Nutrient stoichiometry as a tool for determining nutrient condition in coastal waters

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Primary production sustaining life in coastal lagoons basically requires nutrients and light. The EU Water Framework Directive (WFD), implemented in 2000 recommends assessment of nutrient conditions under the physico-chemical biological supporting elements to ensure the achievement of 'good ecological status' by 2015 in all European waters. However, not much work has been done to develop tools for assessing nutrient conditions. This study utilized nutrient stoichiometry as a tool for assessing nutrient conditions in Ria Formosa lagoon, Portugal. Three sites (with different nutrient inputs namely; natural inputs (Praia de Faro), municipal sewage effluents-Ramalhete; and agricultural inputs-Ponte) were assessed for a period of eight months between November 2014 and June 2015. The concentrations were used to develop nutrient ratios (N: P and N: Si) that were utilized in computing Ecological Quality Ratios (EQR) used in classifying the sites. Results showed N: P ratios below the Redfield's with 8.87, 5.07 and 9.61; and N: Si ratios of 1.66, 0.79 and 1.29 for Praia de Faro, Ramalhete and Ponte respectively categorized under 'Good'/ 'Moderate' and 'Moderate'/ 'Poor' ecological classes. The study concludes that this tool is essential for assessing and identifying areas in the lagoons and other aquatic systems with nutrient condition problems and for establishing effective management strategies to ensure maintenance of their health and integrity. The study however recommended analysis of nutrient stoichiometry together with biological quality elements to ensure achievement of comprehensive results.