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A COMPARATIVE STUDY ON SPECIES ASSEMBLAGES OF ALGAE AND LICHEN

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Structured Abstract

Background: Lichens are vital bioindicators of air quality, forming a symbiotic association between fungi and algae. This study aims to ascertain the effect of carbon monoxide on the ecological parameters of lichens and algae in rural and urban areas.

Methods: The study was conducted at two sites, Shah Alam (urban site), and Jerantut (rural site) which are located near Continuous Air Quality Monitoring Stations (CAQM). Samples were collected using a 20 x 30 cm quadrat, with lichen and algae collected from 10 randomly selected trees.

Results: Crustose was the most dominant species in both rural and urban sites. *Graphis scripta*, and *Lepraria lobificans*, had the highest frequency (10) whereas *Chrysothrix candelaris* had the lowest frequency (1). Five algae genera were recorded, with *Trentepohlia* sp. absent in urban site but present in rural site. A total of 14 species of lichen were recorded with *Lepraria incana* was identified as the most tolerant lichen and recorded the highest species coverage (25.42%), abundance (15 species), and density (248.33) in urban site. *Chrysothrix candelaris* was identified as the most sensitive lichen with the lowest species coverage (1.04%), abundance (6 species), and density (10). For urban and rural sites, respectively, the species coverage values were (5.58% ± 2.07%) and (4.99% ± 1.63%). Urban site recorded (3.15 ± 1.29) species abundance, while rural site recorded (9.48 ± 3.28). The species density for urban site was (52.5 ± 21.55), while for rural site was (157.98 ± 54.63). The recorded species richness was (2.86 ± 0.718) for the urban site and (93.205 ± 0.857) for the rural site. For urban site, a weak positive correlation between lichen density and CO was recorded ($r = 0.307$). For rural site, a moderate positive correlation between algal density and CO was recorded ($r=0.65$). A moderate positive correlation between the bark pH and lichen density was recorded ($r=0.76$) whereas a weak negative correlation between algal density and bark pH was recorded ($r= 0.34$).

Conclusion: This study concluded that the species richness, abundance, and density were influenced by the bark pH and the level of carbon monoxide concentrations.

Keywords: Continuous Air Quality Monitoring Stations, lichen, algae, carbon monoxide

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