OC28: Influence of seasonality on the lipid profile of aquaculture oysters from the Sado and Mira rivers

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Oyster culture arose from the need to meet the growing demand for oysters. The production of oysters in aquaculture on the Sado and Mira rivers is developed according to traditional and artisanal techniques used for a long time. The way in which oysters are handled during the production process strongly influences the final quality of the oysters. In the Mira river, the Portuguese oyster (*Crassostrea angulata*) is produced, being this one also produced in the Sado river joint with the Pacific oyster (*Crassostrea gigas*). The oysters' composition may vary according to the species, sexual maturation degree, production location, food availability, season, and water temperature. According to the literature, [1] it was found that *C. gigas* and *Crassostrea rhizophorae,* cultivated in Florianópolis and produced in the spring, had a higher amount of lipids than those produced in the summer, whereas the *C. gigas* oysters had a higher lipid content. In *C. gigas* oysters, the content of EPA and DHA corresponds to 20% of the total fatty acids, [2] which presented high concentrations of omega-3 fatty acids and low concentration of total saturated fatty acids, being mostly palmitic and oleic acids. [3]

The present work aims to characterize the oyster *C. angulata* and *C gigas*, from nurseries located in the Mira and Sado rivers and to analyse the proximate composition, fatty acid content and sensory analyses of oysters grown in different months of the year. The sampling period included the months of May, July and October 2018, and March 2019. Depurated oysters from wild and aquaculture were analysed, both ready for commercialization and human consumption. The edible part was subjected to chemical composition analyses and sensory assessment. The percentages of moisture, ash, protein, and total fat were determined, allowing the calculation of the energy value, including the fatty acid profile. The sensory analysis was carried out in three sessions by a group of panelists (N=30), to whom depurated samples were provided, to evaluate descriptors of appreciation of appearance, smell, taste and texture, using a scale of 1 (minimum intensity) to 5 (maximum intensity) for each descriptor.

The results indicated that the amount in lipids and fatty acid composition varied in the different months. The analysed oysters had a high content of unsaturated fatty acids, a good proportion of beneficial lipids for health, including omega-3 fatty acids. Among the detected fatty acids, palmitic fatty acid was the most abundant in the different months, with significant differences ($p<0.05$), with lower percentages in May 2018 and March 2019. Monounsaturated fatty acids showed lower percentage values in both species in the different months analysed and in both rivers. On the other hand, polyunsaturated fat had the highest levels (Figures 1 and 2). *C. angulata* oysters presented nutritional advantages with significant differences ($p<0.05$) between rivers and in different months, in the DHA/EPA ratio and in the omega-3 and -6 polyunsaturated fatty acids content, which were higher in the months of May 2018 and March 2019. For *C. gigas* oysters was verified nutritional advantages also due to the DHA/EPA ratio and omega-3 and -6 polyunsaturated fatty acids content, but in this case low levels of lipids and saturated fatty acids was observed.

From the sensory analysis it was possible to verify that the *C. angulata* and *C. gigas* oysters, in general terms, were well scored, had presented the highest scores (4) in parameters such as cream-ivory colour, brightness of the bivalve's body, clarity of the exudate, sea smell, firmness, elasticity and juiciness.

Specifically, in the cream-ivory colour there were significant differences ($p<0.01$) both between oysters and between natural (wild) and aquaculture production systems. In the greenish-gray colour, there were significant differences ($p<0.01$) only between oysters from the natural and aquaculture production systems. These attributes denote the freshness degree at the time of the tasting, reflecting the quality of the bivalve from natural environment and aquaculture production. The salty flavour had all very high scores (3-4), despite not showing significant differences ($p<0.01$), and in line with the sea smell and the algae taste. In all samples, the odour of sludge was poorly scored (1.20-1.40), which agreed with another study, [4] with odours scored of 1.18 and 2.28 at the first and fifth days, respectively, revealing the freshness of the samples. In both species, the high scores were obtained in the March 2019 samples, in the descriptors in general, and with a juiciness of 4.4 in *C. gigas*, followed by those of July 2018 samples and October 2018 ones.

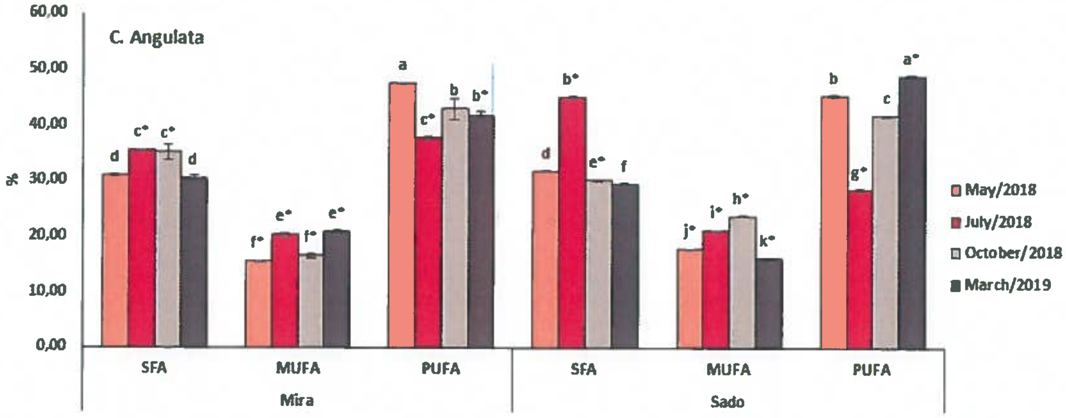

Figure 1: Saturated (SFA), monounsaturated (MUFA) and polyunsaturated (PUFA) fatty acids content (%, g fatty acids/100 g of total fatty acids) of *C. angulata* on the different months in the Mira and Sado rivers. For each river, different letters denote significant differences ($p<0.05$) between samples; Symbol (*) indicates significant differences ($p<0.05$) between rivers for each month.

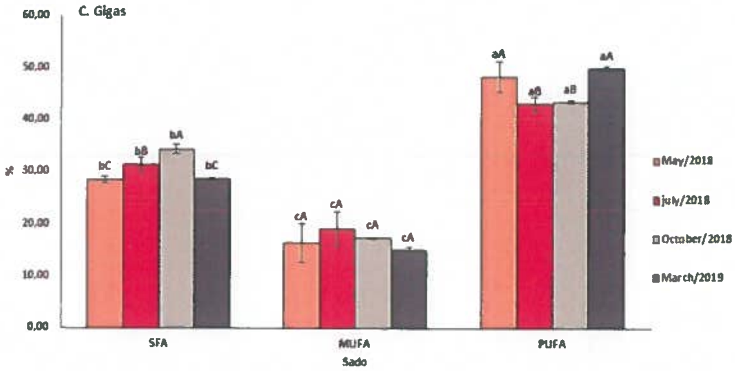

Figure 2: Saturated (SFA), monounsaturated (MUFA) and polyunsaturated (PUFA) fatty acids content (%, g fatty acids/100 g of total fatty acids) of *C. gigas* on the different months in the Sado river. Different letters denote significant differences ($p<0.05$) between samples.

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