



## QUALITATIVE AND QUANTITATIVE ANALYSIS OF PHYTOCHEMICALS IN *Plumbago indica* L.

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### Abstract

*Plumbago indica* L. (Ratnetol) is commonly known as rose coloured leadwort and widely used in traditional medicinal systems worldwide. Plumbagin is the main bioactive compound responsible for its pharmaceutical value. The amounts of Plumbagin present in roots of eight months old field-grown conventionally propagated plants ( $23.53 \pm 6.54 \mu\text{g/mL}$ ) was higher than roots of field-grown *in vitro* propagated plants ( $12.90 \pm 2.96 \mu\text{g/mL}$ ), callus which induced from inter nodal explants on Murashige and skoog (MS) medium supplemented with 2.5 mg/L 6-Benzylaminopurine (BAP) and 1.5 mg/L 1-Naphthaleneacetic acid (NAA) ( $0.009 \pm 0.00 \mu\text{g/mL}$ ), cell culture pellet ( $0.015 \pm 0.01 \mu\text{g/mL}$ ) and supernatant extracts ( $4.23 \pm 2.07 \mu\text{g/mL}$ ) which obtained from three weeks old cell culture on MS medium supplemented with 2.5 mg/L 2,4-Dichlorophenoxyacetic acid (2,4-D), 1.5 mg/L Indol-3-acetic acid (IAA) and 1.0 mg/L NAA. Acclimatized two months old *in vitro* propagated plants showed 100% survival in all provinces. However, plants that grown in Sabaragamuwa province showed the highest mean plant height and Plumbagin content ( $104.60 \pm 8.35 \text{ cm}$ ,  $42.90 \pm 3.25 \mu\text{g/mL}$ ) when compared with Western ( $94.40 \pm 6.50 \text{ cm}$ ,  $35.81 \pm 3.78 \mu\text{g/mL}$ ), North Central ( $34.40 \pm 7.96 \text{ cm}$ ,  $17.29 \pm 5.23 \mu\text{g/mL}$ ) and North Western ( $84.00 \pm 6.32 \text{ cm}$ ,  $27.57 \pm 4.00 \mu\text{g/mL}$ ) provinces. Plants were watered in two days interval and exposed to natural environmental condition in particular area. Root extract of conventionally propagated plants showed a higher number of phytochemicals (16) while roots of *in vitro* propagated plants indicated the presence of only four chemical compounds. Callus extract showed the presence of one compound. However, the cell culture pellet was evident with nine compounds while cell culture supernatant only contained three compounds. The present study suggested that, conventionally propagated *P. indica* L. is an excellent source of several medicinally important phytochemicals. However, it is also possible to use different *in vitro* techniques that can be used effectively for to obtain phytochemicals in order to reduce the over exploitation of *P. indica* grown in nature and overcome the limitations associated with conventional plant cultivation.

**Keywords:** *Plumbago indica* L., *Plumbaginaceae*, *Plumbagin*, *Phytochemicals*, *cell culture*