COMPISITION OF FATTY ACIDS OF GASTROPOD *XANCUS PYRUM*

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SUMMARY: The fatty acids composition of aceanic Gastropod Xancus pyrum have been analysed by combined GC-MS technique, and the result showed the presence of 8 saturated and 6 unsaturated fatty acids. The methyl fatty acids were identified as n-decanoate, n-tridecanoate, n-pentadecanoate, n-hexadecanoate, n-octadecenoate, methyl nonadecanoate, 3,3-dimethyl heneicosanoate, n-pentacosanoate, and tetradecenoate, pentadecenoate, hexadecenoate, heptadecedienoate, heptadecenoate, octadecadecedienoate.

Key Words: Fatty acids, gastropod, Xancus pyrum.

INTRODUCTION

Xancus pyrum Linnaeus (Xancidae, Gastropoda) vernacular name Sankh shell, the slow moving animal, and the species of which uncommon, are found in Pasni, Makran, Coast of Pakistan (11, 12). In English the "Chank" *Xancus pyrum* an important Gastopod expolited commercially in a few martime states in India, the major portion of which comes from Gulf of mannar and Palk Bay (7). It is also reported that *Lithophaga-diberus-bisulcate* d'Orbigny bored into the Gastropod shells of *Xancus pyrum*, causing good amount of destruction to the shells (4). Pearl formation in Gastropod shells including *Xancus* ssp. is reported (4). Whereas some observation from modern methods of harvestigng *Xancus pyrum* is also reported in an abstract (6). As such there is no report on the chemical constituents of *Xancus* ssp. in the scientific literature, and in the present work we describe the results of fatty acids analysis of *Xancus pyrum*.

MATERIALS AND METHODS

The GC-Mass spectrometery of the methylated fatty acid fraction was carried out on a Varian-MAT 112S mass spectrometer fitted with a Varian gas chromatograph, and coupled with DEC PDP 11/34 computer. GC was fitted with FID and 30 mm X2.25 mm glass capillary column coated with Supleco Sp-2100 (0-3 mm film thickness) was used. The column temperature was programmed from 50-270°C at 8°C per minute, the carrier gas flow (Hellium) was 2 ml/min. The GC-Ms was operated at an ionizing energy of 70 eV.

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1. Animal Material

Only two specimens of the mollusc *Xancus pyrum* were collected from the shallow water of Buleji near Karachi sea shore on 1st January, 1986. The specimen shells were cleaned to remove algal castings and sand particles. The animals were processed immediately on collection.

2. Extractions

The specimens (8.07 Kg, with the shell) were percolated at room in n-propanol for three weaks. Thereafter the shells broken down, and the viceral mass of the animals were taken out which weighed (51 mg). The mass of animals so obtained were grinded and kept in n-proponal for one week, and this procedure of extraction was repeated twice. All the n-propanol extracts were combined together and n-propanol was evaporated under vacuum which yielded a dark green syrupy residue (1.4 g).

3. Chromatographic Separation

The n-propanol extract was subjected to silica gel (70-30-mesh Merck). Column chromotography (7.5x20 cm), and the eluting solvent were hexane, dichloromethane in increasing order of polarity, collected in 50 ml each of a fraction. These fractions 1-100 obtained with hexane: dichloromethane (9:1, 1:9) were pooled together and evaporated under reduced pressure which furnished a yellowish oily substance (4 mg). The thin layer chromatography (Silica gel 254 nm DC. Mikrokarten SI F5x10 cm, 0.2 min. TLC plate, Riedel-De-Haen). of the yellowish oily matter in

Table 1: Fatty acids of Xancus pyrum.

Systemic name	Common name	Formula	Mol. Wt.	Mass and fragmentation pattern
Saturated Fatty Acids				
1. Methyl n-decanoic	Methyl caprate	$C_{11}H_{22}O_2$	186	GC-MS, m/z 186 (M^+, $C_{11}H_{22}O_2$), 143 (M^+-43) (3%), 129, (12%), 111 (9%), 97 (28%), 83 (41%), 71 (55%), 69 (55%), 57 (100%), 55 (79%)
2. Methyl n-tridecanoic	Methyl tridecylate	$C_{13}H_{26}O_2$)	228	GC-MS, m/z 228 (M^+, $C_{13,}H_{26}O_2$), 200 (M^+-28) (3.5%), 170,
3. Methyl n-pentadecanonic	Methyl pentadecylate	$C_{16}H_{32}O_2$)	256	GC-MS, m/z 256 (M^+-$C_{16}H_{32}O_2$), 13 (M^+-43) (1.8%), 199 (0.8%), 171 (0.5%), 157 (2.2%), 141 (3.3%), 129 (1.7%), 127 (5.6%), 115 (1%), 111 (2.2%), 101 (4%) 99 (10%), 87 (4%), 85 (39%), 74 (6%), 71
4. Methyl n-hexadecanoic	Methyl palmitate	$C_{17}H_{34}O_2$)	270	GC-MS, m/z 270 (M^+, $C_{17}H_{34}O_2$), 239 (M^+-43) (2%), 199(2%), 185 (4%), 171 (1.5%), 143 (10%), 129 (10%), 101 (22%), 87 (62%), 74 (100%), 57(94%).
5. Methyl n-octadecanoic	Methyl stearate	$C_{19}H_{38}O_2$)	298	GC-MS, m/z 298 (M^+, $C_{10}H_{38}O_2$), 257 (M^+-41) (52%), 240 (21%), 199 (3%), 185 (4%), 171 (6%), 43 (4%), 129 (18%), 101 (100%), 71 (50%), 60 (10%), 57 (94%), 55 (70%).
6. Methyl 10D-methyl-nonadecanoic		$C_{21}H_{42}O_2$)	326	GC-MS, m/z 326 (M^+, $C_{21}H_{42}O_2$), 154 (M^+-172) (2.4%), 143 (1%), 112 (16%), 99 (10%), 98 (34%), 85 (27%), 74 (26%), 71 (52%), 57 (100%), 55 (59%).
7.Methyl 3,3-dimethyl-		$C_{24}H_{48}O_2$	368	GC-MS, m/z 368 (M^+, $C_{24}H_{48}O_2$), 326 (M^+-42) (1%), 169 (1.3%), 154 (5.9%), 111 (16%), 99 (15%), 98 (62%), 87 (26%), 84 (32%), 74 (42%), 71 (60%), 69 (55%), 57 (100%), 55 (88%).
8. Methyl n-pentacosanoic		$C_{26}H_{52}O_2$	396	GC-MS, m/z 396 (M^+, $C_{26}H_{52}O_2$), 207 (M^+-189) (0.7%), 184 (1.9%), 167 (1.6%), 113 (5%), 99 (8%), 97 (1.1%), 85 (24%), 83 (20%), 71 (63%), 69 (32%), 57 (100%), 55 (43%).
Unsaturated Fatty Acids				
9. Methyl n-tetradecenoic	Methyl myristoleiate	$C_{15}H_{28}O_2$	240	GC-MS, m/z 240 (M^+, $C_{15}H_{28}O_2$), 183 (M^+-57) (1%), 141 (1.7%), 127 (3.2%), 112 (6%), 98 (14%), 85 (3%), 71 (63%), 57 (100%), 55 (28%).
10. Methyl pentadecenoic		$C_{16}H_{30}O_2$	254	GC-MS, m/z 254 (M^+, $C_{16}H_{30}O_2$), 207 (M^+-47) (3.7%), 198 (3.7%), 184 (2.3%), 168 (1.8%), 164 (3.2%), 159 (5.4%), 145 (6%), 123 (14%), 119 (8%), 109 (14%), 97 (28%), 95 (15%), 85 (33%), 83 (42%), 81 (25%), 71 (35%), 69 (45%), 57 (100%), 55 (84%).
11. Methyl hexadecenoic	Methyl palmitoleiate	$C_{17}H_{32}O_2$	268	GC-MS, m/z 268 (M^+, $C_{17}H_{32}O_2$), 254 (M^+-14) (2.6%), 240 (1.1%), 207 (0.6%), 198 (1.4%), 184 (2.8%), 170 (2.2%), 156 (2.7%), 153 (3%), 139 (3.8%), 111 (11%), 97 (26%), 85 (38%), 71
12. Methyl heptadecedienoic		$C_{18}H_{32}O_2$	280	GC-MS, m/z 280 (M^+, $C_{18}H_{32}O_2$), 167 (M^+-113) (35%), 149 (100%), 132 (3%), 113 (11%), 83 (8%), 71(30%), 57 (52%), 55 (22%).
13. Methyl heptadenoic		$C_{18}H_{34}O_2$	282	GC-MS, m/z 282 (M^+, $C_{18}H_{34}O_2$), 207 (M^+-75) (2%), 200 (2.3%), 170 (5.4%), 149 (5%), 142 (3.7%), 133 (3.5%), 109 (10%), 97 (22%), 83 (23%), 71 (65%), 57 (100%), 55 (48%).
14. Methyl octadecedienoic	Methyl linoleiate	$C_{19}H_{34}O_2$	294	GC-MS, m/z 294 (M^+, $C_{19}H_{34}O_2$), 242 (M^+-52) (0.7%), 200 (2.1%), 186 (2%), 172 (2.7%), 111 (12%), 97 (20%), 83 (27%), 71 (38%), 69 (38%), 57 (86%), 56 (100%), 55 (65%).

ether: petroeum ether: glacial acetic acid (20:80:0.5), detection with iodine vapours showed different type of constituent (Rf, S_1=0.89, S_2=0.72, S_3=0.54 S_4=0.39). Thereafter combined extract were applied on preparative thin layer chromatographic plate (DC Karten SIF 20x20 cm, silicagel 254 nm, 0.2 mm Riedel-De Haen), and same technique was followed except the visulization with iodine vapours, and the major constituent, S_1 was then scrapped. To the scrapped material was added diethyl ether and filtered, and

as such this procedure was repeated three times. On evaporation of diethyl ether the fatty acids fraction was obtained.

4. Esterification

The fatty acid fraction was then exterified with diazomethane. To a quantity of 10.0 mg of fatty acid 5 ml of diazomethane was added, and kept over night under refrigeration. After removal of the solvents, the methylated fatty acids esters were analyzed through GLC-MS along with fatty acids methyl esters standards.

RESULTS AND DISCUSSION

The marine oils present unusual difficulties in the analysis because of the wide variety of unsaturated fatty acids. Whereas ordinary oils may generally be analyzed in terms of individual acids, in case of marine oils it is only possible to estimate the various acids according to Chain length (2). In the present investigation the fatty acids from the gastropod *Xancus pyrum* was obtained through extraction, isolation and chromatographic separation of viceral mass of the animals. The fatty acids were in turn analyzed by GC-MS. Initial identification was made by comparison with relative to the fatty acids standards. Final identification was made by examining the MS fragmentation pattern and, in most cases, by comparing it with that of values reported in the literature (5,8,9,13). The MS of the separated

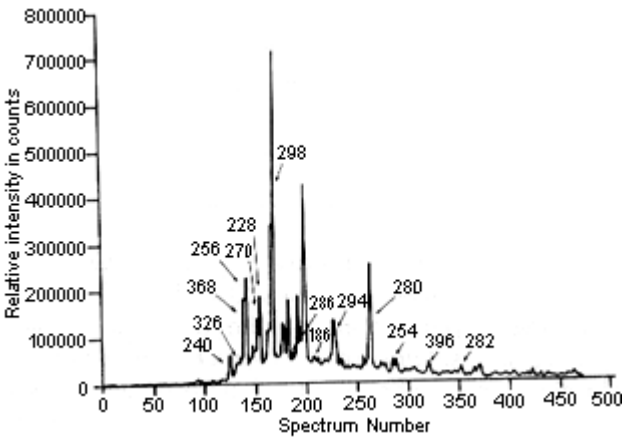

Figure 1: Gas liquid chromatogram of fatty acid methylester of Xancus pyrum.

fatty acid methyl exters typically exhibit the diagnostic fragment ions, and M^+ ion is clearly seen is of medium intensity. The results of the analysis are summarized in the Table 1. Of the 14 fatty acids methyl esters investigated 8 were saturated fatty acids and 6 unsaturated fatty acids. Whereas out of 8 saturated fatty acids, 5 of them were the common acids: methyl caprate, methyl tridecylate, methyl pentadecylate, methyl palmitate, mehyl stearate, and the remaining three were systemic: methyl 10 D-methyl nonadecanoic, methyl 3-3 dimethyl heneicosanoic and methyl pentacosanoic: In case of unsaturated fatty acids methyl esters three are common acids: methyl myrisoleate, methyl linoleiate and the remaining compounds having systemic names are methyl pentadecenoic, methyl heptadecedienoic, and methyl heptadecenoic.

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