

# Development of a Whole Cell Biosensor using Immobilized Cyanobacteria *Anabaena Cylindrica* for Heavy Metal Detection

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## ABSTRACT

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Heavy metal in water sources is a serious threat to the environment and mankind. This work shows a way of using immobilized *A. cylindrica* in a whole cell biosensor by observing its response towards heavy metal such as copper (Cu), zinc (Zn) and aluminium (Al). A spectrophotometer ( $\lambda = 680 \text{ nm}$ ) is used to determine the effect of heavy metal towards chlorophyll a in the cyanobacteria cell. The *A. cylindrica* cells are immobilized by using 1 % of agarose gel and reading was taken for each heavy metal are taken on hour basis such as at 0 hour, 1 hour, 6 hour and 24 hour. The study showed different cell density can influence the sensitivity of the biosensor in determining the response against 1 mg/L of Copper (Cu) solution at a neutral pH. The optimal concentration of the cell to be used for this biosensor is 500,000 cell/mL. The study on Aluminium (Al) and Zinc (Zn) on the biosensor at concentration range of 0.001 mg/L to 10.000 mg/L indicates that the cells response at OD 680 nm decreases as the concentration of heavy metal increases. The study on both Al and Zn also shows the biosensor can be used for both quantitative and qualitative analysis.