Analisis Pengaruh Jenis Sampah Organik Spesifik Terhadap Konsentrasi COD dan Amonia Pada Badan Air = Analysis of the Effect of Specific Organic Waste on COD and Ammonia Concentrations in Water Bodies

Intan Shafira Rachmadhini, author

Abstrak

Keberadaan sampah di badan air dapat mempengaruhi penurunan kualitas lingkungan perairan. Di mana sampah sisa makanan dan sampah taman mendominasi pencemaran sampah di Sungai Ciliwung sebesar 68,63%. Penelitian ini bertujuan untuk menganalisis dinamika konsentrasi, laju perubahan, dan simulasi perubahan konsentrasi COD dan amonia akibat keberadaan sampah organik spesifik pada badan air. Dilakukan pengambilan air sampel di Sungai Ciliwung, Depok yang diuji dengan perlakuan penambahan sampah sisa makanan dan sampah taman menggunakan reaktor batch skala laboratorium. Korelasi pengaruh jenis sampah organik spesifik terhadap dinamika konsentrasi COD dan amonia di investigasi menggunakan Kruskal-Wallis. Laju pembentukan dan penguraian COD dan amonia di investigasi dengan melibatkan penggunaan ODE linear faktor pengintegrasian. Sehingga dapat diperoleh hasil simulasi dengan bantuan opsi analisis solver pada Microsoft Excel. Hasilnya didapatkan bahwa keberadaan sampah sisa makanan dan sampah taman mempengaruhi perubahan konsentrasi COD dan amonia pada badan air, yang dibuktikan dengan hasil uji Kruskal Wallis untuk nilai Hhitung COD dan amonia berturut turut 14,81 dan 10559,4 yang lebih besar daripada nilai kritisnya sebesar 9,49. Untuk parameter COD, diperoleh nilai laju pembentukan (k1) untuk sampah sisa makanan adalah 0,126-0,145 per hari dan sampah taman adalah 0,086-0,0827 per hari. Adapun laju degradasi (k2) untuk sampah sisa makanan adalah 0,437-0,517 per hari dan sampah taman adalah 0,368-0,342 per hari. Sedangkan untuk amonia, (k1) sampah sisa makanan adalah 0,00017-0,000175 per hari dan sampah taman adalah 0,00055-0,00051 per hari. Adapun laju nitrifikasi (k2) sampah sisa makanan adalah 0,1179-0,1391 per hari dan sampah taman adalah 0,2456-0,3481 per hari. Sehingga dapat diketahui bahwa degradasi sampah sisa makanan menjadi COD atau amonia (k1) dan laju degradasi COD akibat sampah sisa makanan (k2) lebih signifikan dibandingkan dengan sampah taman.
.....The presence of waste in bodies of water can affect the decline in the quality of the aquatic environment. Food waste and garden waste dominate the waste pollution in the Ciliwung River by 68.63%. This study aims to analyze the dynamics of concentration, rate of change, and simulate changes in COD and ammonia concentration due to the presence of specific organic waste in water bodies. Water samples were taken from the Ciliwung River in Depok, which were tested with the treatment of adding food waste and garden waste using a laboratory-scale batch reactor. The correlation of the influence of specific organic waste types on the dynamics of COD and ammonia concentration was investigated using Kruskal-Wallis. The formation and degradation rates of COD and ammonia were investigated by involving the use of linear ODE integration factor. Thus, simulation results can be obtained with the help of the solver analysis option in Microsoft Excel. The results showed that the presence of food waste and garden waste affects the changes in COD and ammonia concentration in water bodies, which was confirmed by the Kruskal-Wallis test results for the calculated H values of COD and ammonia, which were 14.81 and 10559.4, respectively, greater than their critical values of 9.49. For the COD parameter, the formation rate (k1) values for food waste ranged from

0.126 to 0.145 per day, while for garden waste it ranged from 0.086 to 0.0827 per day. The degradation rate (k2) for food waste ranged from 0.437 to 0.517 per day, while for garden waste it ranged from 0.368 to 0.342 per day. As for ammonia, the formation rate (k1) for food waste ranged from 0.00017 to 0.000175 per day, while for garden waste it ranged from 0.00055 to 0.00051 per day. The nitrification rate (k2) for food waste ranged from 0.1179 to 0.1391 per day, while for garden waste it ranged from 0.2456 to 0.3481 per day. Therefore, it can be concluded that the degradation of food waste into COD or ammonia (k1) and the degradation rate of COD due to food waste (k2) are more significant compared to garden waste.