**Radiochemical preparation of marine biota samples for measurement of technetium-99 by iCAP TQ ICP-MS**

Paul Blowers\****1***, Rachel Blowers*1*, Angela Daniell*1*, Franck Dal Molin*1*, Boby Thomas*1* Hibaaq Mohamud*2*, Ben Russell*2,* Matthew Gregory*3*, Aude Bombard*4*

*1Cefas, Pakefield Road, Lowestoft, NR33 0HT, UK*

*2Nuclear Metrology, National Physical Laboratory, Teddington, TW11 0LW, UK*

*3ThermoFisher Scientific, Hemel Hempstead, HP2 7GE, UK*

*4Triskem International, 35170 Bruz, France*

Inductively coupled plasma - mass spectrometry (ICP-MS) has been proven to offer a more sustainable, safer and cost-effective alternative to traditional beta counting of nuclear derived technetium-99 (99Tc). In all analytical cases, measurement must be preceded by radiochemical separation, with techniques including ion-exchange, extraction chromatography and commonly via co-precipitation of Tc with stable and commercially available rhenium (Re).

Whilst some ICP-MS equipped with triple quadrupole (TQ) and other detecting technologies have been applied to measure 99Tc in environmental matrices, neither the performance of the iCAP TQ ICP-MS manufactured by Thermo Fischer Scientific nor the radiochemical challenges associated with the preparation of marine biota prior to ICP-MS analysis have been explored.

This work covers some of the challenges encountered when revisiting traditional radiochemical techniques and incorporating more modern crown-ether type resins to provide effective interference removal and produce an appropriate geometry for assay of 99Tc by mass.