

## Publication MIO : Filipe Rocha, Vera Homem, Javier Castro-Jiménez (MIO), Nuno Ratolaa- Marine vegetation analysis for the determination of volatile methylsiloxanes in coastal areas in Science of The Total Environment

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### Abstract

Volatile methylsiloxanes (VMSs) are massively produced chemicals that comprise a wide range of industrial and household applications. The presence of cyclic and linear VMSs in several environmental matrices and ecosystems indicates persistence associated with a potential of (bio)accumulation and food web transfer with possible toxicological effects. Due to the high anthropogenic pressure in its vicinities particularly in summer, coastal areas in Southern European countries are potential hotspots for the presence of VMSs. The massive afflux of tourists and consequent increase of the use of personal care products (PCPs) with VMSs in their formulations highlight the importance of VMSs assessment in such areas. In this study, different species of marine vegetation (algae and seaweed) were collected in three different geographical areas, covering the Atlantic Ocean (North coast of Portugal), as well as the Mediterranean Sea (coasts of the Region of Murcia, Spain and of the city of Marseille, France). Samples were analysed for the determination of 4 cyclic (D3, D4, D5, D6) and 3 linear (L3, L4, L5) VMSs employing a QuEChERS extraction methodology, followed by gas chromatography/mass spectrometry (GC/MS) quantification. VMSs were detected in 92% of the 74 samples analysed, with the sum of the concentrations per sample ranging from below the limit of detection (LOD) to  $458 \pm 26 \text{ ng} \cdot \text{g}^{-1} \text{ dw}$  (dry weight). A strong predominance of cyclic VMSs over linear ones was verified in almost all samples studied, with D5 and D6 found at higher concentrations. Seasonal variation was also assessed and despite higher levels of VMSs being identified mostly in summer months, clear seasonal trends were not perceived. It was also noted that generally the higher incidence of VMSs occurred in samples from urban and industrialized areas or in the vicinities of WWTPs, suggesting a direct input from these sources in the levels of siloxanes observed.