

Muscle lipids and protein content of the rabbit fish *Siganus rivulatus* (Forsk.) from the Southeastern Mediterranean

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Available published work on the biochemical composition of rabbit fish in general and *S. rivulatus* in particular is scanty (PEIRIS & GRERO, 1972). The present paper entails results of total lipid, total protein and water content of the muscles of juveniles (<15 cm total length) and adults (>25 cm total length) of both sexes of *S. rivulatus* from the Southeastern Mediterranean off the Egyptian coast. Biochemical analysis were carried out on monthly samples (covering a complete year) collected from Alexandria region. Total lipids were determined according to the method described by BLIGH & DYER (1959). Total protein was analyzed and assessed following the procedure of ASSEM & HANKE (1981); Egg albumin was used as a standard protein. All results are expressed as percent of wet weight.

The average water content in the muscles of *S. rivulatus* was 75.7% varying between 78% and 74% with no significant differences between both sexes and all lengths.

The lipid content of juvenile fish varied between 0.69% and 1.84% with an average of 0.91%. In adult fish, the lipid content was significantly higher and averaged 1.13% varying between 0.6% and 2.7%. In both juvenile and adult fish total muscle lipid was higher in females than in males but the differences were statistically not significant. Throughout the length range 17-28 cm the lipid content increased with increasing fish length, the correlation coefficient was significantly high ($r=0.93$). The low values of muscle fat content classifies the species among lean fishes which probably store their fat in the viscera. In *S. javis*, the highest amount of lipid (22.8%) occurred in the viscera against 3.8% in the flesh and 4.4% in the liver (PEIRIS & GRERO, 1972). The correlation between muscle lipid and water content was not significant, however, in fatty fishes, a significant inverse relation between muscle lipid and water content usually exists (LOVE, 1970). Seasonal variation in the muscle lipid of both juvenile and adult stages of the species was significant (Fig. 1). This variation was directly correlated with variation in the feeding intensity of the species in the study area (DOWIDAR *et al.*, 1972). Thus in juvenile stage the highest levels of muscle lipid occurred in spring and summer coinciding with the period of intensive food intake and the lowest in winter when feeding intensity is minimal. Likewise in the adult fish the maximum lipid content occurred in autumn during the peak of intensive feeding following the spawning season in summer; the latter season is characterized by low feeding intensity and low fat content. Variation in total lipid was directly correlated with corresponding variation in the hepato-somatic index in the fish ($r=0.727$). The reduction of muscle lipid content during May-July was accompanied with a similar drop in the value of hepato-somatic index. Both may be related to the spawning activity of the fish. The energy needed in the spawning season is probably taken from stored lipid in the muscle and liver (HENDERSON & ALMATAR, 1989).

In *S. rivulatus*, the mean values of the muscle protein were 19.6% (17-21.8%) and 21.2% (17.9-24%) in juvenile and adult stages, respectively. The muscle protein increased with increase in fish length. Throughout the length range 16-28 cm, a significant direct correlation ($r=0.913$) was found between total length and muscle protein. A significant inverse relationship was found between the protein and water content in the flesh of *S. rivulatus* ($r=0.794$). The monthly variations of protein and lipid contents in juvenile fish were positively correlated ($r=0.87$), both increased in spring and summer and decreased in autumn and winter (Fig. 2). These variations seem to reflect changes in feeding intensity in the different seasons (*vide supra*). In adult fish, the correlation between total muscle lipid and protein contents was also significant ($r=0.706$), both follow nearly the same trend of seasonal variation. The remarkable drop of muscle protein in both sexes was recorded in spring (prespawning period), while the maximum values occurred in Autumn, coinciding with maximum feeding intensity following spawning period. It appears that in lean fishes at least part of the energy required for gonadal development is obtained by mobilization of muscle protein (LOVE, 1970).

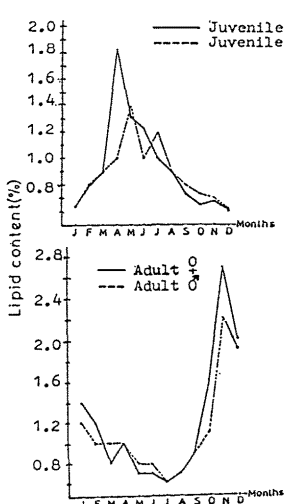


Fig. 1.- Monthly variation of muscle lipid content.

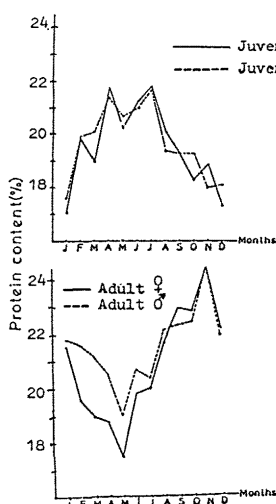


Fig. 2.- Monthly variation of muscle protein content.

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