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ISOLATION AND SPECTROSCOPIC STUDIES OF MONO-PALMITIC, DI-OLEIC TRIGLYCERIDE FROM SEEDS OF *MORINGA OLEIFERA* LAM

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Mono-palmitic, di-oleic triglyceride has been isolated from the benzene extract of semi-dried seeds of *Moringa oleifera Lam* and its tentative structure has been elucidated through spectral data.

Key words: Mono-palmitic di-oleic tryglyceride, *Moringa oleifera*; Triglyceride; Seed oil.

INTRODUCTION

Various methods for the isolation and separation of glycerides have been successfully attempted by different research workers. Walker and Mills [1] successfully tried the chromatographic techniques devised by Tswet [2] and obtained glycerides from linseed oil with double linkage per molecule. Pierre Dauvillie [3] used petroleum ether, ethyl acetate, and ethyl alcohol as solvents for the separation of triglycerides. G.S. Upadhya *et. al.* [4] have reported the presence of unsaturated triglycerides in *Moringa Oleifera Lam.* by the use of GS_2U, but have not mentioned their characterisation.

Palmito di-oleic triglyceride was isolated from poppy seed oil by A.G. Vereschagin [5] by reverse phase chromatography and its structure was elucidated by F.L. Jackson *et. al.* (6) by hydrogenation into the corresponding saturated analogues. The position of groups in the glycerides have been suggested by hydrolysis with the help of pancreatic lipase on the basis of primary hydroxyl group linkages of glycerol by F.H. Mattson *et. al.* [7]. This compound has been isolated for the first time from *Moringa Oleifera Lam.* and its structure established trhough spectroscopic studies.

Mono-palmitic, di-oleic triglyceride was obtained from benzene : chloroform (40:60 v/v) by preparative TLC. Its boiling point was difficult to establish. The triglyceride analysed for $C_{55}H_{102}O_6$. Its molecular weight was confirmed by mass spectrometry (M^+858). It contains one palmitic and two oleic groups. The I.R. Spectrum of the triglyceride shows C-H streching vibration at 3250cm^{-1}, C-O vibration at 1730cm^{-1}, C-H vibration (CH_2) at 1480cm^{-1}, C-H vibration (CH_3) at 1390cm^{-1} and C-H vibration at 1180cm^{-1}. The mass spectrum shows molecular ion peak at *m/e* 816 due to the loss of CH_3 -CH_2-CH_2 from the palmitic group. The elimination of $(CH_2)_{11}$ from the remaining palmitic group shows peak at *m/e* 661 which further loses the remaining branch of the palmitic group, $O\text{-}\overset{O}{\overset{\|}{C}}\text{-}CH_2$, and shows peak at *m/e* 603. In the next loss with rearrangement in the oleic group (CH_3-$(CH_2)_7$-CH=C), it shows peak at *m/e* 465. The other peak at *m/e* 339 is due to $CH_3\text{-}(CH_2)_5\text{-}\overset{H}{\overset{|}{C}}\text{-}\overset{O}{\overset{\|}{C}}$ with rearrangement, which decomposed further by the elimination of $\overset{OH}{\overset{|}{CH}}\text{-}CH_2$ group to show peak at *m/e* 265. The fragmentation pattern is shown below :

$CH_2\text{-}O\text{-}C\text{-}(CH_2)_7\text{-}CH{=}CH\text{-}(CH_2)_7\text{-}CH_3$

$CH\text{-}O\text{-}C\text{-}(CH_2)_{14}\text{-}CH3$ *m/e* 858

$CH_2\text{-}O\text{-}C\text{-}(CH_2)_7\text{-}CH{=}CH\text{-}(CH_2)_7\text{-}CH_3$ -43, $CH_3\text{-}CH_2$

↓ m/e 815

$CH_2\text{-}O\text{-}C\text{-}(CH_2)_7\text{-}CH{=}CH\text{-}(CH_2)_7\text{-}CH_3$

$CH\text{-}O\text{-}C\text{-}(CH_2)_{11}\text{-}CH_2{+}$

$CH_2\text{-}O\text{-}C\text{-}(CH_2)_7\text{-}CH{=}CH\text{-}(CH_2)_7\text{-}CH_3$

↓ -154, $(CH_2)_{11}$, *m/e* 661

$CH\text{-}O\text{-}C\text{-}(CH_2)_7\text{-}CH{=}CH\text{-}(CH_2)_7\text{-}CH_3$

$CH\text{-}O\text{-}C\text{-}CH_2^+$

$CH_2\text{-}O\text{-}C\text{-}(CH_2)_7\text{-}CH{=}CH\text{-}(CH_2)_7\text{-}CH_3$

↓ -58, O-C-CH_2 *m/e* 603

$CH_2\text{-}O\text{-}C\text{-}(CH_2)_7\text{-}CH{=}CH\text{-}(CH_2)_7\text{-}CH_3$

CH^+

$CH_2\text{-}O\text{-}C\text{-}(CH_2)_7\text{-}CH{=}CH\text{-}(CH_2)_7\text{-}CH_3$

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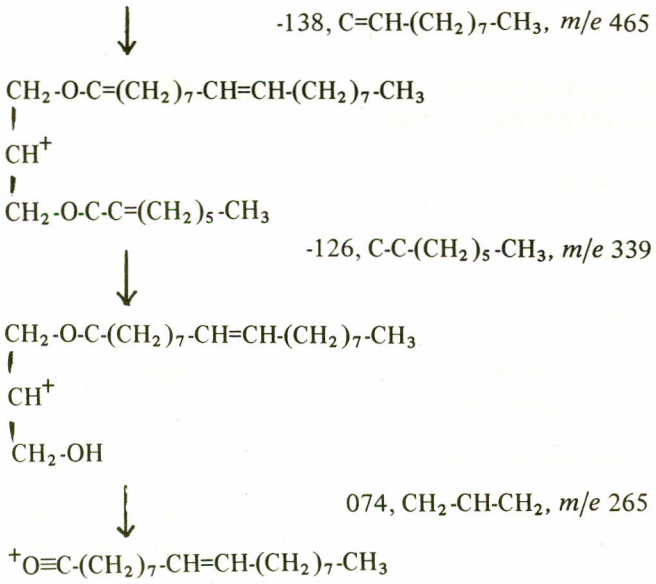
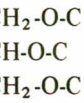
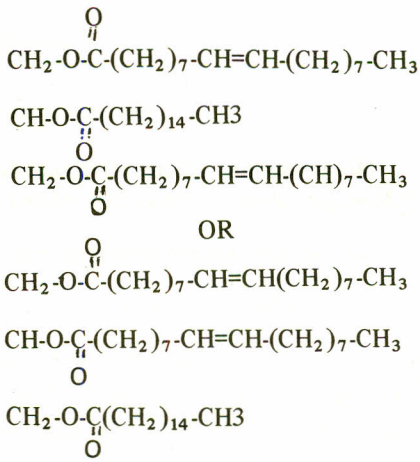


The results are further supported by proton NMR taken in deuterated chloroform ($CDCl_3$), which showed a triplet at 0.805, 0.878, and 0.942 ppm (J=6cps and 3cps) fo three methyl groups, i.e. one on palmitic, and two on oleic groups. A singlet at 1.26ppm for 37-CH_2 groups (24-CH_2 groups of two oleic and 13-CH_2 groups of palmitic group) of same nature. A doublet at 1.52, 1.60 ppm (J=7cps) for 2(CH_2) of two oleic groups. A doublet at 1.97 and 2.04 ppm (J=5cps) for CH_2-CH=CH-CH ', a doublet at 2.21 and 2.31 ppm (J=7cps) for CH_2-C-O, a triplet at 5.34 ppm (J=6cps and 3cps) for two CH=CH groups and another triplet at 4.21 ppm assigned to the group:



The tentative structure of the triglyceride is finally concluded as :



EXPERIMENTAL

Micro analysis of the compound was done on a Perkin Elmer automatic micro analyser.

The Infra red spectra (I.R.) were recorded on a Perkin Elmer double beam grating spectrophotometer in KBr pellets. Nuclear magnetic resonance spectra were recorded on Bruker WP-80 (80 MHZ) spectro spin. All chemical shift values (δ) are given in parts per million (ppm) as measured from tetrametyl silane (TMS) as the

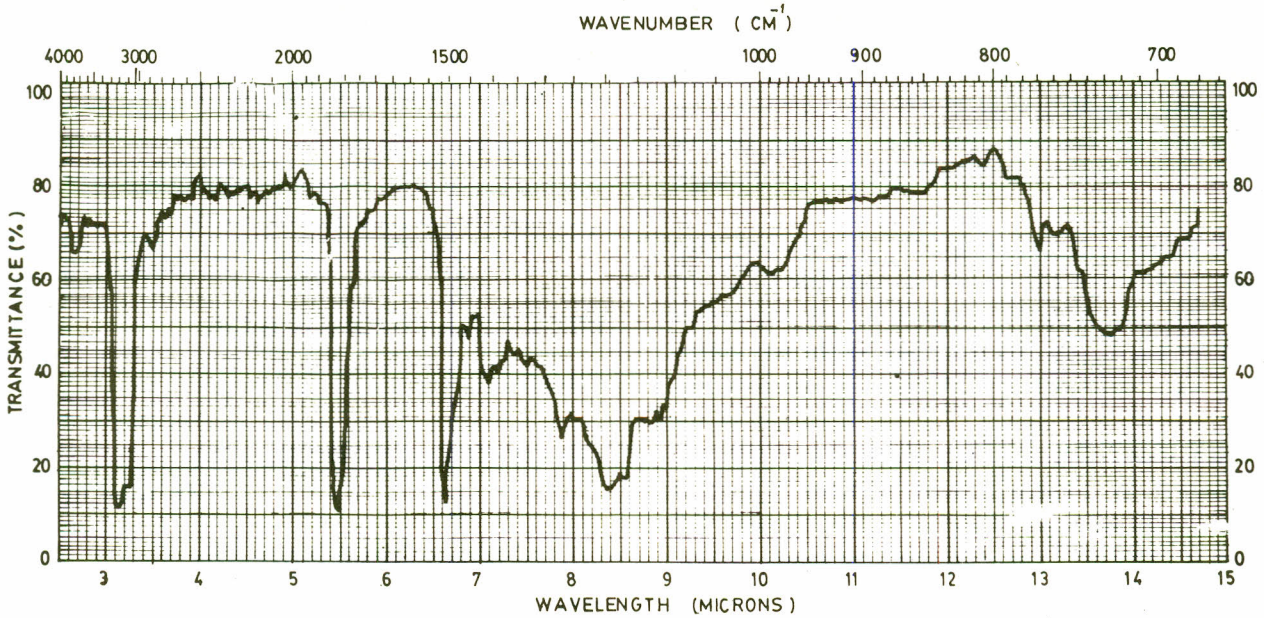


Fig. 1. IR Spectrum of mono-palmitic di-oleic triglyceride.

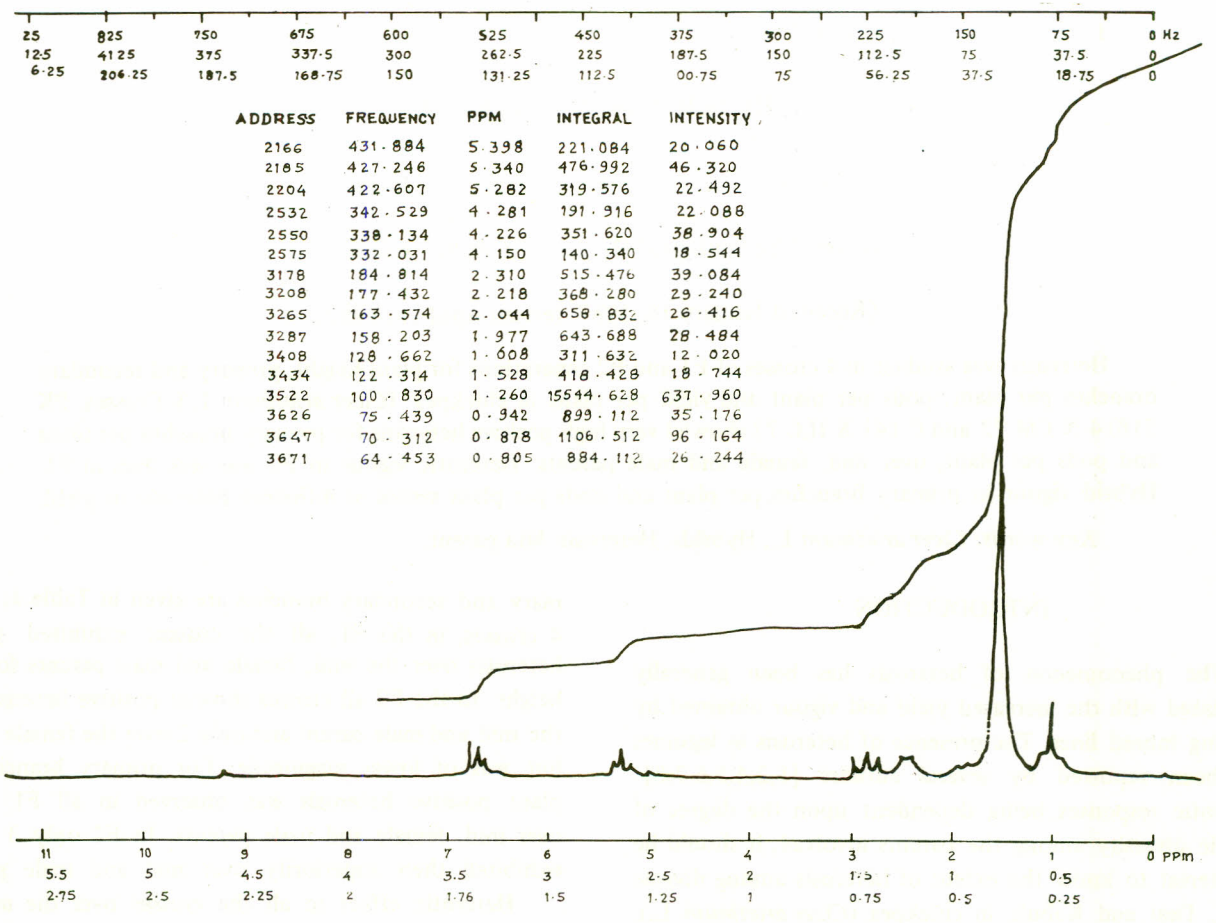


Fig. 2. NMR of mono-palmitic di-oleic triglycerid.

standard. The mass spectra were taken on ZAB-2F vaccum generator, Manchester.

Mono-palmitic di-oleic triglyceride (0.79 %) was isolated from benzene extract of the semi dried seeds of *Moringa oleifera Lam* (630 g) by using silica gel plates of thickness 750 microns in benzene: chloroform (40:60 v/v) as a solvent system by repeated thin-layer chromatography. It was fairly soluble in Petroleum ether and highly soluble in benzene and chloroform. It analysed for $C_{55}H_{102}O_6$; C,76.53 %; H, 11.97 %; 0, 11.25 % molecular weight by mass spectrum M^+ 858 ($C_{55}H_{102}O_6$; requires C, 76.99 %; H, 11.97 %; O, 11.18 %).

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