

ホタテガイ中腸腺のエイコサペンタエン酸含有トリグリセリド

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Short Paper

Eicosapentaenoic Acid-Rich Triglycerides of Scallop Hepatopancreas

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It has been shown that eicosapentaenoic acid (20:5 ω 3) may play an important role for mammals as an agent to reduce blood platelet aggregation¹⁾ and thereby lower the risk of heart attacks.²⁾ Certain fish oil products are available as the current source for such fatty acid. We have recently shown that the hepatopancreas lipids of scallop *Patinopecten yessoensis* may be utilized as an alternate source of 20:5 ω 3 for pharmaceutical products.^{3,4)} The present work was conducted as an examination to determining if this source of 20:5 ω 3-containing triglycerides may be of economic importance to the food industry or pharmaceutical uses.

Total lipids were extracted from five raw and boiled scallop hepatopancreas tissues (Table 1) by the method of Bligh and Dyer.⁵⁾ Quantitative determination of the constituent lipids by thin-layer chromatography (TLC)—flame ionization detector method, fractionation of triglycerides from the total lipids by TLC, preparation of fatty acid esters, and determination of the fatty acid esters by gas-liquid chromatography, were performed by using the same methods as described in the previous reports.^{4,6)} The components' identity for fatty acids was confirmed by comparison with available known standards as well as by making semilogarithmic plots of the retention times against the carbon numbers with different degrees of double bonds.

The hepatopancreas of scallops, collected from four locations at monthly intervals from March to July, ranged in weight from 4.5 to 7.7 g (mean: 6.3 g) as shown in the table. The content of hepatopancreas lipids varied considerably and seasonally, ranging from 3.9 to 10.5% (7.2%) of the tissue weight. Of the total

lipids from the hepatopancreas tissues examined, triglyceride class was the main constituent, ranging from 50.9 to 86.0% (66.5%), followed by phospholipids (19.8%). Only minute amounts of steryl esters, free fatty acids, sterols, and partial glycerides have also been found in the hepatopancreas lipids, with the exception of the samples taken in April, which contained a considerable amount of free fatty acids. As for the component fatty acid percentage of the triglycerides isolated from the hepatopancreas lipids, the most predominant component found was 20:5 ω 3 (33.0%), followed by 16:1 (11.6%), 16:0 (11.4%), 18:4 ω 3 (6.7%), 14:0 (6.5%), 18:1 (6.3%), 21:5 ω 3 (5.0%), and 22:6 ω 3 (4.6%), indicating a high content of polyenes (57.1%). In particular, the yield of 20:5 ω 3 rich-triglycerides (7.8 g/100 g tissue) of the hepatopancreas taken in June and July was greater than those (3.1 g) at other times. In conclusion, the high content of 20:5 ω 3 rich-triglycerides isolated from the total lipids of scallop hepatopancreas, untouched marine resources, lead us to consider that these triglycerides may be used as a potential natural source of 20:5 ω 3 for foods and pharmaceuticals.

References

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Table 1. Level of eicosapentaenoic acid-rich triglycerides of the hepatopancreas lipids of scallops

		1986			1987	
		Mar. 16	Apr. 21	May 18	Jun. 26	Jul. 24
		Mori* ¹	Kikonai* ¹	Tomamae* ¹	Kikonai	Mashike* ¹
Hepatopancreas	wt* ³ g	5.7	6.2	7.2	7.7	4.5
Total lipid						
Content	%* ⁴	3.9	8.9	4.7	8.1	10.5
Component	%* ⁵					
Triglyceride		53.6	50.9	61.5	80.7	86.0
Phospholipid		36.6	15.1	28.9	8.5	9.9
Others* ⁶		9.8	34.0	9.6	10.8	4.1
Fatty acid of triglyceride	%* ⁷					
20:5 ω 3		30.7	34.3	32.7	33.7	33.5
22:6 ω 3		4.4	4.2	3.7	4.9	5.9
Saturates		20.1	20.9	19.8	22.0	20.9
Monoenes		18.2	19.3	23.4	23.0	23.8
Polyenes		61.6	59.8	55.7	54.2	54.4

*¹ Scallops were collected from four locations, belonging to Hokkaido, Japan.*² The tissues were obtained from the fishery factory, where the scallops were boiled at 90 to 100°C for 4 min.*³ Mean value of the individual hepatopancreas separated from 50 scallops.*⁴ % to wet weight tissues.*⁵ % to total lipids.*⁶ Consisted of steryl esters, fatty acids, sterols, and partial glycerides.*⁷ Expressed as weight percentage of total fatty acids.

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