



Physico-chemical water quality of the coastal lagoon of Benin in *Crassostrea tulipa* oyster farming areas.

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ABSTRACT

Objective: This study aims to assess the physico-chemical quality of the coastal lagoon waters of Benin in areas dedicated to the farming of *Crassostrea tulipa* oysters.

Methodology and Results: Physico-chemical parameters were measured on a monthly basis over a full annual cycle from January to December 2023, both in situ (temperature, salinity, dissolved oxygen, pH, and water transparency) and in the laboratory (nitrites, nitrates, ammonium, and orthophosphates), within the oyster farming zones. The results showed that all evaluated parameters varied significantly across months and between farming zones, except for nitrites, ammonium, and dissolved oxygen, which did not show significant spatial variation. The Organic Pollution Index (OPI) calculated for the three oyster farming sites revealed moderate organic pollution levels in all zones (3.33 at Ahouandji and Djondji, and 3.67 at Dégouè on a 5-point scale).

Conclusions and Application of results: As the mangrove oyster (*C. tulipa*) is a highly valuable fishery resource in the Gulf of Guinea region, it is important to regularly monitor the physicochemical quality of the water in oyster production areas. Even slight variations in certain water parameters can greatly affect the reproduction and growth of these bivalve molluscs (oysters), as well as the quality of their flesh, which is consumed by coastal populations. While the values recorded for all physicochemical parameters generally remained within the tolerance ranges for *C. tulipa* oysters during the study period, indicating that the coastal lagoon offers environmental conditions conducive to oyster farming in Benin, moderate organic pollution shows that these oyster production areas are not pollution-free. In order to ensure sustainable, high-quality oyster production in Benin, it is necessary to implement specific measures for sustainable ecosystem management. These measures include regular monitoring of water quality, regulation of wastewater discharges and the use of organic and chemical fertilisers in the watershed, as well as community awareness programmes.

Keywords: Water quality, Physico-chemistry, Coastal lagoon, Oyster farming, *Crassostrea tulipa*.