Measurement of phosphomonoesterase activity in wetland sediments – a sensitive method using HPLC and UV detection

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With 6 figures in the text

Abstract: We have modified the method for the assay of phosphomonoesterase using methylum belliferyl substrates in wetland sediments, by adopting HPLC with UV detection. Separation of the enzymic products from the sample matrix overcomes the problem caused by quenching interference of phenolics in the conventional fluorometric assay, and yet does not require an expensive fluorometric HPLC detector. Phosphomonoesterase activity measured by this method, showed linearity over a 90-minute incubation period and substrate saturation at 800 μM of substrate concentration.

Introduction

Phosphomonoesterase plays a key role in phosphorus cycles in terrestrial and aquatic ecosystems by transforming organic phosphorus into inorganic form (SPEIR & ROSS 1978, COTNER & HEATH 1988). The activity of the enzyme is regulated at several levels (CHRÓST 1991), which would be expressed as an inverse relationships between the enzyme activity and phosphorus availability in an ecological context. From aquatic systems, there have been many reports on such inverse relationships (COTNER & WETZEL 1991, SIUDA & CHRÓST 1987). In soil systems, the correlation is less clear (SPEIR & ROSS 1978) with a few exceptions (HAUSSLING & MARSHNER 1989, ROJO et al. 1990). For a lake sediment, NEWMAN & REDDY (1993) have reported that alkaline phosphatase activity was inversely related to pore water organic phosphorus, thus indicating the importance of phosphatase in organic phosphorus degradation. We

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DOI:10.1127/archiv-hydrobiol/140/1997/411
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0003-9136/97/0140-0411 $ 1.75
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