Analysis of Effects of Air Pollution on Mango and Custard apple Tree Leaves using ASD FieldSpec 4 Spectroradiometer and Spectral Indices

Abstract

This research aims to examine effects of Air pollution on chlorophyll content, water content, carotenoid content, anthocyanin content of Mango and Custard apple tree leaves using spectral indices. Samples are collected from Control Area (University Area) and Polluted Area (Bus Stand area). ASD FieldSpec4 Spectroradiometer machine is used for collecting spectral reflectance measurement of tree leaves. Spectral signatures are analyzed using spectral indices. Normalized Difference Vegetation Indices (NDVI) and Simple Ratio indices (SR), Red

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Edge Chlorophyll index (CI Red Edge), Moderate Resolution Imaging Spectrometer (MERIS) Terrestrial Chlorophyll Index (MTCI), Double Difference Index (DD), Red-Edge Model (R-M) indices are used for estimate chlorophyll content. Water index (WI), Normalized water indices (NWI) are used for estimate water content. Carotenoid concentration index (CRI700), Photochemical reflectance index (PRI), Plant senescencing reflectance Index (PSRI), Carotenoid concentration index (RNIR*CRI550, RNIR*CRI700) indices are used for estimate carotenoid content. Modified Anthocyanin Content Index (mACI), Anthocyanin Reflectance Index (ARI), Modified Anthocyanin Reflectance Index (mARI), Red/Green indices are used for estimate anthocyanin content. Chlorophyll content and Water content seemed inverse proportion with air pollution in Mango tree but directly proportion in Custard apple tree. Carotenoid Content are seemed directly proportion with air pollution in mango tree but inverse proportion in Custard apple tree. Anthocyanin content seemed inverse proportion with air pollution in both mango and Custard apple tree.

References

- Sims DA, Gamon JA, "Relationship between leaf pigment content and spectral reflectance across a wide range species, leaf structures and development stages".

**Index Terms**

Computer Science

Information Sciences
Keywords
Anthocyanin Content  Carotenoid Content  Chlorophyll Content  Spectral Indices
Water Content