Occurrence in Plaice Myogen of a Low Molecular Weight Protein of Abnormal Amino Acid Composition

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The ultracentrifugation of the myogens of frog [1], carp [2] and plaice [3] has shown the presence in these mixtures of a fraction amounting to 40—55 % in the carp and to approximatively 25 % in the plaice sedimenting with a rate of about 1.5 Svedberg units which does not occur in rabbit myogen. A component of this fraction precipitating at neutral pH between 90 and 100 % saturation of ammonium sulphate has been crystallized from carp muscle extracts by Henrotte [4] and further investigated by Hamoir [5]. Its ultraviolet absorption appears to be exclusively due to phenylalanine the amount of which has been evaluated spectrophotometrically to about 15 %. We show here that a similar protein exists in plaice myogen too.

This mixture has been fractionated with neutral ammonium sulphate. The fraction precipitating between 90 and 100 % saturation has been examined by electrophoresis in presence of phosphate buffer of $\mu = 0.05$ and pH = 7.5. A gradient representing about 30 % of the protein content of the fraction and 2 to 3 % of the myogen separates quickly from the slower ones. The corresponding component has been isolated by preparative electrophoresis and examined by ultracentrifugation and spectrophotometry. It sediments as a single peak with a corrected rate of sedimentation of 1.4—1.5 *S*. Its ultraviolet spectrum at pH = 7.5 and 13 is reproduced in Fig. 1. At neutral pH three maxima are observed at 253, 259 and 265 mμ which correspond closely to those of phenylalanine [6,7]. If the absorption at 259 mμ is exclusively ascribed to phenylalanine and if use is made of Fromageot and Schneck's [6] data for the absorption of this amino acid, its content can be evaluated to 16 %. A small absorption of another origin is, however, apparent in both curves at 275—290 mμ. As it varies from one preparation to the other, it is probably due to an impurity containing tyrosine or cystine. The protein isolated from plaice myogen differs in net charge from the crystalline component found by Henrotte [4]. Is electrophoretic mobility at $\mu = 0.05$ and pH = 7.5 on the descending side is of -6.5×10^{-5} cm^2 volt^{-1} sec^{-1} while that of the carp protein at $p = 0.075$ (0.05 in phosphate and 0.025 in NaCl) and pH = 7.3 is of -3.20×10^{-5} cm^1 volt^{-1} sec^{-1}. The content of basic and acid amino acids thus probably varies according to the origin.

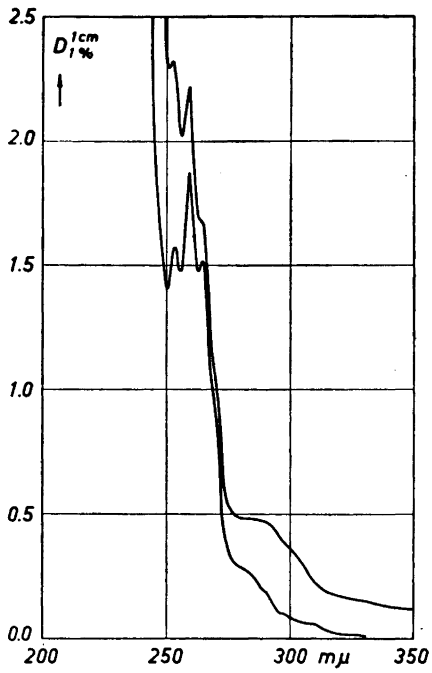

Fig. 1. Ultraviolet spectra at neutral pH (lower curve) and in presence of 0.1 N NaOH (upper curve) of a low molecular weight protein of plaice myogen.

An abnormal type of proteins characterized by a low rate of sedimentation, a very high salting-out range, a high content in phenylalanine and the absence of tyrosine and tryptophane appears therefore to occur generally in fish muscle.

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