

A TRIGLYCERIDE FROM *PUNICA GRANATUM*

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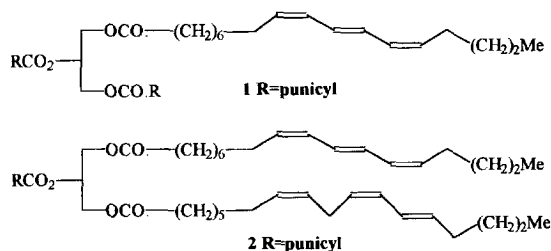
Key Word Index—*Punica granatum*; Punicaceae; pomegranate seeds; triglyceride.**Abstract**—A new triglyceride, di-*O*-punicyl-*O*-octadeca-8*Z*,11*Z*,13*E*-trienylglycerol, has been isolated and characterized from the seeds of *Punica granatum* from India and Iran. Copyright © 1997 Elsevier Science Ltd

INTRODUCTION

Pomegranate seeds are claimed to contain both glycerides and sterols, and in particular it has been claimed that variable amounts of oestrone are present [1–3]. Since the seeds are used for a variety of chemotherapeutic purposes in China, we were interested in re-examining the accuracy of this claim. Most investigators have saponified their crude acetone or methanol extracts, and would thus have been unable to establish the composition of the native glycerides. In contrast, we have investigated the unsaponified extract and report our results in this paper.

RESULTS AND DISCUSSION

An acetone extract of dried pomegranate seeds was chromatographed on silica gel with a slow gradient elution from pure hexane through hexane–ether, then hexane–methanol mixtures through to pure methanol. The major triglyceride was, as expected, tri-*O*-punicylglycerol (**1**) whose ¹H NMR was in complete agreement with published data [4]. In addition, we obtained the previously unreported triglyceride **2**. The ¹H NMR spectrum clearly showed the presence of two punicyl residues, together with another triunsaturated fatty acid. This had a similar structure (as far as carbon-12) to linoleic acid, but with an additional *trans*-double bond, and our assignment of the structure is based upon comparisons with the literature [5]. The mass spectrum of **2** was in accord with the proposed structure. These triglycerides were present to the extent of



ca 50–55 mg per 50 g of dried seeds. Finally, though we could detect no trace of free oestrone or other oestrogens, we did obtain cholesterol (ca 50 mg per 50 g of dried seeds) as the sole sterol, and this was easily identified through co-chromatography with an authentic sample, and by ¹H and ¹³C NMR comparisons.

EXPERIMENTAL

Pomegranates were obtained from the local supermarket and were labelled 'Persian' or 'Indian'. They were peeled and seeds were sepd from juice and pulp. After drying, 100-g batches of seeds were extracted with Me₂CO (for 8 hr) using a Soxhlet extractor. The solvent was removed under red. pres., then the crude extract was chromatographed on silica gel using gradient elution of hexane through hexane–MeOH and through to MeOH. The frs eluted with hexane–Et₂O (1:1) contained the triglycerides and cholesterol, and these were rechromatographed using silica gel and hexane–Et₂O (2:1). The CI MS of **1** showed a [M]⁺ at *m/z* 872.882 and **2** a [M]⁺ at *m/z* 876.946. ¹H NMR (CDCl₃, 400 MHz): Table 1.

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Table 1. Key ^1H NMR spectral data (CDCl_3) for compound **2**

2.78	(<i>m</i> , 2H, H-10 of other acyl moiety)
4.14	(<i>dd</i> , 2H, $J = 11.9$ and 4.2 Hz, CH_2O)
4.29	(<i>dd</i> , 2H, $J = 11.9$ and 5.9 Hz, CH_2O)
5.27	(<i>m</i> , 1H, CHO)
5.45	(<i>m</i> , 6H, $J = 10$ and 10.4 Hz, H-9 and H-14 of punicyl, H-8, H-9, H-11 and H-12 of other acyl moiety)
5.66	(<i>dd</i> , 1H, $J = 9.5$ and 14.9 Hz, H-14 of other acyl moiety)
5.96	(<i>m</i> , 1H, $J = 14.9$ and 7.1 Hz, H-13 of other acyl moiety)
6.05	(<i>m</i> , 4H, $J = 10.2$ and 10.4 Hz, H-10 and H-13 of punicyl)
6.45	(<i>m</i> , 4H, $J = 14$ Hz, H-11 and H-12 of punicyl)

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