Herbaceous Vine, Mikania micrantha as a Bioindicator of Urban Air Pollution

H.W.W.M.U.S. Thalgodapitiya[1]*, B.L.W.K. Balasooriya[1], W.A.U. Vitharana[2]

[1]*Department of Biotechnology, Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka, Makandura, Gonawila (NWP), 60170, Sri Lanka*
[2]*Department of Soil Science, Faculty of Agriculture, University of Peradeniya, 20400, Sri Lanka*
**supipithalgodapitiya1997@gmail.com*

Plants undergo different physiological, morphological and chemical changes in response to the air pollution and act as bioindicators. Several herbs, trees and lichens have been identified as such bioindicators. This study aims to determine the potential of herbaceous vine; *Mikania micrantha*, commonly known as Wathupalu in Sinhala and Tuni-kodi in Tamil as a bioindicator to monitor air pollution at urban environments. Kandy city (7.2908° N, 80.6335° E), located in the central province of Sri Lanka which is known to have a high degree of air pollution was selected as the study location. The study area of 12.51 km^2 within 2 km radius from the city center was selected. Sampling locations (n=20) were identified by purposive random sampling using ArcGIS and classified into four land use classes; urban (n=9), suburban (n=4), homestead (n=4), forest (n=3). Fresh leaf samples were collected and leaf extracts were analyzed for total chlorophylls, ascorbic acid, pH, and relative water content. Air pollution tolerance index (APTI) was determined based on the plant parameters. The secondary air pollution data (particulate matter and Air Quality Index) at each sampling location indicated significantly ($p<0.05$) higher air pollution in urban areas followed by suburban, homestead and forest areas. The total chlorophyll content was significantly ($p<0.05$) lowest in urban areas (0.32±0.01 mg/g) with high vehicular air pollution and highest in forest areas (0.89±0.46 mg/g). Similarly, ascorbic acid content was significantly ($p<0.05$) lowest in urban areas (0.53±0.06 mg/g) with high vehicular air pollution and highest in forest areas (1.97±0.08 mg/g). APTI was significantly varied from highest in forest areas with low vehicular pollution to lowest in urban areas with high vehicular air pollution. Hence, *Mikania micrantha* found as a sensitive plant species to indicate urban air pollution. Thus, it can be recommended as an effective bioindicator to monitor urban air pollution.

Keywords: APTI, Biomonitoring, Kandy, *Mikania Micrantha*, Urban Air Pollutants