maximum antioxidant activity in methanol and distilled water extracts.

The antimicrobial activity was carried out by agar well diffusion method. Two gram positive bacteria (*Bacillus subtilis*, *Staphylococcus aureus*) and one gram-negative bacterium (*Escherichia coli*) were used for evaluation of antibacterial activity and for determination of antifungal activity against two fungal strains (*Aspergillus niger* and *Aspergillus oryzae*). Maximum zone of inhibition of antibacterial activity was shown by chloroform and n-hexane extracts of plumule and root extracts against *Bacillus subtilis*, *Staphylococcus aureus* and *Escherichia coli*. The antifungal activity of *Citrullus colocynthis* root callus extract in methanol and chloroform showed the maximum potential against *Aspergillus niger* and *Aspergillus oryzae*. Methanol extract also has significant results as compared to distilled water.