

Ecological factors that co-occur with geosmin production by benthic cyanobacteria. The case of the Llobregat River

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With 7 figures and 2 tables in the text

Abstract: The ecological factors that co-occur with the production of geosmin have been studied in a Mediterranean river, which shows repeated episodes of this metabolite causing nuisance off flavours. The geosmin peaks consistently occurred from early winter (late January or February) to late spring (May or June). Absolute geosmin maximum were different between years, the highest concentration occurring on March 1999 (146 ng.l⁻¹). These episodes coincided with the progressive development of thick algal mats on sediments and cobbles, especially in pools and littoral zones. The dominant taxa in these mats were *Oscillatoria limosa* (AGARDH ex GOMONT) and two different morphotypes of *Oscillatoria* aff. *tenuis*. Analyses of geosmin in the mat confirmed that the algal mats dominated by *Oscillatoria* were geosmin-producers. An analysis of redundancy (RDA) based on algal and cyanobacterial taxa showed a gradient of velocity and dissolved geosmin in the water associated to the occurrence of the two *Oscillatoria* taxa, and allowed to summarise that low water velocity favours the development of these algal mats. Temperature also exerted a critical role for the geosmin occurrence in the river, since it contributed to determine the period of development of the algal mats in the different sites of the river.

Key words: algal mat, cyanobacteria, ecology, geosmin, off flavour, river.

Introduction

Unpleasant odours and tastes in drinking water are a common problem for water suppliers. Sources of contaminants that produce off-flavours can be natural as well as anthropogenic (ZOETEMAN & PIET 1973). Among the substances produced by biological agents, geosmin is commonly responsible for earthy and musty