

SEASONAL VARIATION IN THE FATTY ACID COMPOSITION OF *ATHERINA SP* FROM KERKENNAH ISLANDS

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Abstract

The effects of seasonal variations on the fatty acid composition of the silverside *Atherina sp* from Kerkennah islands were determined for a one-year period. The levels of lipid displayed pronounced seasonal fluctuations with the highest values in March. The increase of the polyunsaturated fatty acids (PUFA) percentage was accompanied with a decrease of saturated fatty acids. Docosahexaenoic acid and eicosapentaenoic acid were the most abundant PUFA. The percentages of total n-3 fatty acids were higher than those of total n-6 fatty acids in spring season.

Keywords: Fishes, Islands, Chemical Analysis

Introduction

Atherina is a genus of small inshore fishes with many populations living in brackish, marine water and fresh water [1]. Like marine food products, Silverside are valuable sources of nutrients such as lipids. Lipids of marine fish are rich in n-3 long chain polyunsaturated fatty acids [2], [3], [4] of excellent nutritional value and beneficial effect on human health, especially eicosapentaenoic acid (C20:5n-3) and docosahexaenoic acid (C22:6n-3). *Atherina sp* is one of the commercially important and highly consumed fish species in Tunisia especially in the centre and south coast of Tunisia. In view of these facts, the aim of this study was to determine seasonal variations of the fatty acid composition and n-3/n-6 ratios of the Silverside which has not been studied in the area. Materials and methods This study was carried out in 2008 and samples were obtained in January, March, May, July, September and November from kerkennah islands (Tunisia). This study was focused on adult fishes and samples were conserved at -40°C until their analysis. Total lipids were extracted according to [5] procedures by chloroform/methanol (2/1) and quantified gravimetrically. A fraction of lipids extract was transesterified according to the experimental procedure of [6]. The comparison of different biochemical parameters were tested using Duncan's test (95% confidence interval) with one-way ANOVA.

Results and discussion

The fat content of the analysed specie shows an important dependency on season (Table 1) in Silverside, it was minimal in September and November (2.4–2.2%), and maximal in March and May (4.7%–5.9%). The fatty acid profile in silverside was typical of marine animals (Table2), with the dominance of palmitic acid (C16:0) for saturated fatty acids SFA. Also, Oleic acid (C18:1) was identified as the major monounsaturated fatty acids MUFA, Docosahexaenoic acid (DHA) (C22:6n-3), linoleic acid (LA) (C18:3) and eicosapentaenoic acid (EPA) (C20:5n-3) were the most abundant polyunsaturated fatty acids PUFA. The same data were found by [7], [8]. In the present study, the significant increase ($p < 0.05$) of the polyunsaturated fatty acids percentage was accompanied with a decrease of saturated fatty acids. The observed increase in PUFA is likely due to the preparation of spawning period. This finding is supported by the fact that the level of PUFA was lowest both before and just after reproduction [9]. The n-3/n-6 ratio is a good index for comparing relative nutritional value of fish oils [10]. The present data show that in all months except September and November, the percentages of total n-3 fatty acids were higher than those of total w6 fatty acids. n-3/ n-6 fatty acids ratio in Silverside can be significantly influenced by spawning and season.

Conclusion

This study has shown that the maximum levels of lipids were reached during the period of March and May; in contrast, the lowest levels were recorded in September and November. The Silverside is a suitable item in the human diet during the spring period in Kerkennah islands when the levels of EPA, DHA and n-3/n-6 ratio are considered.

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