ABSTRACT

Wetland ecosystems are sinks for organic carbon and greenhouse gases thus faciliating their biotransformation into less harmful compounds through anaerobic degradation. The aim is to protect aquatic ecosystems from ecotoxicological harm. This paper studies model pollutants; N-phenyl-1-naphthaleneamine and 3,5-diethylphenol in Lake Naivasha wetland. N-phenyl-1-naphthaleneamine is a suspected carcinogen which can metabolize into the well-known human carcinogen 2-naphthylamine whereas phenol derivatives scuh as 3,5-diethyl phenols are well-established carcinogens and mutagens. Soil sediments were collected from the wetland at intervals of 3 hours starting from 6.00 am to 6.00 pm three times during the dry season of December, 2018. Extraction of organics from sediments was carried out in a mixture of methanol and dichloromethane. Purified extracts were analyzed using a Gas Chromatograph coupled to a mass selective detector (MSD). The maximum concentration of N-phenyl-1-naphthaleneamine was 2.71 μg/L at 6 am and decreased to ~ 34% at 6 pm. 3,5-dimethylphenol had a maximum concentration of 0.51 μg/L and decreased to ~ 25% at 6 pm. The diminishing concentration of these model organic pollutants is an indication that wetlands play a remarkable role in water purification and environmental management. Degradation pathways of N-phenyl-1-naphthaleneamine and 3,5-dimethylphenol to H_2O CH_4, and CO_2 by microbial action has been suggested in this work. Furthermore, computational simulation on the stability behaviour of the model compounds under study has been performed to support their degradation characteristics.