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Effects of different growing systems on chemical profiles and plumbagin content of *Plumbago Indica* Linn. (S. Ratnitul)

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Plumbago indica Linn. (Family: Plumbaginaceae) is a shrubby perennial herb, native to South Asia and widely cultivated throughout India and Sri Lanka. Plumbagin (5-hydroxy-2-methyl-1,4-napthoquinone), is a therapeutically important natural naphthoquinone, which occurs mainly in the roots of *P. indica*. This plant is heavily used in Sri Lankan traditional systems of medicine for the preparation of formulations used to treat a variety of disease conditions. The slow growth rate, absence of seeds and the lack of a fruiting stage of *P. indica* in traditional agricultural methods necessitate the search for an alternative and effective source to meet the enhanced commercial demand. Therefore, the aim of the present investigation was to compare the chemical profile and to quantify the plumbagin content in *P. indica* grown under different growing systems using roots of (a) conventionally field grown (b) tissue cultured field grown (c) hydroponically grown plants and (d) *in vitro* developed callus from leaf explants. Quantification of plumbagin was done using the Thin Layer Chromatography-densitometric method.

Phytochemical evaluation on methanolic extracts of *P. indica* roots and callus revealed the presence of tannins, steroid glycosides, flavonoids and alkaloids. Further, the above extracts did not show the presence of saponins. Four prominent spots (R_f: 0.16, 0.35, 0.55, 0.93) were observed in conventionally field grown and tissue cultured field grown *P. indica* root samples. An additional spot (R_f: 0.73) was observed in hydroponically grown *P. indica* root samples while callus samples consist of only 3 spots (R_f: 0.16, 0.55, 0.93). There were no significant differences in chemical constituents of *P. indica* grown under different growing systems. However, the intensity of the spots present in the callus samples was lower than in the other tested samples.

Among the tested samples, plumbagin content decreased in the following order when considering the plumbagin content (g) in 100 g of dry material (dry weight basis): tissue cultured field grown plants (1.80 ± 0.25) > conventionally field grown (1.33 ± 0.15) > hydroponically grown (1.08 ± 0.01) > callus (0.26 ± 0.02). In conclusion, tissue culture and hydroponic techniques can be used as alternative methods to the conventional field grown system for the cultivation of *P.indica* and the maximum plumbagin content was present in the roots of tissue cultured field grown plants.

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