Bol. Inst. Esp. Oceanogr. 15 (1-4). 1999: 517-522 **BOLETÍN** INSTITUTO ESPAÑOL DE OCEANOGRAFÍA
ISSN: 0074-0195

Anionic surfactant biodegradation in seawater

D. Sales, J. A. Perales, M. A. Manzano and J. M. Quiroga

Departamento de Ingeniería Química, Tecnología de Alimentos y Tecnologías del Medio Ambiente. Facultad de Ciencias del Mar. Universidad de Cádiz. 11510 Puerto Real (Cádiz), Spain

Received October 1997. Accepted March 1998.

ABSTRACT

The authors conducted a study of the influence of several environmental factors (temperature, salinity, luminosity, aeration and the presence of sediments) on the biodegradation of a commercial anionic surfactant (LAS) in waters and sediments of Cadiz Bay (southwest Iberian Peninsula). The assay was carried out using an adaptation of the river die-away test. At temperatures of 20-25 °C, degradation exceeded 90 % within less than 10 days of assays, whereas at temperatures under 10 °C, degradation scarcely took place. Luminosity increases the degradation speed, compared with assays performed under darkness. Finally, the results show that the rate of surfactant degradation was remarkably accelerated in the presence of sediments, except in those tests where anoxic conditions were established.

Key words: Surfactant, LAS, seawater, biodegradation, sediments.

RESUMEN

Biodegradación de un tensioactivo aniónico en agua de mar

Se presenta un estudio de la influencia de diversas variables ambientales, tales como temperatura, salinidad, luminosidad, aireación, etc., en el proceso de biodegradación de un tensioactivo aniónico comercial (LAS) en aguas y sedimentos de la bahía de Cádiz (suroeste de la península Ibérica). El ensayo se ha llevado a cabo empleando una modificación del método test de agua de río. A temperaturas de 20 y 25 °C, el nivel de degradación superaba el 90 % en menos de 10 días de ensayo, mientras a temperaturas inferiores a los 10 °C, apenas tenía lugar degradación alguna. La iluminación provoca un aumento de la velocidad de degradación respecto a los ensayos llevados a cabo en oscuridad. Los resultados han mostrado que la velocidad de degradación del tensioactivo se ve claramente aumentada por la presencia de sedimentos, excepto en aquellos casos en los que se dieron condiciones anóxicas.

Palabras clave: *Tensioactivo, LAS, agua de mar, biodegradación, sedimentos.*

INTRODUCTION

Society's ever-expanding utilisation of materials, energy and space is accompanied by an increasing flux of anthropogenic organic chemicals into the environment. One of the several sets of transformations that remove organic compounds from the environment is that group of reactions mediated by organisms. As for chemical and photochemical reactions, these biochemical processes (biodegradation) change the structure of the organic chemical in question, thereby removing that particular compound from an environmental system of interest. The resulting one or more products (biointermediates) have their own properties, reactivities, fates and effects. It should be noted that when we refer to