DECOMPOSITION OF 17α-ETHYNYLESTRADIOL BY PHOTOCATALYTIC PROCESS ON TITANIUM DIOXIDE CATALYST

Spacilova M., Spacilova L., Solcova O.

Institute of Chemical Process Fundamentals of the Czech Academy of Sciences, v.v.i., Prague 6, Czech Republic

Endocrine disruptors are chemical substances with effect on the human or animal hormonal systems. It is a large group of chemicals of antropogenic and natural origin. This group consists of variety of compounds such as hormons, surfactants, pesticides etc. These substances occur in wastewater and partially pass through any sewage treatment plant. Therefore, their presence in environment has been rising tremendously, similarly as the importance of their removal. Advanced oxidation processes Photocatalysis on appropriate metal oxides seems to be the effective method for the environment protection.

This study is focused on decomposition of the harmful compound, 17α-ethynylestradiol (EE2), which belongs to the group of hormones called estrones. They are compounds with similar structure as estrogen and they have a similar effect on a hormonal system. The group of estrones covers estron, 17β-estradiol, estriol and 17α-ethynylestradiol.

Photocatalytic reaction was performed in the presence of titanium dioxide catalyst. Photocatalytic reaction proceeded on titanium dioxide coated in four layers on glass beads. The UV lamp Philips HOK 4/120 SE, 400 W medium pressure mercury lamp with wavelength 250 - 420 nm was used for activation of the prepared photocatalyst. The experiment was carried out in a batch reactor with and without glass filter. The glass filter was used to shield the UV-B and UV-C radiation. Elimination of this substance was monitored by HPLC module. Toxicity and estrogenity of compound as well the possible intermediates were determined by the luminescence method.

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