

Light intensity effects on production and antioxidant activity of flavonoids and phenolic compounds in leaves, stems and roots of three varieties of *Labisia pumila* Benth

ABSTRACT

This research was performed to evaluate the effect of light intensity (310 and 630 $\mu\text{mol m}^{-2}\text{s}^{-1}$) on production and antioxidant activity of flavonoids and phenolic compounds from the leaves, stems and roots in three varieties of *Labisia pumila* Benth. The experiment was carried out based on randomized complete block design with a factorial arrangement. The results revealed that total phenolic and flavonoid content as well as antioxidant activity in all three varieties had consistently higher values when exposed to high irradiance (70% IR). The highest amount of these components was accumulated in the leaves followed by the roots and stems in all three varieties. The results showed that total flavonoid accumulation was highest in the leaves of *L. pumila* var *pumila* (2.94 ± 0.11 mg rutin equivalent /g DW) under 630 $\mu\text{mol m}^{-2}\text{s}^{-1}$ light intensity and total phenolics was highest in *L. pumila* var *alata* (3.92 ± 0.06 mg Galic acid equivalent (GAE)/g DW) under the same light intensity. HPLC analyses of phenolics and flavonoids in all three varieties revealed the presence of gallic acid, caffeic acid, kaempferol, naringin and myricetin in the leaves of all three varieties of *L. pumila* Benth and these compounds increased under 630 $\mu\text{mol m}^{-2}\text{s}^{-1}$ light intensity. Antioxidant activities determined by 1,1-Diphenyl-2-picryl-hydrazyl (DPPH) and ferric reduction antioxidant power (FRAP) assays in all varieties. The results showed significantly ($p < 0.05$) higher activity with increasing total phenolics and flavonoids in all plant organs under 630 $\mu\text{mol m}^{-2}\text{s}^{-1}$ light intensity compared to 310 $\mu\text{mol m}^{-2}\text{s}^{-1}$. This study indicates the ability of different light intensities to enhance the secondary metabolites such as flavonoid and phenolic compounds as well as their antioxidant activities in all three varieties of *L. pumila* Benth.

Keyword: Antioxidant activity; *Labisia pumila* benth; Light intensity; Total phenolics and flavonoids