



Title	Occurrence of all-cis-5,8,11,14,17,20,23-hexacosaeptaenoic acid (26:7n-3) in roughscale sole <i>Clidoderma asperrimum</i> flesh lipids
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1 Occurrence of All-*cis*-5,8,11,14,17,20,23-Hexacosaeptaenoic Acid (26:7n-3) in the Roughscale

2 Sole *Clidoderma asperrimum* Flesh Lipids

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26

27 **Abstract**

28 Fatty acid analysis of roughscale sole *Clidoderma asperrimum* flesh lipids was carried out by  
29 gas chromatography. An unidentified peak appeared in the chromatogram in the elution region  
30 of  $\geq C_{24}$  fatty acids. After enrichment by solvent partitioning, reversed-phase TLC, and  
31 argentation TLC, the peak component was subjected to structural analyses. The partially  
32 hydrogenated products after reaction with hydrazine hydrate gave seven isomers of *cis*-  
33 hexacosenoic acid (26:1). GC-MS analysis of their dimethyl disulfide (DMDS) adducts  
34 identified the monounsaturates as 5-, 8-, 11-, 14-, 17-, 20-, and 23-26:1. The peak component  
35 was assigned to all-*cis*-5,8,11,14,17,20,23-hexacosaeptaenoic acid (26:7n-3). GC-MS analyses  
36 of the 4,4-dimethyloxazoline (DMOX) derivative and methyl ester confirmed this structure.  
37 This fatty acid is a rare, very long chain polyunsaturated fatty acid (VLCPUFA). The  
38 concentrations of the acid found in roughscale sole were  $0.69 \pm 0.34$  % ( $N=5$ ) of the total fatty  
39 acids in the flesh lipids. Roughscale sole appears to be characterized by the occurrence of 26:7n-  
40 3, which is lacking in popular sources of methylene-interrupted VLCPUFA, such as vertebrate  
41 retina, spermatozoa, and herring.

42

43 **Keywords**

44 Hexacosaeptaenoic acid, Very long chain polyunsaturated fatty acid, Fatty acid, Roughscale  
45 sole, *Clidoderma asperrimum*, GC, GC-MS

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53 **Introduction**

54 Very long chain polyunsaturated fatty acids (VLCPUFA) occur in many species of animals,  
55 plants, and lower organisms [1–4]. Mammalian retinas [5,6], brains [7–9], testes [10], and  
56 spermatozoa [11–12] include methylene-interrupted VLCPUFA of the n-3 and n-6 series up to  
57 C34–C40. Aquatic organisms also contain VLCPUFA [13]. Baltic herring include those up to  
58 C28 [14–16], some of which are represented in the fatty acids of the predatory ringed seal [17].  
59 Bottom-living flathead flounder is rich in 24:6n-3 [18,19], which presumably originated from  
60 their diet of brittle star [20–22]. Additionally, dinoflagellates and some species of microalgae  
61 include 28:8n-3 and 28:7n-6 [4], and even- and odd-numbered VLCPUFA up to C36 were  
62 observed in a species of dinoflagellate [23,24].

63 All-*cis*-5,8,11,14,17,20,23-hexacosaeptaenoic acid (26:7n-3) is also a VLCPUFA.  
64 However, this fatty acid is a very rare one among the VLCPUFA of n-3 series. To the best of our  
65 knowledge, 26:7n-3 has been found in only 6 species of microalgae (Cryptophyceae,  
66 Prymnesiophyceae and Dinophyceae) at less than 0.3% of the total fatty acid content [23–25].  
67 This fatty acid also cannot be prepared from popular sources of n-3 and n-6 VLCPUFA  
68 standards such as retinas, sperm, and herring [1]. A detailed assignment of the structure has also  
69 not been reported.

70 In the present study, the fatty acids of roughscale sole *Clidoderma asperrimum*, i.e.,  
71 ‘samegarei’ in Japanese, which is one of the edible fish in Japan, were investigated for  
72 VLCPUFA. The fatty acid analysis of the sole revealed the occurrence of 0.3%–1.3% of 26:7 in  
73 their flesh lipids. This paper reports the structural assignment of this fatty acid as 26:7n-3 along  
74 with their enrichment process and the fatty acid composition of the roughscale sole.

75

76 **Materials and methods**

77 Materials

78 Five individuals of roughscale sole caught in the Pacific waters off Hidaka, Hokkaido, Japan,  
79 and in the Sea of Okhotsk off Shari, Hokkaido, Japan, were purchased in stores in May 2009.  
80 Two of the Pacific samples were obtained as whole fish (females; body lengths, 39.8 and 41.2  
81 cm; body weights, 2.4 and 2.8 kg) and another in frozen form without skin and viscera (body  
82 length, 34.8 cm). The two Okhotsk samples were obtained in frozen form without the head, skin,  
83 or viscera (lengths of trunk and tail, 24.0 and 25.8 cm). The flesh was removed, minced, and  
84 stored at  $-30^{\circ}\text{C}$  before lipid extraction.

85

#### 86 Fatty acid methyl esters

87 Total lipids were extracted from 150 g of the flesh by the method reported by Bligh and  
88 Dyer [26]. Fatty acid methyl esters were prepared from the lipids by transesterification with 7%  
89  $\text{BF}_3$ -methanol for 1 h at  $100^{\circ}\text{C}$  under a nitrogen atmosphere. Methyl esters were purified by  
90 thin-layer chromatography (TLC) on silica gel G plates ( $10 \times 10$  cm, 0.25 mm thickness;  
91 Analteck, Newark, USA) with hexane/diethyl ether (85:15, v/v) for development.

92 For quantity preparation, the total lipids were saponified by refluxing them with 1 M  
93 KOH in ethanol for 1 h; the unsaponifiable portion was extracted with diethyl ether. Following  
94 acidification of the aquatic phase using dilute HCl, the fatty acids were recovered by ether  
95 extraction. The fatty acids were converted to methyl esters by refluxing them with 7%  $\text{BF}_3$ -  
96 methanol at  $70^{\circ}\text{C}$  for 14 min.

97

#### 98 Fractionation of fatty acids

99 The fatty acid methyl esters were divided into two fractions obtained through a solvent partition  
100 method using a solvent system of 2,2,4-trimethylpentane and ethanol/water (1:1, v/v) containing  
101 0.25 g/ml of silver nitrate [27,28].

102 The methyl esters were fractionated according to their partition number by reversed-phase

103 TLC (RP-TLC) on Partisil KC18F plates (20 × 20 cm, 0.2 mm thickness; Whatman, Maidstone,  
104 England) with acetonitrile/water (95:5, v/v) for double developments [29].

105 The methyl esters were fractionated according to the degree of unsaturation by  
106 argentation TLC (Ag-TLC) on 10% silver nitrate-impregnated layers of silica gel 60G (20 × 20  
107 cm, 0.5 mm thickness; Merck, Darmstadt, Germany) with hexane/acetone (70:30, v/v) for  
108 double developments [29].

109

110 Derivatization for structural analysis

111 Partial hydrogenation of the polyunsaturated fatty acids was carried out using hydrazine hydrate  
112 [30,31]. A mixture of 5 mg of free fatty acids and 10% (v/v) hydrazine hydrate in methanol (5  
113 ml) was stirred at 50°C for 7 h with aeration. The products, which were extracted with diethyl  
114 ether, were converted to methyl esters using 7% BF<sub>3</sub>-methanol. The monounsaturated fatty acids  
115 were isolated from the products by Ag-TLC on 5% silver nitrate-impregnated silica gel 60G  
116 with hexane/acetone (95:5, v/v), and then fractionated according to the olefinic bond position by  
117 Ag-TLC on 15% silver nitrate-impregnated silica gel 60G with hexane/toluene (50:50, v/v)  
118 [32,33].

119 Dimethyl disulfide (DMDS) adducts of monounsaturated fatty acids were prepared  
120 following the procedure of Shibahara *et al.* [34,35]. The methyl esters were reacted with DMDS  
121 (1 ml) in the presence of catalytic I<sub>2</sub> (13 mg) for 1 h at 35°C before adding 30% aqueous  
122 NaHSO<sub>3</sub>. The resulting adducts that were extracted by hexane/diethyl ether (50:50, v/v) were  
123 purified by TLC on a silica gel G plate with hexane/diethyl ether/acetic acid (80:20:1, v/v/v) for  
124 development.

125 4,4-Dimethyloxazoline (DMOX) derivatives of fatty acids were prepared by the  
126 procedure reported by Christie [36]. Acid chlorides formed from the free fatty acids by a  
127 reaction with oxalyl chloride were reacted with a 10 mg/ml solution of 2-amino-2-methyl-1-

128 propanol in dichloromethane (0.5 ml) for 1 h at room temperature. After the solvent was  
129 evaporated, trifluoroacetic anhydride was added to the residue and the mixture was left at 40°C  
130 for 1 h. The DMOX derivatives were purified by TLC on a silica gel G plate with  
131 hexane/diethyl ether/acetic acid (50:50:1, v/v/v) for development.

132

### 133 Instrumental analysis

134 The fatty acid methyl esters were analyzed by GC using a Shimadzu GC-18A gas  
135 chromatograph (Shimadzu, Kyoto, Japan) equipped with a flame ionization detector and a  
136 Restek FAMEWAX column (30 m × 0.32 mm i.d., 0.25 µm film thickness; Restek, Bellefonte,  
137 USA). The column temperature was programmed to either increase from 170 to 240°C at a rate  
138 of 4°C/min, or to remain isothermal at 240°C. The injector and detector temperatures were  
139 240°C, and the carrier gas was helium (85 kPa). Peak area percentages were obtained using a  
140 Shimadzu C-R6A integrator.

141 The monounsaturated fatty acids isolated from the hydrazine hydrogenation products  
142 were analyzed using a Shimadzu GC-17A gas chromatograph equipped with a flame ionization  
143 detector and a SLB-IL100 column (60 m × 0.32 mm i.d., 0.26 µm film thickness; Supelco,  
144 Bellefonte, USA) [37]. The column temperature was isothermal at 200°C, the injector and  
145 detector temperatures were 240°C, and the carrier gas was helium (117.5 kPa). The peaks were  
146 monitored using a Shimadzu C-R3A integrator.

147 GC-MS analysis was carried out using an HP 6890 series gas chromatograph (Hewlett-  
148 Packard, Palo Alto, USA) linked to a JEOL JMS-700TZ mass spectrometer (JEOL, Tokyo,  
149 Japan). The latter was used in the electron impact mode at 70 eV with source temperatures of  
150 240°C for methyl esters, 270°C for DMOX derivatives and 280°C for DMDS adducts. The GC  
151 was fitted with split/splitless injection. For the analyses of the methyl esters and DMOX  
152 derivatives, a DB-23 column (30 m × 0.25 mm i.d., 0.25 µm film thickness; Agilent, Santa

153 Clara, USA) was used. The column temperatures were programmed from 40°C to 230°C and  
154 from 40°C to 270°C at 20°C/min for the methyl esters and DMOX, respectively. For the  
155 analysis of the DMDS adducts, a Zebron ZB-1ms column (30 × 0.25 mm i.d., 0.25 µm film  
156 thickness; Phenomenex, Torrance, USA) was used. The column temperature was held at 40°C  
157 for 1 min then raised to 175°C at 40°C/min and then to either 265°C at 5°C/min or to 280°C at  
158 20°C/min. Helium was used as the carrier gas.

159 Fourier transform infrared spectra were measured in CCl<sub>4</sub> solutions using a JASCO FT-IR  
160 5300 spectrometer (JASCO, Tokyo, Japan).

161 Fatty acid composition determined by GC of methyl esters was represented by mean ±  
162 standard deviation of the five individuals of roughscale sole.

163

## 164 **Results**

165 GC and enrichment of 26:7

166 The GC analysis of the fatty acid methyl esters derived from roughscale sole flesh lipids showed  
167 two remarkable peaks, A and B, after elution of 24:1n-9 (Fig. 1). Their equivalent chain lengths  
168 (ECLs) on FAMEWAX at 240°C were 26.14 and 28.30, for peak A and B, respectively. The  
169 ECL of peak A was in fair agreement with that of 24:6n-3, which was previously found in  
170 flathead flounder [18,19] and brittle star [20,21]. The component of peak B was confirmed to be  
171 hexacosaeptaenoic acid (26:7) since the mass number of the molecular ion peak obtained under  
172 high resolution conditions agreed with that calculated for a 26:7 methyl ester; the *m/z* found was  
173 396.30280 and the value calculated was 396.30283 for C<sub>27</sub>H<sub>40</sub>O<sub>2</sub>.

174 For the structural analysis, the enrichment of 26:7 was conducted by the solvent partition  
175 procedure, RP-TLC, and 10% Ag-TLC in this order (Table 1). The concentration of 26:7, which  
176 started at 1.3% of the total fatty acids, was boosted to 10.4% by the solvent partition, 27.7% by  
177 RP-TLC, and finally 83.0% by Ag-TLC. A coexistent minor component of the final fraction was



178 24:6n-3 (17.0%).

179

180 Structure of 26:7

181 The infrared spectrum of the 26:7 concentrate showed absorptions at  $1650\text{ cm}^{-1}$  and  $710\text{ cm}^{-1}$ ,  
182 but not that near  $970\text{ cm}^{-1}$  which is characteristic of a *trans*-olefinic bond. Hydrazine  
183 hydrogenation yielded *n*-26:0 as a saturated fatty acid. These results indicate that the fatty acid  
184 is normal-chain 26:7 with all *cis*-geometry.

185 The monounsaturated fatty acids, which were produced by the partial hydrogenation of  
186 26:7, separated into four fractions on the 15% Ag-TLC plate. The GC analyses of these fractions  
187 showed a total of seven peaks corresponding to 26:1 isomers with ECLs in the range of 26.41–  
188 27.23 on SLB-IL100 at 200°C. The mass spectra of the DMDS adducts of the 26:1 isomers gave  
189 a molecular ion at  $m/z$  502 corresponding to the DMDS adduct of 26:1 methyl ester and a series  
190 of key fragment ions showing the olefinic bond position in 26:1 (Fig. 2). In Fig. 2a, the  
191 fragment ions at  $m/z$  161 and 341 indicate cleavage between the methylthio-substituted carbons  
192 of C5 and C6. The fragment ion at  $m/z$  129 was due to the loss of methanol ( $m/z$  32) from the  
193 ion at  $m/z$  161. A set of the fragment ions indicated the structure of 5-26:1. In the same manner,  
194 the other isomers were identified as 8-, 11-, 14-, 17-, 20- and 23-26:1, as shown in Figs. 2b-2g.  
195 Hydrazine reduces olefinic bonds without positional and geometrical isomerization of the  
196 remaining olefinic bonds [30]. The structure of 26:7 was assigned as all-*cis*-5,8,11,14,17,21,23-  
197 hexacosaeptaenoic acid (26:7n-3).

198 The mass spectrum of the DMOX derivative of 26:7 showed irregular intervals of  $m/z$  12  
199 between the maxima in the fragment ion peaks for each carbon atom as follows: C7 ( $m/z$  180,  
200 intensity 19.0%)–C8 ( $m/z$  192, 9.7%); C10 ( $m/z$  220, 23.2%)–C11 ( $m/z$  232, 15.0%); C13 ( $m/z$   
201 260, 16.5%)–C14 ( $m/z$  272, 8.6%); C16 ( $m/z$  300, 13.7%)–C17 ( $m/z$  312, 7.3%); and C19 ( $m/z$   
202 340, 15.6%)–C20 ( $m/z$  352, 9.8%) (Fig. 3a). These fragments indicate the occurrence of olefinic

203 bonds at the  $\Delta 8$ , 11, 14, 17, and 20 positions in 26:7 [29]. An olefinic bond at the  $\Delta 5$  position  
204 was shown by the fragment ion due to cleavage at this position ( $m/z$  152, 17.6%) accompanied  
205 by an intense odd-numbered peak at  $m/z$  153 (32.3%) [38]. GC-MS analysis of the 26:7 methyl  
206 ester revealed fragment ions characteristic of n-3 and  $\Delta 5$  series polyunsaturated fatty acids at  
207  $m/z$  108 (33.4%) and 180 (14.1%), respectively [29], confirming the structure of 26:7n-3 (Fig.  
208 3b).

209

210 Fatty acids of the roughscale sole flesh lipids

211 The fatty acid composition of the roughscale sole flesh lipids is shown in Table 2. The major  
212 fatty acids (>5% of the total lipids) were 14:0, 16:0, 16:1n-7, 18:1n-9+18:1n-11, 20:1n-  
213 11+20:1n-13, and 20:5n-3. The proportions of these fatty acids were not very different from  
214 those previously reported for deep-sea flounders [39], in which the monounsaturated fatty acids  
215 were rich in the liver and flesh neutral lipids. The major highly unsaturated fatty acids of the  
216 roughscale sole were 20:5n-3, 22:5n-3, 22:6n-3, 24:6n-3, and 26:7n-3. The content of 26:7n-3  
217 was  $0.69 \pm 0.34\%$  of the total lipids, ranging from 0.33% to 1.26% among the five individuals.  
218 The lipid content of the flesh was  $30.5 \pm 4.6\%$  on wet-weight base, much higher than the  
219 previous datum (5.6%) observed for smaller-sized roughscale sole (mean body length, 22.3 cm;  
220 mean body weight, 199.8 g) [39].

221

## 222 **Discussion**

223 In the present study, 26:7n-3 and 24:6n-3 were found in the roughscale sole flesh lipids as their  
224 VLCPUFA. Methylene-interrupted VLCPUFA of n-3 series are typical of vertebrate retinas (up  
225 to 36:6n-3) [5,6], spermatozoa (up to 34:6n-3 in chain length and 32:7n-3 in unsaturation)  
226 [11,12], and Baltic herring (generally up to 28:7n-3) [14–16]. These tissues or fish have been  
227 recognized as convenient sources of VLCPUFA standards for the n-3 and n-6 series [1]. One of

228 the shorter-chain VLCPUFA, 24:6n-3, was rich in flathead flounder [18,19] and brittle stars  
229 [20–22], and was also found in sea lilies [20], coelenterates [40,41], gorgonians [42], jellyfish  
230 [43], and gastropods [44]. Freshwater crustacea of the order Bathynellacea were reported to  
231 contain more than 50 VLCPUFA up to 40:8n-3 [45,46]. Marine dinoflagellates contain 28:8n-3  
232 together with 28:7n-6 [23–25,47–53]. Fatty acids of the dinoflagellate *Amphidinium carterae*  
233 included even- and odd-numbered chain VLCPUFA up to 36:8n-3 [23,24].

234 As a tentatively identified component, 26:7n-3 were found in Dinophyceae (*Heterocapsa*  
235 *niei*, 0.2% of total fatty acids; and *Amphidinium carterae*, in trace amounts), Prymnesiophyceae  
236 (*Pavlova pinguis*, up to 0.3%), and Cryptophyceae (*Proteomonas sulcata* and *Phodomonas*  
237 *salina*, each in trace amounts) [25]. In the fatty acids of the dinoflagellate *Amphidinium carterae*,  
238 26:7n-3 was found at a concentration of 3.2% in the heptaenoic + octaenoic acid concentrate  
239 [23], which corresponds to 0.064% of the total fatty acids. The same acid was also found at  
240 1.40% in a concentrate of VLCPUFA with more than 3 olefinic bonds [24]. To the best of our  
241 knowledge, there has been no other report describing the occurrence of 26:7n-3 in nature. While  
242 the analogous 26:6n-3 was observed in vertebrate retina [5,6], murine testis [10], and ram  
243 spermatozoa [11], the fatty acids of these tissues were not reported to include 26:7n-3. Baltic  
244 herring [15], seal [17], and crustacea (Bathynellacea) [45,46] contain both analogous 26:6n-3  
245 and homologous 28:7n-3, but not 26:7n-3.

246 Therefore, the roughscale sole flesh lipids are characterized by the occurrence of the rare  
247 VLCPUFA, 26:7n-3. This fatty acid seems to be formed from coexistent 24:6n-3 *via* two-carbon  
248 chain elongation followed by  $\Delta 5$ -desaturation. In GC analysis, unidentified minor peaks were  
249 observed between the peaks of 24:6n-3 and 26:7n-3 (Fig. 1). Roughscale sole preferentially feed  
250 on brittle star [54,55], which is usually rich in 24:6n-3 [20–22]. At this time, the occurrence of  
251 26:7n-3 in brittle star is unknown. Although the concentrations of 26:7n-3 in the flesh lipids  
252 (0.3–1.3%) were not very high, there was no sample where 26:7n-3 was not found.

253

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258

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- 402

403 **Figure captions**

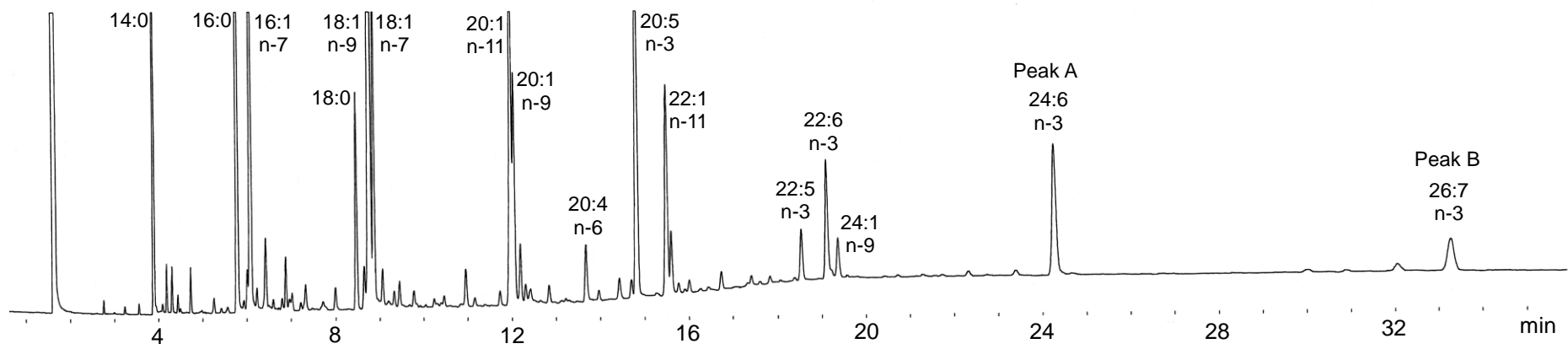
404 **Fig.1** Gas chromatogram of fatty acid methyl esters formed from roughscale sole flesh lipids  
405 (Restek FAMEWAX, 170 to 240°C at 4°C/min).

406

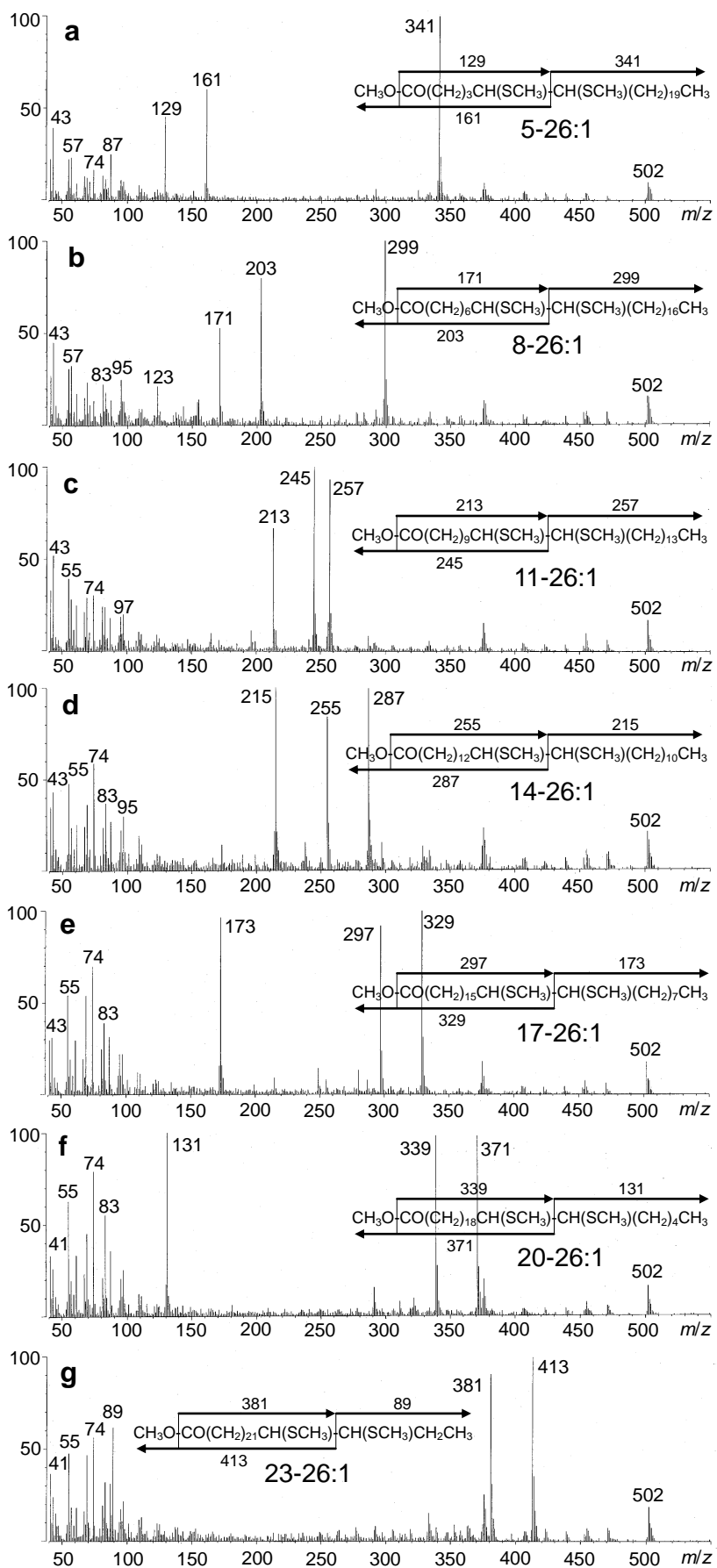
407 **Fig. 2** Mass spectra of dimethyl disulfide (DMDS) adducts of 26:1 isomers formed by  
408 hydrazine hydrogenation of the roughscale sole 26:7 acid.

409

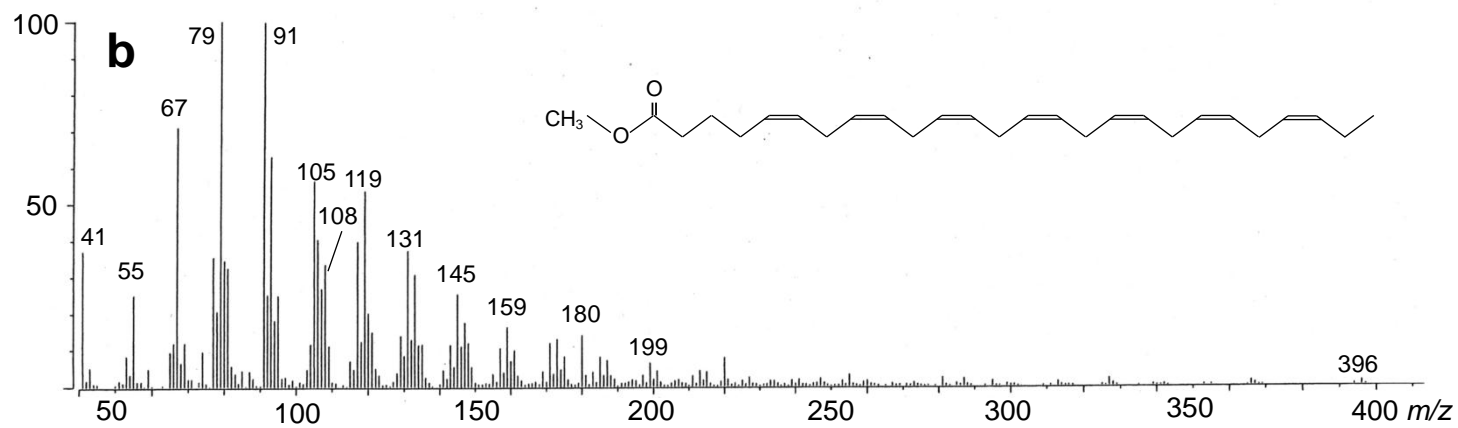
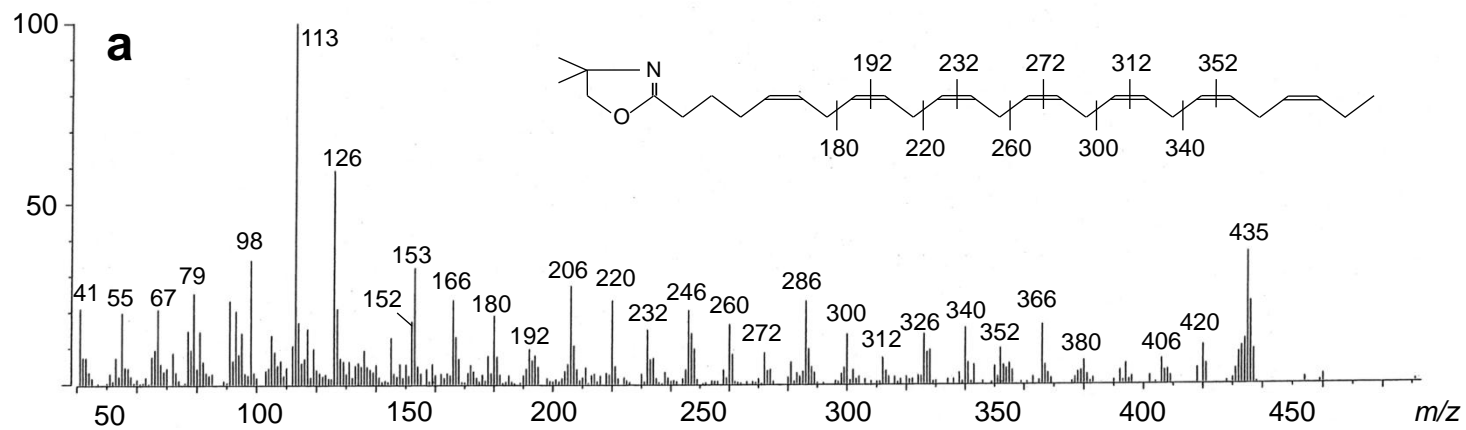
410 **Fig. 3** Mass spectra of 4,4-dimethyloxazoline (DMOX) derivative (**a**) and methyl ester (**b**) of  
411 the roughscale sole 26:7 acid.



Fukuda & Ando  
Figure 1



Fukuda & Ando  
 Figure 2



**Table 1** Enrichment of 26:7 from the fatty acids of roughscale sole flesh lipids

Fatty acid	Intact <sup>a</sup>	Solvent partition	RP-TLC	Ag-TLC
Concentration (wt%)				
20:5n-3	7.7	48.4	0.4	ND
21:5n-3	0.2	1.1	0.5	ND
22:5n-3	0.7	2.0	6.8	ND
22:6n-3	2.0	15.7	ND	ND
24:6n-3	3.1	16.4	62.1	17.0
26:7n-3	1.3	10.4	27.7	83.0
Others	85.0	6.0	2.5	0.0

<sup>a</sup> Fatty acid methyl esters prepared from a Pacific sample (41.2 cm, 2.8 kg).

**Table 2** Fatty acid composition of the roughscale sole flesh lipids (wt%)

Fatty acid	Composition <sup>a</sup>	Fatty acid	Composition
12:0	0.06 ± 0.02	18:4n-3	0.37 ± 0.06
14:0	5.97 ± 0.64	18:4n-1	0.10 ± 0.02
14:1n-5	0.28 ± 0.03	20:0	0.14 ± 0.03
iso-15:0	0.24 ± 0.08	20:1n-11+n-13	6.50 ± 1.38
anteiso-15:0	0.10 ± 0.04	20:1n-9	2.63 ± 0.34
15:0	0.31 ± 0.01	20:1n-7	0.76 ± 0.16
iso-16:0	0.12 ± 0.03	20:2n-6	0.18 ± 0.02
16:0	12.05 ± 1.44	20:3n-6	0.02 ± 0.02
16:1n-9	0.33 ± 0.04	20:4n-6	0.83 ± 0.13
16:1n-7	9.30 ± 0.65	20:3n-3	0.10 ± 0.02
16:1n-5	0.20 ± 0.03	20:4n-3	0.23 ± 0.03
iso-17:0	0.52 ± 0.19	20:5n-3	8.31 ± 0.46
anteiso-17:0	0.11 ± 0.03	22:0	0.07 ± 0.01
16:2n-4	0.15 ± 0.04	22:1n-11+n-13	3.07 ± 0.59
17:0	0.18 ± 0.02	22:1n-9	0.93 ± 0.14
16:3n-4	0.08 ± 0.03	22:1n-7	0.22 ± 0.05
17:1n-7	0.32 ± 0.02	22:2n-6	0.05 ± 0.03
16:4n-1	0.19 ± 0.09	21:5n-3	0.24 ± 0.05
18:0	2.12 ± 0.13	22:5n-6	0.13 ± 0.05
18:1n-13	0.69 ± 0.15	22:5n-3	0.80 ± 0.11
18:1n-9+n-11	23.54 ± 1.48	22:6n-3	2.88 ± 0.74
18:1n-7	4.34 ± 0.25	24:1n-9	0.75 ± 0.11
18:1n-5	0.60 ± 0.07	24:6n-3	3.75 ± 1.02
18:2n-6	0.33 ± 0.05	26:7n-3	0.69 ± 0.34
18:2n-4	0.13 ± 0.04	Others	3.18 ± 0.34
18:3n-6	0.02 ± 0.02		
18:3n-3	0.15 ± 0.03	Lipid content (%) <sup>b</sup>	30.5 ± 4.5

<sup>a</sup> Mean ± SD of the 5 individuals caught in the Pacific water and the Sea of Okhotsk around Hokkaido, Japan.

<sup>b</sup> Determined by gravimetry (% on the wet-weight base).

サメガレイ *Clidoderma asperrimum* の筋肉脂質における全-*cis*-5,8,11,14,17,20,23-ヘキサ  
コサヘプタエン酸 (26:7n-3) の存在

福田悠紀・安藤靖浩 (北大院水)

北海道産サメガレイの筋肉脂質の脂肪酸を GC で分析したところ、炭素数 24 以上の領域に未知のピークが出現した。この成分を濃縮後、数種の誘導体に変換して GC-MS に供した結果、同成分は全-*cis*-5,8,11,14,17,20,23-ヘキサコサヘプタエン酸 (26:7n-3) と同定された。総脂肪酸中の含有量は供試 5 個体の平均で  $0.69 \pm 0.34\%$  であった。サメガレイは、n-3 系および n-6 系超長鎖ポリエン酸の給源として一般的な高等動物の網膜、精子、ニシン油などには見られない 26:7n-3 を含む点で特徴的である。