

VARIATION OF CARBON DIOXIDE FIXATION AND PRODUCTION OF SECONDARY METABOLITES OF LICHEN *Relicinopsis intertaxta* IN DIFFERENT SEASONS IN TROPICAL ECOSYSTEMS

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Abstract: Production of organic matter and secondary metabolites of lichens, known as natural product or lichen product, are influenced by environmental factors. These processes are different among species. The objectives of this study were 1) to find the optimal condition for photosynthesis and 2) to observe seasonal variations of photosynthesis, chlorophyll fluorescence and production of secondary metabolites of the lichen *Relicinopsis intertaxta* from the tropical rain forest at Khao Yai National Park. The lichens were collected in cold season of 2011, hot, rainy, late-rainy and cold seasons of 2012. This lichen achieved maximum carbon dioxide fixation after thallus was wet for 60 minutes when its water content was 88% of air dry weight, light saturated at $500 \mu\text{mol m}^{-2}\text{s}^{-1}$ during 25°C of the measuring condition. This lichen had the highest NP in rainy season and subsequently lower in hot, late rainy and cold seasons. The light adapted quantum yield (Φ PSII) showed a similarly seasonal pattern with Fv/Fm which correspond with NP. In addition the highest NPQ value was measured in hot season. Menegazziaic acid was produced in the highest quantity than the other lichen products. This substances and usnic acid were high in late-rainy and low in cold seasons, whereas protocetraric acid was high in the cold season. This study indicated that optimum carbon fixation and maximum yield of lichen products fluctuated, and were influenced by environmental factors of different seasons. It provided basic information for harvesting lichen to achieve the highest yield, and enhanced our understanding on seasonal responses of lichen, which can be used for conservation and sustainable utilization of lichens.

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