In this research, toxicity and mechanism of cadmium bioaccumulation in *Tetraselmis chuii* was studied in possibility of *Tetraselmis chuii* use as the bioindicator of sea waters contamination monitoring. In practice, series of *Tetraselmis chuii* culture with or without cadmium contaminant exposure in Walne medium. Toxicity test was performed by determining specific growth rate parameter (μ), percentage of growth inhibition (PGI), non effective concentration (NEC), maximum tolerable concentration (MTC) of cadmium and cadmium concentration causing the decrease of growth rate by 50%, relative to the control (EC50). Kinetics parameter that will be studied is establishing reaction order of cadmium bioaccumulation of *T. chuii* and to determine the influence of medium pH to cadmium accumulation ability of *T. chuii*. The result of research showed that cadmium exposure concentration which not influence growth was 0.01 to 0.20 ppm and maximum tolerable concentration (MTC) value of *T. chuii* was 0.20 ppm with EC50 of 7.7 ppm. In addition, the research revealed that cadmium bioaccumulation process of *T. chuii* followed first-order kinetic with constant value of withdrawal rate (k1) of 0.2539/min and constant value of extrication rate (k2) of 0.0299/min. Subsequently, accumulation ability was very influenced by medium pH, it was increase with increasing t medium pH and it was optimum at pH of 8 with accumulation ability of 0.5223 mg/Cd/gram of *T. chuii*.

Key words: Toxicity, Mechanism, Bioaccumulation, Cadmium, *Tetraselmis chuii*