

Whole Cell Bio – Indicator Using *Anabaena cylindrica* and Carotenoids as a Reporter

Prepared by: Saktis Paul A/L Alexander

ABSTRACT

Pollutants like heavy metals have detrimental effect on humans and other organisms, therefore a fast and easy detection method is required. For monitoring purposes, whole cell biosensors are good alternatives as they are portable, allow rapid detection and generate reliable results. The main objective of this experiment is to study the effects of single and combined toxicity response of *Anabaena cylindrica* towards copper (Cu), cadmium (Cd) and lead (Pb). Through standardised experimental parameter, *A.cylindrica* of day 7 culture cells with cell density = 0.5 A were immobilised in 1% agarose and exposed to various concentrations (0.001 mg/L, 0.010 mg/L, 0.100 mg/L, 1.000 mg/L and 10.000 mg/L) of heavy metals. The effect of heavy metal on carotenoids, produced during photo-oxidative stress was measured using OD_{450nm}. The results showed predominantly antagonistic effect of combined toxicity of different combination of heavy metals. The response of *A.cylindrica* to heavy metals enables the build-up of biosensors capable of quantitative and qualitative analysis of single and combined heavy metals' toxicity. Thus, a whole cell bio indicator was successfully constructed using carotenoid as a reporter.