ABSTRACT

The fate and effects of the most of known pharmaceuticals as they are exposed to the environment is yet not known. After certain pathways and possible reactions in human and animal body, variety of unchanged active pharmaceutical compounds and their metabolites are excreted through urine or faeces. Entering the environment, pharmaceuticals and their metabolites are exposed to the sunlight that can cause degradation of such compounds and even increase in toxicity. Therefore the great efforts and hopes are laid in the advanced water and wastewater treatment technologies to be implemented on the point where contamination occurs.

In this study anthelmintic drugs were investigated. This drugs used in veterinary practice to threat infections with parasitic worms, applied in great quantities, have the potential to appear in surface waters. The photochemical behaviour of the four anthelmintics, albendazole, praziquantel, levamisole, febantel in water was investigated folowed by laboratory scale removal through RO/NF membranes. In this study a NF/RO laboratory scale up for wastewater treatment using membrane technology was applied and membranes' removal potential for anthelmintic drugs and their photodegradation products was investigated.

Samples were exposed to UV light of 254 nm. Even though the UV light of 254 nm could not pervade on the Earth surface, irradiations were performed at the above mentioned wavelengths to determine as much photodegradation products as possible. Water solutions of anthelmintics before and after irradiation were passed through six different types of RO/NF membranes. The results (HPLC chromatograms of water samples) show efficient removal of active pharmaceutical compounds and the majority of photodegradation products (>99%) by two RO membranes (LFC-1 and XLE) and by the tight nanofiltration NF90 membrane. Other nanofiltration membrane elements tested incompletely remove investigated active compounds and their degradation products.

Key words: anthelmintic drugs, photodegradation products, RO/NF membrane treatment

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