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Effect of seasonal changes in proximate composition of common pandora (*Pagellus erythrinus*, Linnaeus 1758) caught from Saros.

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ABSTRACT

The aim of this study is to determine the seasonal changes in water, protein, lipid and ash contents of common pandora (*Pagellus erythrinus*) a commercial fish species caught from Saros Bay (Turkey) via trawl nets. Eight samplings were taken twice during each season (January 2007- February 2008). Water %, protein %, lipid % and ash % content in the muscle for winter period were found to be 83.10; 13.59; 1.73 and 1.18, respectively. These values were recorded as 82.94; 13.32; 2.02 and 1.27, respectively for spring. The findings were 83.69; 13.29; 1.65 and 1.23 in summer and 84.21; 12.66; 1.46 and 1.18 in fall, respectively. Seasonal differences can be explained by the prolonged spawning period of fish from spring to fall. Changes occurred in the proximate composition depending on the seasons had no significant impact on marketing value of fish.

Introduction

Fish and most other marine species are biologically important foods depending on their low satiety and high nutritional values (Varlık et al. 2004). Nevertheless, meat yield and chemical composition of fish muscle shows differences between and within the species (Erkoyuncu et al. 1994; FAO 2002; Grigorakis et al. 2002; Love 1988; Luzia et al. 2003; Samsun et al. 2005; Samsun et al. 2006; Tzikas et al. 2007). These differences are thought to be related with food intake, energy spending, migration, sexual changes during the spawning period, water temperature and salinity, seasons, environment and age (Balogun and Talabi 1985; Hearn et al. 1987; Nettleton et al. 1990; FAO 2002; Grigorakis et al. 2002; Luzia et al. 2003; Nakamura et al. 2006; Tzikas et al. 2007; Miniadis et al. 2007). According to Erkoyuncu et al. (1994), being aware of these differences is important for conscious feeding (Samsun et al. 2005;

Samsun et al. 2006). Furthermore, knowing the proximate composition of fish have great importance for managers in order to implement the correct processing method (Yeannes and Almandos 2003; FAO 2004; Tzikas et al. 2007).

Fishery products in human nutrition date back to prehistoric times and have always been preferred (Turan et al. 2006; Besler 2008; Brown 2000). Furthermore, currently, importance of fish in human diets was comprehended much more and fishes were started to be evaluated by considering their easily digestible proteins and lipid sources (Besler 2008; Brown 2000; Erkoyuncu et al. 1994; Güner et al. 1998; Pigot and Tucker 1990; Samsun et al. 2005). Easy digestibility characteristics of fish flesh are associated with absence of hardly digestible cellulose and filaments which are existed in vegetables and also fibres present in red meat. Additionally, depending on the water mass, fish requires less structural support and has a hollow structure (Gorga 1998; Hultin 1985; Okland et al. 2005; Turan et al. 2006; Varlık et al. 2004).

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Common Pandora (Pagellus erythrinus)

Common pandora species are widely spread in Norway,

East Atlantic, Madeira and Canary Islands. In Turkey, they are existed especially in Mediterranean and Aegean and Black Sea. Their average length is 10-15 cm. but some of them can reach up to 60 cm. Body colour is reddish with no stripes. They live near the coasts, on rocky, gravelly, sandy and muddy surfaces at 200-300 m. depth. On the other hand, they go down deep in winter period. They are omnivorous. They are white flesh fishes with high economic value (Bauchot et al. 1990). Fishing rods, longline fishing and trawl nets can be used to catch these fishes (Hoşsucu 2000).

Material and methods

In this study common pandora (*Pagellus erythrinus*) species (figure 1) was used. The most effective factors for choosing this species were it's high economically value, availability in all seasons and convenient taste for Turkish people. The research materials were taken from fishes captured from Saros Bay via trawl nets. Sampling was made between January 2007 and February 2008. Eight samplings were taken twice during each season and total of 96 fish were used for analysis.

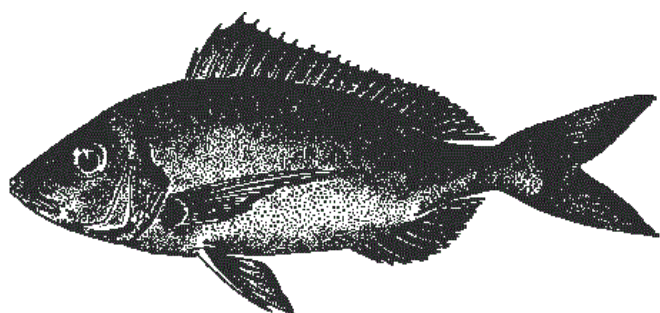


Figure 1. Common pandora (*Pagellus erythrinus*) (FAOADRIAMED, 2012)

Samples were selected among 18-22 cm. fishes and were cooled immediately after being caught and were brought up to Faculty of Marine Sciences and Technology, Fisheries Laboratory maintaining the cold chain. Fish fillets were taken for protein, lipid and ash analysis as described below and were homogenized immediately after transporting to the laboratory. Fishes were frozen at -18°C for one month and defrost at 4°C right before analysis. Triplicate analysis were made for each fish.

Moisture content was determined by drying method. The amount of nitrogen was determined by Kjeldahl method and protein ratio was calculated according to 6.25 factor. Lipid and ash contents were determined by Folch and heating methods, respectively (AOAC, 2002). Standard deviation was computed by using the Microsoft Excel 2003 Programme.

Results and Discussion

Seasonal changes in proximate composition of common pandora (*Pagellus erythrinus*) are given in Table 1 and Figure 2.

Table 1. Proximate composition of common pandora according to the seasons (%)

Seasons	Water	Crude protein	Crude lipid	Ash
Winter	83.10±0.58	13.59±0.37	1.73±0.58	1.18±0.01
Spring	82.94±0.20	13.32±0.79	2.02±0.20	1.27±0.06
Summer	83.69±0.37	13.29±0.65	1.65±0.37	1.23±0.02
Fall	84.21±0.35	12.66±0.25	1.46±0.35	1.18±0.08

Crude lipid % values were found to be similar with the results of a study (%0.20 and %7.15) that was conducted with the same species, in the Northwest Lion Gulf and South Catalan Seas of France between June-August 2001 via trawl nets (Lloret et al. 2005).

In an another study, *Pagellus erythrinus*, *Lithognathus mormyrus*, *Pagrus caeruleostictus*, *Dentex maroccanus*, *Mullus barbatus* and *Mullus surmuletus* species which were supplied from local fisheries in the Sfax region of Tunisia and caught from Gabes Gulf in the Mediterranean Sea between December 2005 and May 2006 were studied. Average water %, protein %, lipid % and ash contents of *Pagellus erythrinus* were found to be 72.87 ± 1.10 ; 19.52 ± 0.08 ; 3.18 ± 0.20 and 3.08 ± 0.08 , respectively. Results were found to be considerably different when compared to the present study. The variation between the results can be attributed to study area, weather conditions and water parameters (Koubaa et al. 2010).

Ersoy (2006), has conducted a study in Iskenderun-Turkey with seabream (*Sparus aurata*) species which is in the same family with common pandora. Fishes were provided from the local fisheries during the months of September and December 2003 and March and May 2004. Amounts of water %, protein %, lipid % and ash % in September 2003 were found to be 75.64; 20.45; 1.70 and 1.40 respectively. In December 2003 these values were recorded as 74.32; 22.63; 1.75 and 1.03, respectively. The values were 76.85; 21.43; 0.23 and 1.11 in March 2004 and 75.91; 21.26; 0.67 and 1.54 in May 2004, respectively. Results in lipid amounts were very similar for winter and summer findings of the present study. Ash amounts were also very similar. For the same period results were different in water and protein amounts. These differences can be explained by variations in dietary components, nutrient sources, temperature and salinity.

Conclusion

According to the findings, common pandora becomes fatty best in spring and leans in fall. The variations in the lipid amounts can be explained by the spawning period of fish that starts in early spring and continues until September. Water % content of common pandora reaches to the highest value in fall and decreases to the lowest value in spring due to the inverse relationship between lipid.

Protein content reaches to the highest value in winter, but there are no significant differences between seasons.

Ash contents of common pandora species are quite similar in all seasons.

Consequently, the amount of lipid in fish muscle increases prior to reproduction period and decreases during

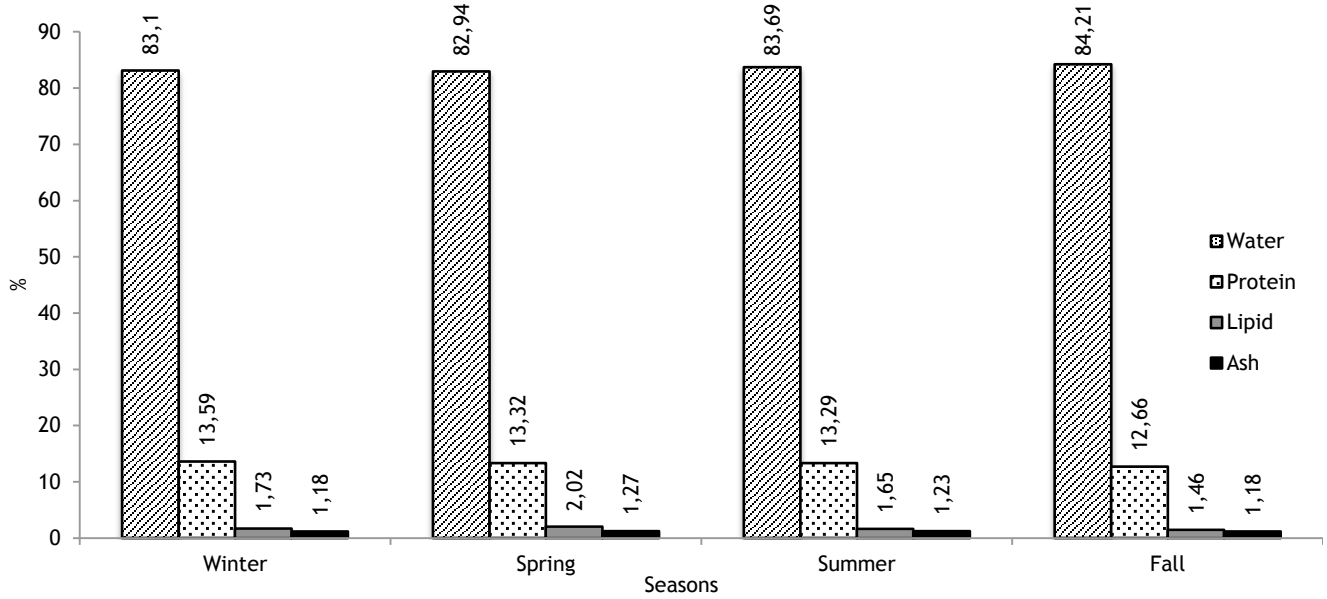


Figure 2. Seasonal changes in proximate composition of common pandora (*Pagellus erythrinus*)

the spawning period. There is an inverse ratio between lipid and water, thus water content was increased after the finishing of spawning period. In this study, significant differences in other findings were not observed.

As a result, it can be concluded that common pandora species are valuable food sources in terms of their nutritional values. Additionally, the differences in proximate composition between seasons are not substantially important for customers. Depending to these facts, they should be evaluated as a species of high economic value and the suitability of different processing methods should be also investigated.

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