

Seasonal variation of biochemical composition of Noah's ark shells (

The seasonal changes in biochemical composition of the edible bivalve *Arca noae* harvested from a Mediterranean coastal lagoon (Bizerte lagoon, Tunisia) were investigated from October 2013 to September 2014. Potential food sources and nutritional quality indices (NQI) were determined by analyzing the fatty acid profiles of their tissues during an annual reproductive cycle. Results showed that *A. noae* had moisture (73.8–82%) and protein (24.1–58.6% dry weight) as major components, followed by lipid (10.4–28.8% dry weight) and glycogen (4.05–14.6% dry weight). *A. noae* accumulated lipid and glycogen for gonadal development during both maturation periods (late autumn/late spring–summer) to be used during spawning periods (winter/late summer–early autumn). However, proteins were mainly used to support reproductive allocation and played an important role on the energetic maintenance. Lipid and glycogen were found to be significantly related to temperature, salinity and chlorophyll *a* ($p < 0.05$). An increase of condition index (CI) was observed during spring and early summer when both temperature and food supply increased. The total fatty acid (TFA) profile of Ark shells was dominated by polyunsaturated fatty acids (PUFA) (33.8–49.6%), followed by saturated (SFA) (29.1–43.1%) and monounsaturated fatty acids (MUFA) (20.77–28.3%). *A. noae* soft tissues were also rich in macro-minerals (Na, Ca and Mg). The analysis of fatty acid trophic markers revealed that the diet of *A. noae* during the year of study was based on mixture food mainly on phytoplankton followed by zooplankton and other sources (bacteria, seagrass and macroalgae). Furthermore, the nutritional quality indices have revealed that *A. noae* is an excellent source of nutrients and a healthy food for human consumption. These data are useful to the conservation of natural stocks of *A. noae* and the development of sustainable aquaculture production of this shellfish species in the Bizerte lagoon.

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