Colloquium on Applied Sciences- CAS 2023
17-18 July 2023, Faculty of Applied Sciences, UiTM Shah Alam, Malaysia

Utilizing Lichen Biodiversity as Bioindicator in Urban and Rural Environments

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Structured Abstract

Background: The lack of studies involving lichen as a bioindicator for monitoring air pollution is a key motivation behind this research. The main objective of this study is to investigate the morphological characteristics of lichen, to assess lichen species frequency and coverage in both rural and urban environments, and to identify the most tolerant and sensitive lichen types in response to CO gas emissions.

Methods: Two distinct sites were chosen: UiTM Shah Alam representing an urban area and Merambong Island representing a rural area. Lichen sampling was conducted on 15 random trees at each site, using 15cm X 15cm quadrat placed on the trunk, 1.5m from the base of the tree. Each identified lichen species was collected and preserved in a paper envelope. CO gas measurements were taken in ppm using Aeroqual portable gas analyzer. In the laboratory, species identification was carried out using a stereoscopic microscope and spot tests by using different chemicals to identify each lichens secondary metabolites.

Results: A total of 25 species were identified from both sites, comprising five foliose lichens and 19 crustose lichens. *Crysothrix flavovirens* is the dominating (9) in UiTM Shah Alam. *Lepraria achariana* and *Lepraria nivalis* was the highest in frequency (8) in Merambong Island. *Lepraria finkii* has the highest percentage cover (7.53%) compared to other species presents in Merambong Island. *Crysothrix flavovirens* has the highest percentage cover (2.40%) compared to other species presence in UiTM Shah Alam. The CO gas readings were higher in urban area (5.58 mg/m^3) compared to rural area (3.32 mg/m^3).

Conclusion: These findings suggest that crustose and foliose lichens have the potential to serve as bioindicators for monitoring air quality in tropical rural-urban ecosystems.

Keywords: Lichen in Urban and Rural areas, CO Concentration on Lichens Frequency

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