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Freshwater and estuarine diatom composition and seasonal variation: influence of environmental factors and its forensic application

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Abstract

Background: Diatoms are unicellular microalgae common in aquatic systems. Different species and communities are characteristic of the ecosystems where they are found, allowing temporal and local associations to be made. Additionally, they do not occur naturally in the human body. Therefore, diatoms can provide relevant information in forensic investigation situations, i.e., determining the cause of death by drowning [1,2], or be used to establish associative indices between places, individuals, and/or objects [3,4]. Nevertheless, the diatom composition of an aquatic ecosystem depends on diverse factors such as seasonality and physiochemical and hydrological conditions of the water body. **Objective:** This study focused on analyzing the composition of diatoms in three types of aquatic environments (stream, estuary, and wells) throughout 4 seasons and exploring the influence of the physicochemical parameters of the water in diatom composition and variation. Methods: Samples were collected from two sampling locations in the stream and estuary, and from two wells. Afterward samples were processed and analyzed by optical microscopy for diatom identification. Physicochemical parameters (temperature, pH, conductivity, turbidity, dissolved oxygen and nutrients) were measured. **Results:** Differences in the composition and abundance of diatoms between the three aquatic systems were found, demonstrating the influence of hydrological and anthropogenic characteristics in diatom composition. The stream and estuary showed the higher diversity and abundance of diatoms in summer, whereas samples from the wells showed the lowest and even absence of diatoms in one well. Seasonal and spatial variations were evident and association of diatom composition with physicochemical parameters were found for some species. **Conclusions:** This preliminary study highlights the importance of investigate diatom composition in different aquatic systems and its relationship with seasonal and physicochemical factors. This study provides a basis for future research that could develop a useful database for forensic investigations.

Keywords: aquatic systems; seasonality; diatoms; forensic sciences

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