

# SEASONAL VARIATION OF THE GLOBAL CHEMICAL COMPOSITION OF FISH: ANNULAR SEA BREAM *DIPLODUS ANNULARIS* (L, 1758)

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## Abstract

Seasonal variation of the global chemical composition of the annular sea bream species of the coastal catch fish of the Gulf of Gabes (Tunisia) was studied between October 2007 and September 2008. The period of reproduction of *Diplodus annularis* occurs from April to June. This sexual maturity (RGS, RHS) is in strong correlation with the fat content. The fat content is negatively correlated with moisture content  $R = 0.83$ ,  $P < 10^{-3}$ . The variance analysis of moisture, protein, fat and ash in the whole muscle shows that only the factor months has significant effect on the muscles chemical composition ( $P < 10^{-3}$ ).

**Keywords:** Chemical Analysis, Fishes, Coastal Engineering

## Introduction

The period of reproduction of the annular sea bream occurs from February to September. The size of *Diplodus annularis* at the first sexual maturity is equal for both sexes to 10.21 cm [1]. The aim of the present study is to report an assessment of the global seasonal chemical composition (moisture, protein, fat and ash) of the principal coastal catch fish species of the gulf of Gabes and to determine the factors influencing chemical composition. Material and Methods The muscle of fish is divided in two parts: latero-dorsal and latero-ventral parts, whole muscle and organs (liver, Head, gonads, viscera). The gonado-somatic (GSI) and the hepato-somatic (HIS) indexes were calculated as follows:  $GSI = (Wg/Wev) \cdot 100$ ,  $HIS = (Wh/Wev) \cdot 100$ , where Wg is the gonad weight and Wev is the eviscerated fish weight. Wh is the liver weight. Moisture content, Crude protein, Fat and Ash are determined. All statistical analysis were performed by using SPSS software® version 11.0 (Statistical Package for Social Sciences). Every factor presenting a p-value (p) inferior to 0.05 was considered significant.

## Results

Figure 1 shows the comparison between the gonado-somatic and the hepato-somatic indexes, and the fat content.

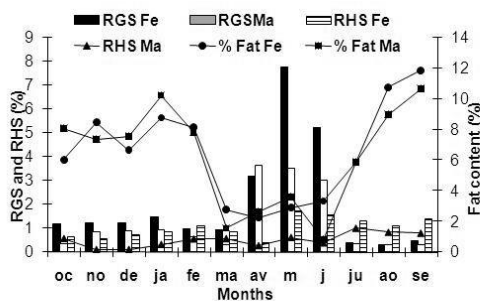


Fig. 1. Comparison between the gonado-somatic and the hepato-somatic indexes, and the fat content.

The gonado-somatic and hepato-somatic indexes of annular sea bream female's present maximal values in May (RGS = 7.73 % and RHS = 1.73 %), and minimal values in April (RGS=0.30) and in Aout (RHS=0.37). The RGS and RHS values are inferior for males than females. The maximal of fat content coincides with the chute of RGS and RHS values from March to July. The maximal of fat content is observed in september and is accompanied with a minimal RGS values. The minimal of fat content corresponds to the highest value of RGS. Strongest negative correlation is shows between fat and moisture contents ( $R = -0.83$ ;  $p < 10^{-3}$ ). Moisture, fat and ash contents varied significantly as a function of month ( $p < 0.001$ ). Whereas the sex of the fish did not have any significant effect on the variation of the moisture, fat, protein and ash contents of the organs ( $p = 0.83$  for the sex). The month haven't a significant effect on the protein content ( $p = 0.45$ ).

## Discussion

According to the classification of fishes [2] based on their fat content, Annular sea bream could be considered as high fat fish categories » 5 to 25 % (g fat/ 100 g fresh fish). In the state of sexual maturity, the size of gonads increases and the fat content of muscle decreased. So the fishes use their muscle fat reserve for the maturation of gonads. After the spawning period, the fat content increases due to the conversion of the gonad tissue. Moisture content is usually inversely related to fat content [3]. This relationship has been observed generally in pelagic fish, which lay down oil in the muscle tissue [4], and it could be a consequence of the fish maintaining constant density. The effect of sex on the chemical composition was not significant ( $P < 10^{-3}$ ). Whereas the effect of month is significant for moisture, fat and ash content of the muscle.

## Conclusion

The seasonal variation of the fat content is inversely correlated to the RGS index. In fact, the maximal of fat content reached in September (11.47 for males and 10.76 for females) coincides with the minimal value of RGS index. Fat and moisture contents are negatively correlated. The effect of sex on the global chemical composition of the annular sea bream is not significant.

## References

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