

Modeling of domestic wastewater treatment facultative stabilization ponds

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Abstrak

processes of Biological treatment intend to reduce the organic matter content by using microorganisms. Problems, which often occur in the treatment process, include the Wastewater Treatment Plant (WWTP) being planned for treating domestic wastewater only, but in fact the WWTP often receives non-domestic wastewater particularly direct or indirect faecal deposits. There are 13 simultaneous systems of nonlinear differential equations using the method of Runge-Kutta-Fehlberg (RKF45). Data validation is measured in a facultative stabilization pond at a distance of 0 m, 25 m, 50 m and 75 m respectively. Samples are taken at the inlet and outlet of the pond covering the concentration of Bacteria (B), Algae (A), Zooplankton (Z), Organic Matter (OM), Detritus (D), Organic Nitrogen (ON), Ammonia (NH₃), Organic Phosphorus (OP), Soluble Phosphorus (SP), Dissolved Oxygen (DO), Total Coliform (TC), Faecal Coliform (FC), and Biochemical Oxygen Demand (BOD). The research comparing observation and count data results in 11 kinds of concentration that have a relative error <20% and 2 concentrations > 20%, namely Chemical Oxygen Demand (COD) and Faecal Coliform.(FC). Wastewater quality is predicted with 45o angle charts and tolerance $\pm 20\%$, respectively for BOD (76.8%), COD (57.7%) and DO (81.9%). The model, as a means for performance evaluation of the WWTP, is appropriate for Class II water quality standards.