

In vitro studies and Phytochemical evaluation of *Pseudarthriaviscida*(L.) Wight and Arnott.

Abstract of UGC Minor Project

Dr T S Swapna

Principal Investigator (UGC Minor Project)

Associate Professor of Botany

Pseudarthriaviscida. (L.) Wight and Arn. (Leguminosae) commonly called “Moovila”, is a perennial viscid pubescent semi erect diffuse under shrub. This plant is an essential component of many famous Ayurvedic formulations like Dashamoola, Mahanarayanataila and Dhantarataila and has high medicinal value. The roots are astringent, thermogenic, digestive, anthelmintic, antiinflammatory, antifungal, antidiarrhoeal, antioxidant, aphrodisiac, nervine, febrifuge, cardio and rejuvenating tonic. This investigation evaluated the phytochemicals and medicinal properties of *P. viscida* and also considered *in vitro* conservation of this medicinally important plant.

Qualitative analysis of phytochemicals showed that glycosides, flavonoids, alkaloids, tannins, terpenoids, steroids, coumarins and anthraquinones were present actively in extracts of leaf, stem, root, flower and seeds of *Pseudarthriaviscida*. Phytochemical screening showed the presence of more active compounds in methanol extract. Hence the methanol extract was analyzed further for its medicinal properties.

Five different assays such as DPPH, Superoxide anion scavenging, Hydroxyl radical, Nitric oxide scavenging assay along with Ferric reducing power activity assay were carried out in different concentration of methanol extract (12.5, 25, 50, 100 and 200 µg/ml) of *Pseudarthria*

viscida. From the results, it can be concluded that the methanol root extract of *Pseudarthria viscida* possesses high antioxidant potential. Secondary metabolites present in roots might be contributing for this antioxidant potential.

The anti-inflammatory activity was evaluated by cyclooxygenase inhibition assay (COX-2) and 5-lipoxygenase inhibition assay (5-LOX) in Human Platelet lysate (HPL'S) culture. The results revealed that percentage of inhibition was increasing with the increase in the concentration of the sample. Bioactive molecules present in roots could be the reason for high anti-inflammatory activity. In hepatoprotective analysis, the methanolic root extract was tested for its inhibitory effect on Chang liver cell line, and confirmed that methanol root extract of *Pseudarthria viscida* (L.) possessed good hepatoprotective activity. *P. viscida* also has good antimicrobial activity.

Analysis of medicinal properties of *Pseudarthria viscida* indicated its high commercial and medicinal values. The excessive collection has resulted in gradual disappearance of this plant from its natural habitat and at present its number is highly reduced in the wild. To conserve the genetic stocks of this plant *in vitro* propagation can be utilized successfully. The main aim of this work is to identify an efficient regeneration of a medicinally important plant *Pseudarthria viscida* using MS medium. Ninety six percentage of callus induction was observed from leafy segment on MS medium supplemented with 1.5 mg l^{-1} 2,4-D + 0.5 mg l^{-1} Kinetin and 2.5 mg l^{-1} NAA + 1 mg l^{-1} BAP. Maximum number of shoot regeneration from nodal segments noticed on MS medium with 0.5 mg l^{-1} NAA + 2.5 mg l^{-1} BAP after 28 days. Maximum number of rooting noticed on medium with 2.5 and 2 mg l^{-1} IBA and NAA respectively after 29 days. Regenerated plantlets were transferred to *in vivo* conditions and transferred to green house. This study will be

helpful for the conservation and maximum utilization of the plant along with the identification and isolation of useful bioactive molecules.

In vitro propagation and secondary metabolite production are important for conservation of *Pseudarthria viscida*. From the results, 2,4-D & KIN and NAA & BAP combinations are most suitable for callus induction, high concentration of BAP and low concentration of NAA are best for shoot regeneration and high concentration of NAA is good for root induction in *Pseudarthria viscida*. Phenolic compound (gallic acid) in the callus was produced and elicited using biotic and abiotic elicitors in the medium. The optimal fold increase (9 fold increase) of phenolic compound were noticed in 48 hours of 1.5 mg Chitosan treatment. Maximum gallic acid content (45.4mg/g of callus) was noticed in chitosan treated cell culture which was quantified by HPLC method. This will be helpful for the conservation and maximum utilization of the plant along with the *in vitro* production of useful bioactive molecules.

Secondary metabolites were separated using chromatographic techniques and isolated gallic acid were further used for the evaluation of anticancer property in Cervical cell line, Hep G2 cells hepatic carcinoma and HCT-15 colon cancer cells and L929 normal fibroblast cell lines. *In vitro* cytotoxic assay of the isolated compound, gallic acid showed potent cytotoxic activity against HeP G2 cell Line with low IC₅₀ value. So *P. viscida* could be proposed as a good candidate of drug lead molecules for hepatoprotection and anticancer effect with low side effects.