

Waters

Lab Highlights

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WATERS GOES TO SEA

The English Channel is being studied to measure the composition of the seawater in an attempt to better understand its productivity in terms of the flora and fauna which live and grow there.

Roger Evens, James Braven and Leslie Brown of the Department of Environmental Sciences at Plymouth U.K. and Ian Butler of the Marine Biological Association of the U.K. have studied changes in the available nitrogen in seawater. It has been found that inorganic nitrogen builds up during the winter. During the spring the nitrate is used by phytoplankton which must then use alternatives in the form of ammonia, urea and other nitrogenous products of metabolism, which are recycled by the biota. These authors state that there is considerable evidence that some species of phytoplankton preferentially use specific forms of dissolved nitrogen, whose nature decides which of the competing phytoplanktons are the most successful survivors. About half of these nitrogenous constituents available during the summer have been identified and measured individually but amino acids, which are part of the unstudied fraction, were not studied previously because they are present at microgram quantities in 3.5% saline solution.

Evens *et al.* took a Waters L.C. to sea and successfully used pre-column derivatization with o-phthalaldehyde (OPA) for the separation. The authors report obtaining linear response for each amino acid over a range of 1 to 400 picomoles in seawater. Two M6000A's were used with a Model 720 Systems Controller using a complex gradient and fluorescence detectors, one of which was a Model 420 Fluorometer.

They use pre-injection preparation of the OPA derivatives and report coefficients of variation of about $\pm 10\%$.

The main purpose of their paper was to give details of the method which was found to be successful, even when tested at sea on the NERC Research Vessel Frederick Russell. The equipment performed well under difficult weather conditions, including a Force 8 gale!

The fate of amino acids in the English Channel is not described in this paper, but if you would like to know more of the method, consult: "A High Performance Liquid Chromatographic Determination of Free Amino Acids in Natural Waters in the Picomolar ($M \times 10^{-12}$) Range Suitable for Shipboard Use." Evans, R., Braven, J., Brown, L. and Butler, I., Chemistry in Ecology, Vol.1, p.p. 99-106 (1982).

We don't recommend that you test our equipment under such adverse conditions, but it's reassuring to know that it continued to work well. Waters' equipment finds its way to some pretty strange places -- an RCM-100® RCSS is in the Antarctic being used to measure carotenoids in plantlife.

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