

Effects of nitrogen fertilization on synthesis of primary and secondary metabolites in three varieties of Kacip Fatimah (*Labisia Pumila* Blume).

ABSTRACT

A split plot 3 by 4 experiment was designed to examine the impact of 15-week variable levels of nitrogen fertilization (0, 90, 180 and 270 kg N/ha) on the characteristics of total flavonoids (TF), total phenolics (TP), total non structurable carbohydrate (TNC), net assimilation rate, leaf chlorophyll content, carbon to nitrogen ratio (C/N), phenyl alanine lyase activity (PAL) and protein content, and their relationships, in three varieties of *Labisia pumila* Blume (alata, pumila and lanceolata). The treatment effects were solely contributed by nitrogen application; there was neither varietal nor interaction effect observed. As nitrogen levels increased from 0 to 270 kg N/ha, the production of TNC was found to decrease steadily. Production of TF and TP reached their peaks under 0 followed by 90, 180 and 270 kg N/ha treatment. However, net assimilation rate was enhanced as nitrogen fertilization increased from 0 to 270 kg N/ha. The increase in production of TP and TF under low nitrogen levels (0 and 90 kg N/ha) was found to be correlated with enhanced PAL activity. The enhancement in PAL activity was followed by reduction in production of soluble protein under low nitrogen fertilization indicating more availability of amino acid phenyl alanine (phe) under low nitrogen content that stimulate the production of carbon based secondary metabolites (CBSM). The latter was manifested by high C/N ratio in *L. pumila* plants.

Keyword: Total phenolics; Total flavonoids; Total non structurable carbohydrate; Net assimilation rate; Phenyl alanine lyase activity.