Efektivitas Penyisihan Mikroplastik di Instalasi Pengolahan Air Limbah Domestik Ruang Publik Terpadu Ramah Anak Dahlia = Microplastic Removal Effectivity in Ruang Publik Terpadu Ramah Anak Dahlia Municipal Wastewater Treatment Plant

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Abstrak

Mikroplastik merupakan emerging contaminant yang semakin banyak diteliti dampak dan persebarannya di lingkungan. Studi terdahulu menyimpulkan bahwa IPAL penting dalam mencegah mikroplastik masuk ke badan air, tetapi masih melepaskannya dalam jumlah besar melalui air dan tanah. Penelitian ini bertujuan untuk mengkaji efektivitas IPAL Domestik RPTRA Dahlia dalam menyisihkan mikroplastik dari greywater. Prosedur penelitian meliputi pengambilan sampel lumpur di 1 titik dan sampel air di 6 titik IPAL, yang kemudian diuji di laboratorium. Hasilnya, IPALD RPTRA Dahlia memiliki efektivitas penyisihan mikroplastik sebesar 92,85%, dengan variasi efisiensi penyisihan per titik sampel. Efisiensi penyisihan kumulatif tertinggi diketahui terdapat pada unit biologis yaitu 81,08% dengan mekanisme penyisihan berupa pengendapan partikel pada unit-unit sebelumnya. Data karakteristik mikroplastik termasuk bentuk, warna, ukuran, dan material. Persentase bentuk dari terbanyak adalah fragmen (59,6%), microbead (29,1%), fiber (5,9%), film (3,9%), dan foam (1,6%). Warna mikroplastik dominan adalah hitam (33,5%), biru (27,5%), merah (23,9%), dan kuning (6,9%), dengan sebagian kecil hijau (4,2%), dan putih-bening (4,0%). Ukuran partikel bervariasi: fragmen (12 Î¼m - 1,425 mm), microbead (6-75 Î¼m), fiber (112 Î¼m - 4,737 mm), film (37 Î¼m - 1,518 mm), dan foam (63 Î¼m - 1,053 mm). Material mikroplastik yang teridentifikasi di antaranya: PVFM, PVB, PVC, Polyester Film, FEP, PEI, PC/PBT.

.....Microplastics are one of emerging contaminants that are increasingly being studied for their impact and distribution in the environment. Previous studies have concluded that WWTPs are important in preventing microplastics from entering water bodies, but still release them in large quantities through water and soil. This study aims to assess the effectiveness of the RPTRA Dahlia Domestic WWTP in removing microplastics from graywater. The research procedure included sampling of sludge at 1 point and water at 6 points of the WWTP, which were then tested in the laboratory. As a result, the RPTRA Dahlia WWTP has a microplastic removal effectiveness of 92.85%, with variations in removal efficiency per sample point. The highest cumulative removal efficiency is known to be found in the biological unit at 81.08% with a removal mechanism in the form of particle deposition in the previous units. Data on microplastic includes shape, color, size, and material. The highest percentage of shapes were fragments (59,6%), microbeads (29,1%), fiber (5,9%), film (3,9%), and foam (1,6%). The dominant microplastic colors were black (33,5%), blue (27,5%), red (23,9%), dan yellow (6,9%), dengan sebagian kecil green (4,2%), dan white-transparent (4,0%). Particle sizes varied: fragments (12 Î¼m - 1.425 mm), microbeads (6-75 Î¼m), fiber (112 Î¼m - 4.737 mm), film (37 Î¼m - 1.518 mm), and foam (63 Î¼m - 1.053 mm). The microplastic materials identified include PVFM, PVB, PVC, Polyester Film, FEP, PEI, PC/PBT.