

Research Article

Determination of metformin and triclosan in sewage sludge using Liquid chromatography-mass spectrometry (LC-MS)

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Abstract

Pharmaceuticals and personal care products (PPCPs) are generally neither totally removed by sewage treatment nor completely destroyed in the environment. Metformin (MET) and triclosan (TRI) are two compounds in PPCPs that have the potential to be environmental pollutants. This research aimed to determine MET and TRI in sewage sludge using a liquid chromatography-mass spectrometer (LCMS-8040) and a sewage sludge extraction method. The Milli-Q water and sewage sludge were also tested at three different MET and TRI concentrations (0.01, 0.02, and 0.03 mg L⁻¹). As a result, the corresponding recoveries of MET and TRI in both matrixes ranged from 85.93 to 116.10 per cent and 90.50 to 116.30 per cent (n = 7, RSD < 10%). Then, the limit of detection (LOD) and the limit of quantification (LOQ) for MET and TRI were found to be 0.005 and 0.01 mg L⁻¹. The amounts of MET and TRI in the sewage sludge samples from the Ukkadam sewage treatment plant (USTP), Coimbatore, ranged from BDL to 0.0587 mg L⁻¹ and 0.0719 to 0.1851 mg L⁻¹, respectively. Consequently, the amounts of MET and TRI in the sewage sludge samples from the Tamil Nadu Agricultural University sewage treatment plant (TSTP), Coimbatore, ranged from BDL to 0.0227 mg L⁻¹ and 0.0393 to 0.1296 mg L⁻¹, respectively. This exclusive use of the highly sensitive LCMS-8040 consumes less time than other analytical methods for measuring the amount of MET and TRI in sewage sludge by overcoming the risk of chemical degradation.

Keywords: Sewage sludge, Metformin (MET), Triclosan (TRI), Liquid chromatography-mass spectrometry (LC-MS)

INTRODUCTION

One of the biggest issues harming our planet is chemical pollution. It is a cyclical process that impacts all forms of the environment (air, water, and soil), as well

as living things that are both pollutant emitters and recipients. Due to their design to remove organic debris and nutrients at concentrations higher than mg L⁻¹, one of the main issues is that wastewater treatment plants (WWTPs) are unable to remove many EPs (Pérez-