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Optimized solid state ^{13}C CP-MAS NMR, FTIR and Raman spectroscopy for the accurate determination of %degree of acetylation of extracted crab shell chitin for valorization of fisheries waste streams

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Optimized solid state ¹³C CP-MAS NMR, FTIR and Raman spectroscopy for the accurate determination of %degree of acetylation of extracted crab shell chitin for valorization of fisheries waste streams

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Solid state ¹³C CP-MAS NMR was optimized for the accurate determination of %degree of acetylation (%DA) using a range of extracted chitin and chitosan standards. Application of the optimized ¹³C CP-MAS NMR technique, along with FTIR and Raman spectroscopy for qualitative analysis, determined the %DA of fisheries waste-stream chitin isolated from brown crab (*Cancer Pagurus*) as being from 91-100% and of high purity. The extraction procedure was optimized, under principles of green chemistry and for ease of up-scaling for industrial application, by review of literature and replicate studies. Extraction is shown to be necessary for accurate analysis as determined by comparison of ¹³C CP-MAS NMR, FTIR and Raman spectra of both raw and extracted samples. An analytical suite consisting of these techniques is proposed as a standard reproducible method for the accurate characterization of crustacean sourced chitin.

Biography

Fionn Ó Fearghail is a Post-graduate Researcher in the Radiation and Environmental Science Centre (RESC) and NanoLab in the FOCAS Institute at the Dublin Institute of Technology. His research focuses on development of analytical techniques for the detailed characterization of marine sourced bio-polymers and bio-active compounds. He also works towards up-scaling of sustainable processing and extraction of raw materials for valorization of waste streams by enhancing understanding of the chemical and physical properties of raw and extracted marine sourced materials.

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