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| **Title:** | A Rapid Approach to Measure Extracted Chlorophyll-a from Lettuce Leaves using Electrical Impedance Spectroscopy | | | |
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| **Abstract:** |  |
| Chlorophyll-a is a highly measured metric in water quality and plant health monitoring. Current laboratory-based methods exploit spectroscopic techniques and require expensive instrumentation like spectrophotometer or fluorometer. In this work, a rapid approach has been proposed using electrical impedance spectroscopy (EIS) to measure chlorophyll-a that is extracted from lettuce leaves into 95% (v/v) ethanol. Multiple readings of 70 differently concentrated samples were taken, and the corresponding impedances were measured using the proposed EIS system by varying frequency from 1.5 to 7.5 kHz. Pearson coefficient, variance inflation factor (VIF), and backward elimination were used to identify the significant component of the frequency. Finally, a multiple linear regression model with 11 features in the range of 2.3 kHz to 4.7 kHz was chosen based on the lowest root mean square error (RMSE) and mean absolute error (MAE). The results show high index of positive determination of chlorophyll-a with the coefficient of determination being 0.932, RMSE of 1.05 μgL-1, and MAE of 0.904 μgL-1. | |