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DATA ABOUT THE PROTEINS AND AMINOACID CONTAINED IN SOMME BLACK SEA MOLLUSCS

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A B S T R A C T

The paper presents data about the proteins and free and bound amino-acids found in Mytilus galloprovincialis, Mya arenaria and Rapana thomasiana.

The proteins analysis has shown a higher content in Mytilus galloprovincialis and Mya arenaria (2 and 56 p.c. of the dried substance) and a lower one in Rapana thomasiana (46 p. c. of the dried substance).

Using the single-dimension paper chromatography technique for the separation of the amino acids, one has identified 17 free and bound amino-acids: sulphur compounds, lysine, histidine, arginine, asparagine, serine+aspartic acid, glycocoll, glutamic acid, threonin, alpha-alanine, proline, tyrosine, tryptophan, methionine, valine, phenyl-alanine and leucine.

Data regarding the biochemical composition of Black Sea molluscs are rather few, most of them being supplied by Soviet scientists : VINOGRADOVA, 1949; SEVERIN, DIKANOVA, 1960; LAGUNOV, 1962 ; NIKOLAEVA, 1965 ; STEPANIUK, 1967.

Working technique

The molluscs were collected off the Romanian coast at Agigea and Cape Midia.

The Mytilus galloprovincialis specimens longer than 5 cm were collected on 0.5 m deep rocky beds in November 1971. Mya arenaria were collected on 0.5 m deep sandy bed, same month, and Rapana thomasiana from the mussel beds washed ashore by storm in January 1972.

Before being analysed the animals were kept for 48 hours in aquarium to let them get free of sand and assimilate consumed food. The whole fresh flesh of the animals was dried off on filter paper and homogenized by means of a Porter homogenizer. Following tests were carried out: humidity, proteins, free amino-acids, bound amino-acids. For humidity testing small quantities of homogenized substance were kept for 5-6 hours at 105°C in a moisture-testing-oven.

Protein testings was carried out by Lowry method (GHETIE, 1966). Separation of free amino-acids from 10 p.c. trichloroacetic extractions was carried out by means of Dowex 50 WX8 ion-exchange resins and single dimension paper chromatography (BUSSON, 1960).

Quantity assessment of free amino-acids was carried out after the method of BODE, (1955) and KAY (1956). The extinction were read by means of a FEK-51 photocolormeter.

In view of the assessment of bound amino-acids, the hydrolysis of proteins was carried out with 6N hydrochloric acid in an autoclave for 2h 30 min., at 1.5 at. The humic substances were removed by means of a G4 glass filter provided with filter paper. The bound amino-acids were separated and assessed by the same techniques used for free amino-acids. Proline was identified separately with the help of Isatin (LEDERER 1960).

Results

The proportion of protein concentration in the dried substance of the studied molluscs was 62 p.c. in Mytilus galloprovincialis 56 p.c.

Table 1

Free amino-acids content in several Black Sea Molluscs

Amino-acid	Species		
	Mytilus galloprovincialis	Mya arenaria	Rapana thomasiana
	amino-acids in g p.c. of the dried substance		
Sulphur compounds	0.147	0.159	2.3
Lysine	0.248	0.125	0.02
Histidin	0.161	0.385	0.12
Arginin	0.332	0.442	0.88
Asparagine	0.028	0.049	0.58
Serine+Aspartic acid	0.175	0.329	0.214
Glycocoll	0.073	0.921	0.382
Glutamic acid	0.629	0.425	-
Threonin	0.127	0.255	-
Alpha alanine	0.627	0.496	-
Proline	0.023	0.096	-
Tyrosine	0.018	0.019	-
Tryptophan	0.019	0.025	-
Methionine	0.036	0.017	-
Valine	0.065	0.065	-
Phenyl-alanine	0.009	0.049	-
Leucine	0.099	0.089	-

in Mya arenaria and 46 p.c. in Rapana thomasiana. Qualitative and quantitative assessments of free amino-acids are presented in table 1. It appears that in Mytilus galloprovincialis and in Mya arenaria prevail free basic aminoacids as arginine (0.332 - 1.442 p.c.) and lysine (1.125-1.248 p.c. of the dried substance), whereas in Rapana thomasiana the sulphur amino-acids (2.3 p.c. of the dried substance) are prevalent.

The studies of FLORKIN (1966 a,b) show that the amino-acids glycocoll, alpha alanine, proline and glutamic acid (in free state) take

Table 2

Bound amino-acids in some Black Sea Molluscs

Amino-acid	Species		
	<i>Mytilus galloprovincialis</i>	<i>Mya arenaria</i>	<i>Rapana thomasiana</i>
amino-acids in g p.c. of the dried substance			
Sulphur compounds	0.993	0.625	6.54
Lysine	6.879	8.593	0.24
Histidin	6.775	9.200	8.62
Arginin	13.782	10.650	6.82
Asparagine	1.19	0.37	7.26
Serine+Aspartic acid	9.158	8.175	2.42
Glycocolll	3.572	4.775	1.61
Glutamin acid	8.720	6.650	4.86
Threonin	6.612	10.325	3.48
Alpha alanine	2.931	1.200	2.22
Proline	0.496	0.725	3.58
Tyrosine	1.005	2.827	1.16
Tryptophan	-	-	-
Methionine	-	-	-
Valine	2.019	3.27	3.20
Phenyl-alanine	3.026	2.025	0.54
Leucine	1.331	7.350	5.68

part in the osmoregulation processes occurring in euryhaline marine invertebrates. Our determinations have proved the high percentage of these free amino-acids. They amount to 1.352 g p.c. in *Mytilus galloprovincialis* and 1.938 p.c. in *Mya arenaria* of dried substance.

Bound basic amino-acids are prevalent in all three species, (see table 2). The highest values have been recorded in *Mytilus galloprovincialis* : arginine · 13.78 p.c. ; lysine · 6.8 p.c. ; hystidine 6.77 p.c. of the dried substance.

Mya arenaria shows a high content of lysine, 8.9 p.c. ; histidine, 9.2 p.c. ; serine + aspartic acid, 8.7 p.c. and threonin 10.3 p.c. of the dried substance, whereas in Rapana thomasiana prevail sulphur amino-acids, 6.54 p.c. and asparagine. 7.26 p.c. of the dried substance .

Conclusions

In all three Black Sea molluscs, Mytilus galloprovincialis, Mya arenaria and Rapana thomasiana on has identified 17 amino-acids, out of which free and bound basic amino-acids are prevalent.

Here are the highest recorded values : arginine, 13.7 p.c. in Mytilus galloprovincialis ; lysine, 8.9 p.c. in Mya arenaria and 8.6 p.c. in Rapana thomasiana. We have identified 17 free amino-acids in Mya arenaria and Mytilus galloprovincialis and 7 in Rapana thomasiana

The free amino-acids playing a role in osmoregulation processes viz. glycocoll, alpha alanine, proline and glutamic acid amount to 1.35 g p.c. in Mytilus galloprovincialis and to 1.93 g p.c. in Mya arenaria .

Mytilus galloprovincialis and Mya arenaria show a higher protein content, 62 and 56 p.c., respectively, than Rapana thomasiana, 36 p.c.

This study was conducted having in view possible use of these mollusks as raw material in the extraction process of some valuable amino-acids : arginine, lysine, histidine, proline.

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