SCREENING OF ENDOCRINE DISRUPTING COMPOUNDS IN PAŞAKÖY MUNICIPAL WASTEWATER TREATMENT PLANT AND THEIR REMOVAL BY OZONATION

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Endocrine Disrupting Compounds (EDC) are among the micropollutants that have gained importance in recent years due to their adverse biological effects on animals and human beings at low ng/L levels. Natural hormones, synthetic hormones and some of the synthetic chemicals like pesticides are known to have endocrine disrupting effects. Wastewater discharges, which are the main source of these compounds, lead to the transportation of EDCs to clean water resources. Monitoring of EDCs in wastewaters and receiving environments, development and application of treatment technologies are inevitable today when their numerous diverse adverse effects including reproduction problems in animals, some type of cancer growths in human beings are considered. Until now, no detailed screening of EDCs has been made in İstanbul wastewater treatment plants (WWTP). Most common estrogenic compounds detected in WWTP effluents are estrogenic hormones like estrone (E1), 17 β-estradiol (E2), 17 α-ethinylestradiol (EE2) and estriol (E3); synthetic chemicals like nonylphenol (NP), octylphenol (OP), bisphenol A (BPA) and pesticides. In this study, these compounds were measured using solid phase extraction, derivatization and GC/MS. In Table 1 influent and effluent EDC concentrations of Paşaköy Advanced WWTP are presented. Additionally, EDCs were monitored in various treatment steps to evaluate the effect of treatment units on EDC removal. It was observed that treatment units were effective in the removal of some EDCs such as Bioallethrin, El and E3 while 4-t-OP, NP and 4-n-OP remained intact throughout the treatment plant. Ozonation was applied to the effluent of Paşaköy Advanced WWTP at pilot plant scale and its effect on EDC removal was investigated.

Table 1 EDC concentrations measured in for Paşaköy Advanced Wastewater Treatment Plant influent and effluent

<table>
<thead>
<tr>
<th>Compound Name</th>
<th>4-t-OP</th>
<th>NP</th>
<th>4-n-OP</th>
<th>Bioallethrin</th>
<th>E1</th>
<th>17α-estradiol</th>
<th>E2</th>
<th>Pemethrin</th>
<th>E3</th>
<th>Phytosterol</th>
<th>BPA</th>
<th>DES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influent (ng/L)</td>
<td>60</td>
<td>4295</td>
<td>2352</td>
<td>676</td>
<td>1107</td>
<td>1448</td>
<td>1038</td>
<td>30</td>
<td>69650</td>
<td>69417</td>
<td>85</td>
<td>BDL</td>
</tr>
<tr>
<td>Effluent (ng/L)</td>
<td>57</td>
<td>4916</td>
<td>2592</td>
<td>23</td>
<td>BDL</td>
<td>BDL</td>
<td>BDL</td>
<td>21</td>
<td>101</td>
<td>202</td>
<td>64</td>
<td>BDL</td>
</tr>
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REFERENCES