

A small overview of the current, natural & affected environments by microplastics

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Background

There is a growing concern and increasing evidence that microplastics in the World's rivers and oceans are having an affect on marine environments; and ultimately into the food chain. Infrared Spectroscopy and Microscopy are well- established analytical techniques for defining, identifying and categorising of plastic materials. However, it is also good to remember that microplastics is a term that consists of diverse chemicals of all shapes, sizes, colour etc. Increasingly collating research and information on these materials has become of great importance as they are being added as priority contaminants to monitor by various governments. This presentation reviews the recent scientific findings in the microplastics applications in order to sharpen our understanding of their affects in our marine environments.

1. Methods

Infrared (IR) spectroscopy is the established technique for identifying polymer materials and has been used extensively for identifying large (over 100 micrometer) polymer materials. Spectrum Two™ with ATR is used to identify these large plastic debris. For microplastics, down to a few micrometers in size, an IR microscope can be used for the detection and identification of these materials. There are two forms of microscope measurement: (1) in-contact using a micro-ATR or ATR-crystal imaging; and (2) non-contact measurement such as transmission or reflection imaging. With the help of software packages Spectrum10 and Spectrum Image, appropriate and reproducible data can be collected.

2. Results

Large microplastic particles using the Spectrum Two™ were easily scanned and identified due to the extensive polymer materials library and knowledge. Smaller microplastic particles/debris were also successfully imaged; IR scanned and identified using the Spotlight400 or Spotiligh200i microscope. Using the different measurement options, full particle characterisations were established and collated with other techniques to further our understanding.

3. Conclusions

Large and small particles of microplastics can be scanned, imaged and identified successfully. Using the different measurement options for the infrared spectroscopy and microscopy provides flexibility in choosing the most appropriate method for the given analytical opportunity that will hopefully lead to a full characterisation, and thus a better understanding of the microplastic concern in the marine environments worldwide.

References

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