

Studies On The Effects of Auxins on Stem Cutting and Bio-active Components in Rauvolfia tetraphylla L.

Abstract

Rauvolfia tetraphylla L. is a highly potent medicinal plant belonging to the family of the milk-weed or Apocynaceae. It is a small bush like plant or a small tree. This plant is commonly seen to be growing in countries like South America, Indian Subcontinent, Central America etc. This plant due to its highly active secondary metabolites such as Reserpine, Serpentine, Rauwolscine, Serpentinine holds an important value in both traditional and modern medicinal sectors. This plant has plethora of medicinal values starting from treating hypertension, schizophrenia and activities such as antibacterial activity, antifungal activity, antioxidant activity, cardio protective activity and various anti-inflammatory activities.

The seeds of *Rauvolfia tetraphylla* L. are very hard to propagate, mainly because it has very poor seed germination rate and it is mainly dependent on the season of plantation and it has certain seed dormancy period. Therefore, conventional seed propagation method is not enough to meet the demand of this plant required for the purpose of producing the desired quantity of alkaloids. Hence, vegetative propagation is the only other viable method to get the most out of this plant.

Auxins have a significant effect on the rooting and shooting on vegetative cuttings. Pigments, nutrients and secondary metabolites are some good indicators of the physiological conditions, medicinal properties and proper harvesting season of the plant.

In the present study, cuttings of 10-12 cm. of *Rauvolfia tetraphylla* L. having 3 replications were treated with 250 ppm, 500 ppm, 750 ppm, 1000 ppm, 1250 ppm, 1500 ppm, 1750 ppm solutions of Auxins (IAA, IBA, NAA) respectively (a total of 22 treatments) following quick dip method and planted in seedling bags. Data were collected after 30, 60 and 90 DAP (Days after plantation).

Finally, the dynamics of foliar pigments (Chl-a, Chl-b, Carotenoid), secondary metabolites, polyphenols and the qualitative presence of secondary metabolites in the leaves of *Rauvolfia tetraphylla* L. were assessed.

The whole method was conducted following CRD (Completely Randomized Design) starting from June 2022 to July 2023 at the Botanical Garden at University of Chittagong. Statistical analysis were done using MS Excel 2019 and Python's Matplotlib module for plotting graphs.

In the first cuttings, the maximum shooting and rooting performance viz: no. of shoot, length of shoot, no. of leaves were observed to be maximum at 90 DAP in the cuttings treated with IBA at 750 ppm solution (T_{11}) whereas minimum in (T_{22}). Finally, the photosynthetic pigments (Chl-a, Chl-b, Carotenoids, total Chlorophyll, total pigments) was found maximum in (T_{11}) and minimum in (T_{22}). All the data of the above experiments were subjected for ANOVA. Treatments for all the parameters were found significant.

Therefore, the present study concludes that IBA 750 ppm solution would be considered as the most suitable treatment for producing maximum no. of shoot, length of shoot, no. of root, length of root and no. of leaves in stem cuttings after 90 DAP. Qualitative presence of high number of phenolic compounds and secondary metabolites approved the medicinal importance of the plant *Rauvolfia tetraphylla* L..