

MICROPLASTICS DETECTED IN MARINE WATERS USING SPECTROSCOPIC ANALYTICAL TECHNIQUES: A REVIEW ON THE CURRENT STATE OF KNOWLEDGE

H. Jayawardhana^{1, *}, W.B. Gunawardana¹

¹ Department of Civil Engineering, University of Moratuwa, Moratuwa

Microplastics (MPs) contamination in marine waters has recently become a serious environmental concern. Hence, the identification of various types of MPs in marine waters is essential to control the MPs contamination in marine water. Several analytical methods have been adopted for the identification of MPs in marine waters and spectroscopic analyses are the most popular method adopted. In this study, a comprehensive review was carried out using published literature during 2010-2022 related to the identification of MPs in marine waters globally using spectroscopic methods. The present study is aimed at (1) identifying the most suitable spectroscopic method currently available to identify the MPs in marine waters, and (2) determining the most abundant type of MPs identified using the spectroscopic methods globally. About 65% of the reviewed studies (n=84) have adopted spectroscopic methods associated with the Fourier Transform Infrared (FTIR) and among them, 45% used the Attenuated Total Reflection FTIR (ATR-FTIR) method for the MPs identification in marine waters. By using the data available and comparing different aspects of the testing procedures of the reviewed studies (n=84) [cost of analysis, sensitivity, availability of the facilities], the ATR-FTIR method was found as the most suitable spectroscopic method to identify MPs in marine waters globally. Based on the data available from reviewed studies (n=31), Polyethylene (PE) (combined with LDPE and HDPE) was found as the most abundant type of MPs identified using spectroscopic methods globally. In conclusion, the present review provides insight into the applicability of the ATR-FTIR method for MPs identification in marine waters and the abundance of various types of MPs detected using spectroscopic methods.

Keywords: ATR-FTIR, Marine waters, Microplastic, Polyethylene, PE, Spectroscopic method

* Correspondence: charuka68@gmail.com

