Response of Indigenous Forest Trees Species to Elevated Co_2

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Abstract—*In the changing climatic scenario the atmospheric CO_2 concentration is exposed to rise from 500 to 1000 ppm by 2100 AD (IPCC). Photosynthetic process is one which is capable of reducing the atmospheric CO_2. In this regard, the present study was conducted to compare and select the indigenous tree species with higher photosynthetic ability at elevated CO_2 concentration. The photosynthetic measurements using Infra Red Gas Analyzer (IRGA) in tree saplings of nine month old were exposed to enriched CO_2 (550ppm) for three months revealed that, Dalbergia sisso and Madhuca latifolia species found efficient in trapping 31.07% and 35.09 % of CO_2 respectively at higher concentration of 550 ppm compared to ambient 400 ppm of CO_2*

Further, the stomatal conductance (gs) found to decrease to an extent of 2.5 % and 5.8 % respectively in Dalbergia sisso and Madhuca latifolia at elevated CO_2 of 550 ppm. In addition, a higher photosynthesis activity coupled with decreased stomatal conductance, led to improved instantaneous water use efficiency (WUE). The WUE reached 2.2 mg CO_2 g H_2O^{-1} in the case of Dalbergia sisso (1.5 mg CO_2 g H_2O^{-1} at ambient CO_2) and 5.6 mg CO_2 g H_2O^{-1} in the case of Madhuca latifolia (4.1 mg CO_2 g H_2O^{-1} at ambient CO_2).

Hence, these two species found to posses better WUE , Therefore the Dalbergia sisso and Madhuca latifolia can be effectively utilized for plantations in eastern and southern dry zones of Karnataka to combat the increasing CO_2 Concentration.

Keywords*: Dalbergia sissoo, Madhuca Latifolia, photosynthetic process, enriched CO_2, Infra Red Gas Analyzer, stomatal conductance, water use efficiency.*