

# Multi Marker Response in *Spirogyra* as a Potential Reporter for Spectrometric Biosensor in Light Metal, Herbicide and Pesticide Detection

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## ABSTRACT

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The accumulation of light metals and pesticides in the environment poses a major health concern to humans, plants and animals. Thus, there is a need to monitoring the toxicants by using reliable detection methods. One of a way is by using whole cell biosensor as it is widely studied for the detection of toxicants or pollutants and have more advantages compared to the conventional detection methods. Algae are suitable biological elements in whole cell biosensor due to its high sensitivity to the changes in environment. The objective of this study is to determine the response of multi markers in *Spirogyra* as a potential reporter for biosensor application in light metal and pesticides detection. Cells immobilized using agarose gel were exposed to 0.001, 0.010, 0.100, 1.000 and 10.000 mg/L of aluminium (Al), 2, 4-dichlorophenoacetic acid (2, 4-D) and atrazine for a period of 48 hours. Respond trends for chlorophyll, carotenoids, alkaline phosphatase, and SODs were recorded. The cells showed the best sensitivity after 48 hours of exposure to atrazine compared to Al and 2, 4-D. Potential markers for biosensor application was determined using chlorophyll to detect Al, using SOD to detect 2, 4-D and atrazine due to the highest result in  $R^2$  value at specific exposure time proving high reliability in the testing of research.