



Organic compounds isolated from *Juniperus brevifolia* bark



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INTRODUCTION

In continuation of our study on the chemical characterization of endemic plants of the Azores archipelago, we have examined *Juniperus brevifolia*. Our interest in this plant was stimulated by the wide range of biological activities reported for other species of this genus and/or of their constituents.¹

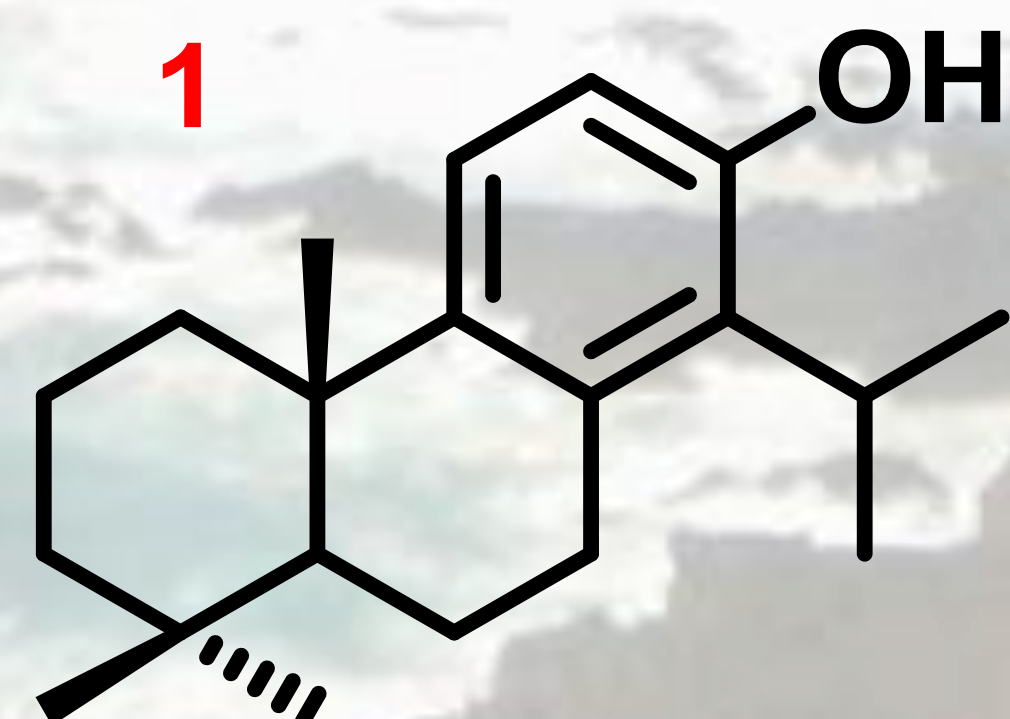
Previous work showed that leaves extracts, for instance dichloromethane extract and chloroform-soluble fraction of the acetone extract, showed high activity against HeLa and Hep-2 tumour cell lines.² Chemical investigation of these extracts afforded more than thirty compounds, mainly abietane and pimarane derivatives, eight of them were new natural compounds and other exhibit interesting antitumor activity.³

Recent investigation showed that the bark acetone extract has antioxidant activity similar to that of quercetin; and also showed activity against *Bacillus cereus*, *B. subtilis* and *Micrococcus luteus*. Furthermore the bark acetone extract showed higher anti-AChE activity.⁴ These findings prompted us to study bark extracts.

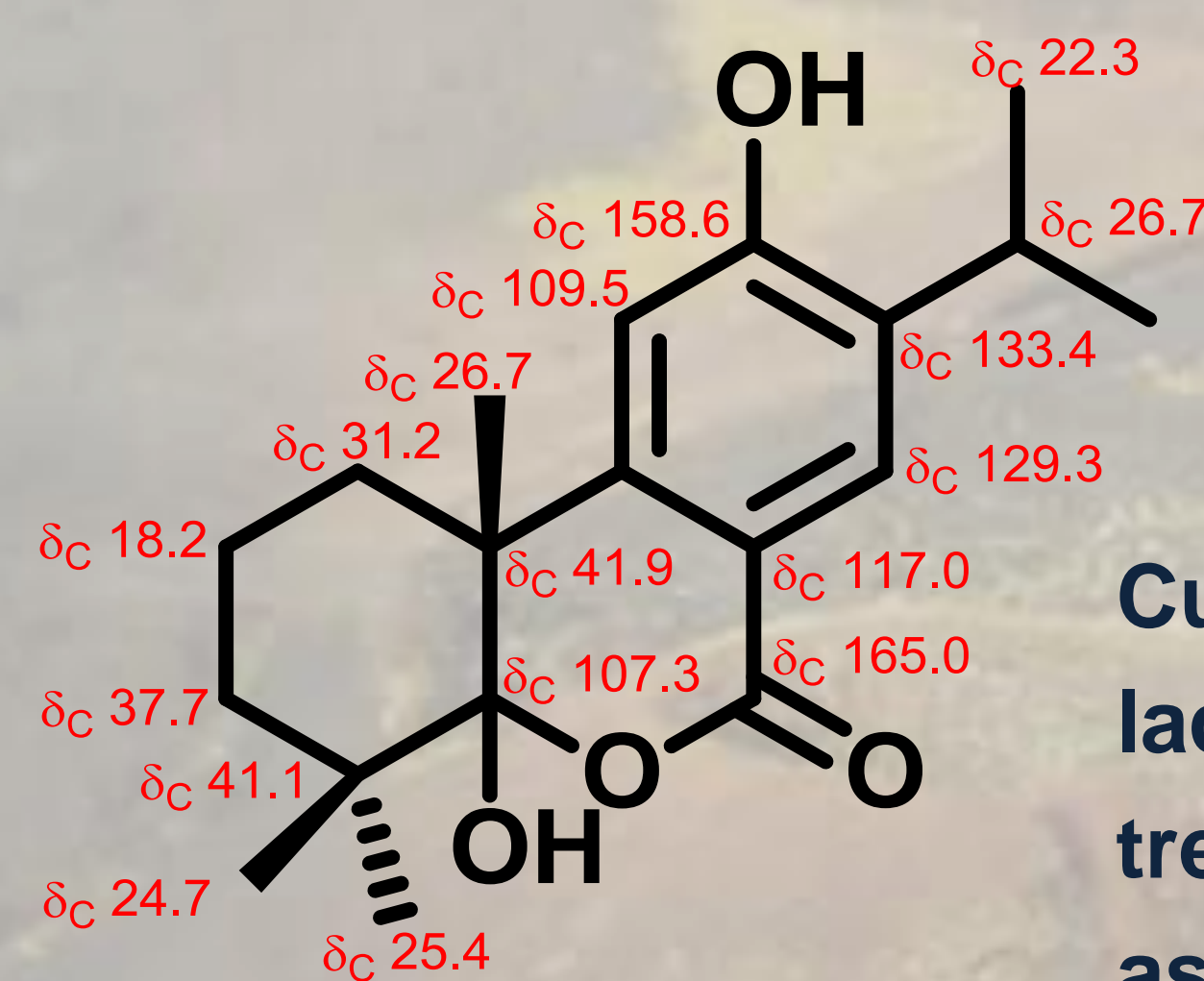
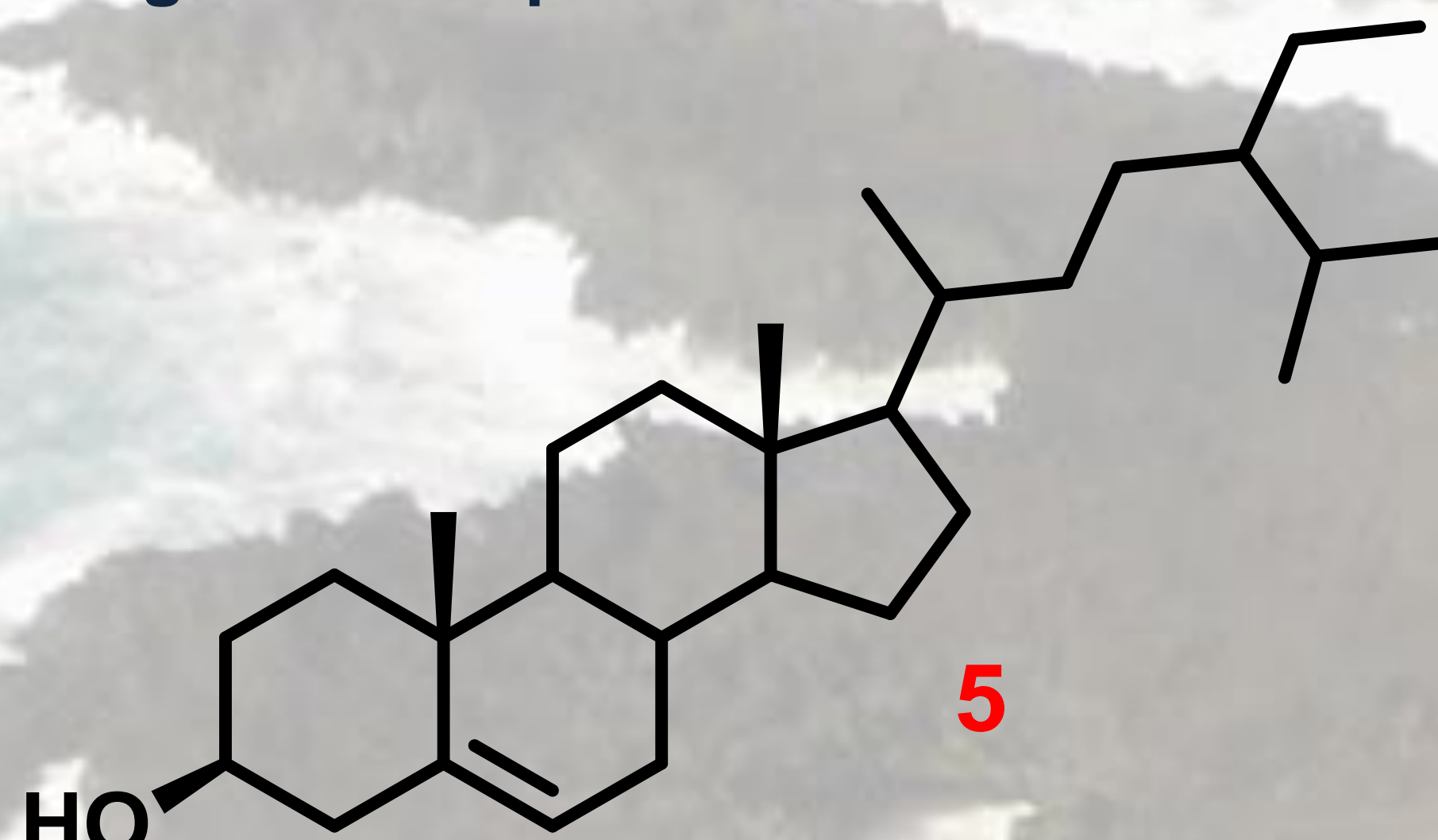
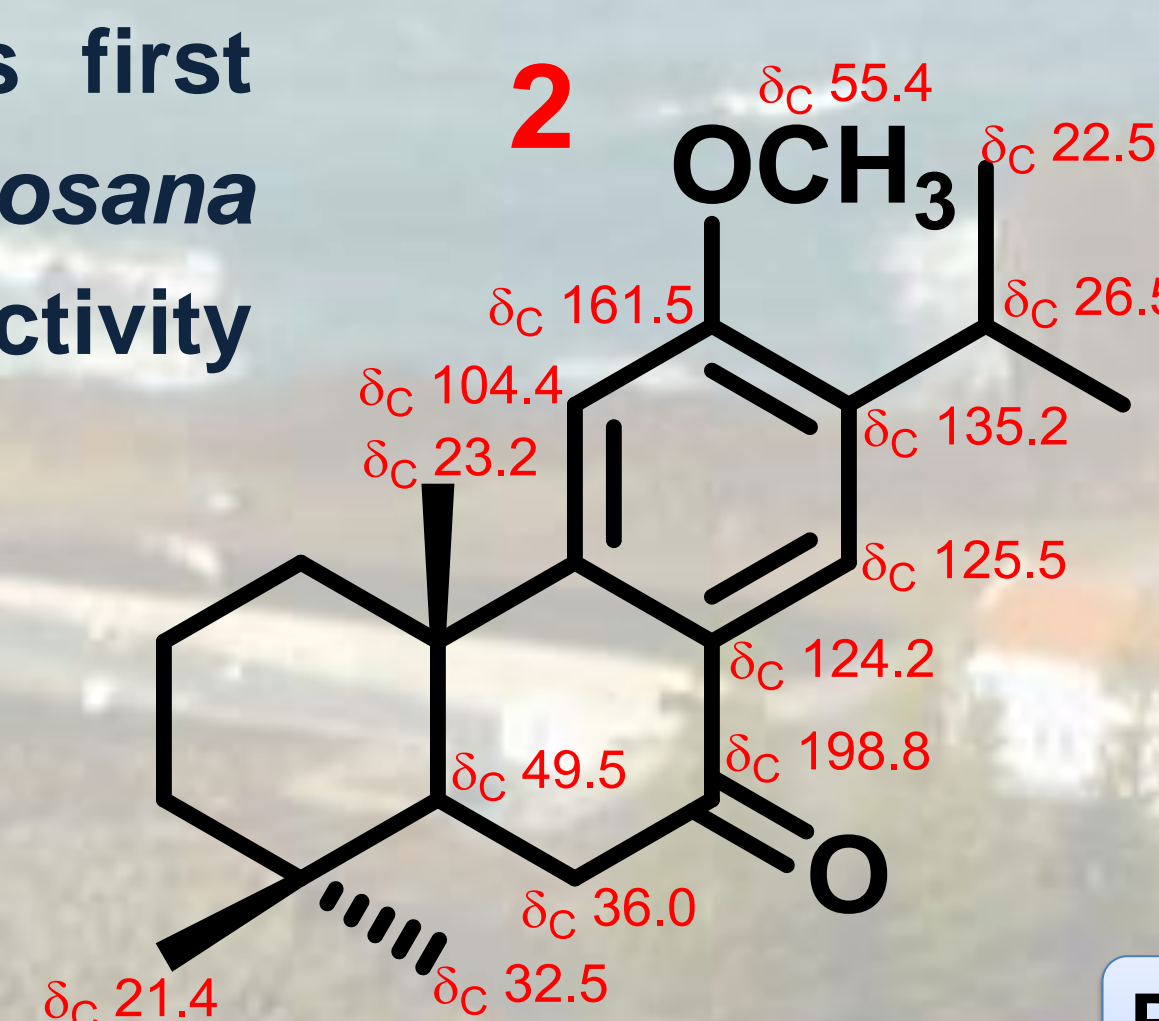
RESULTS AND DISCUSSION

From the hexane and acetone extracts of *Juniperus brevifolia* bark were isolated several compounds (1-7) by preparative chromatographic techniques. The structural unequivocal identification of these compounds (1-7) were obtained by detailed spectroscopic methods.

Totarol (1), previously identified by GC-MS in bark hexane extract of *Juniperus brevifolia*, is a potent antibacterial and fungicide diterpene.⁵

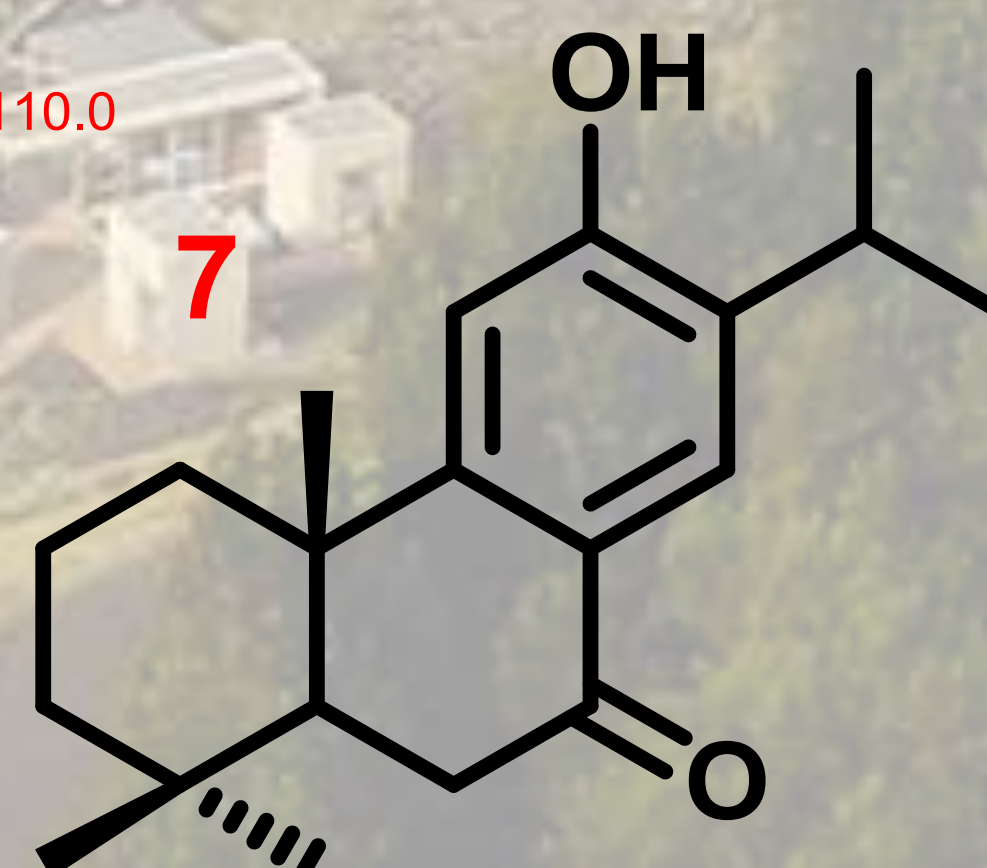
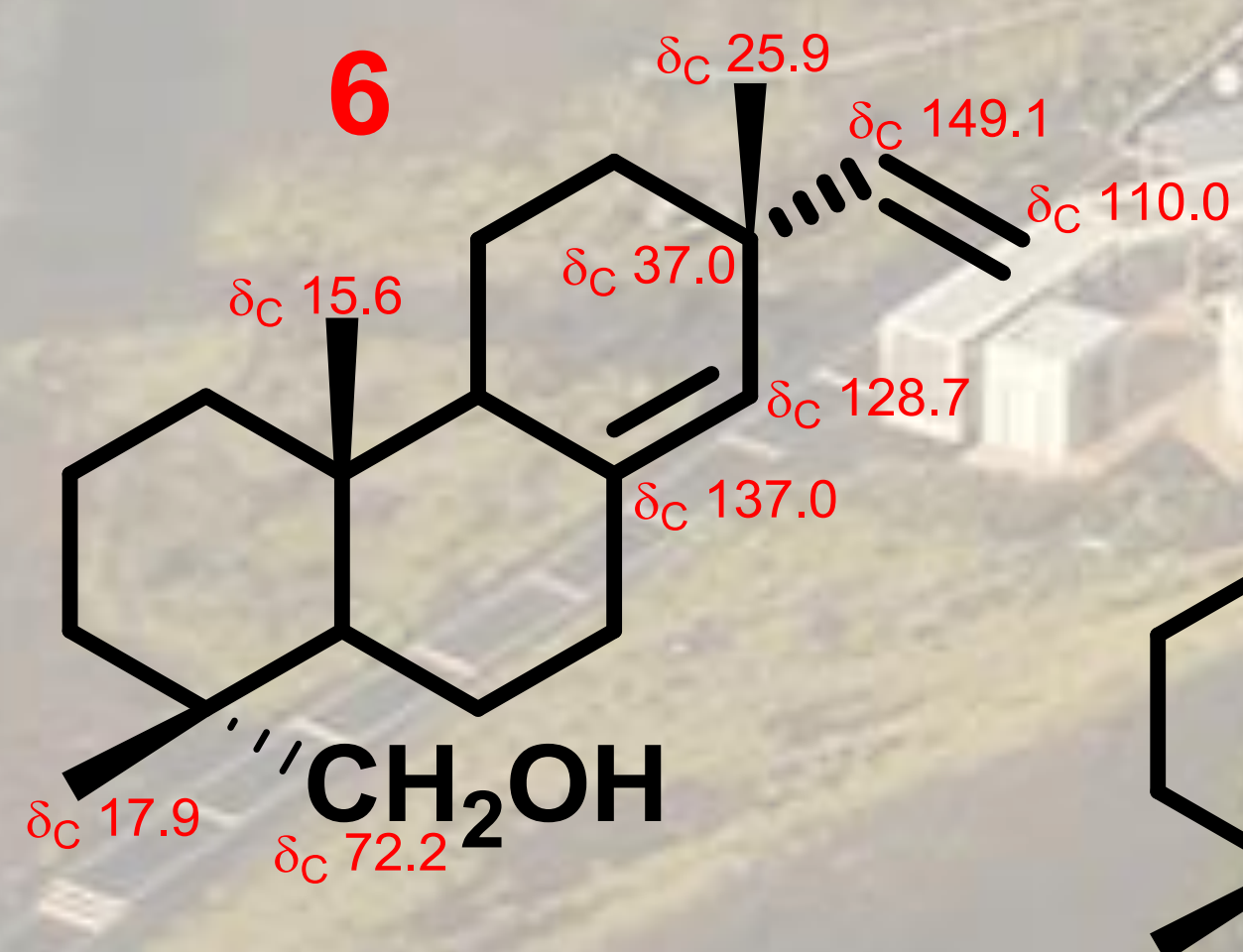


12-Methyl-sugiol ether (2), was first isolated from *Juniperus formosana* and exhibits antibacterial activity against MRSA.⁶



Cupresol (3), is a norditerpene with a lactone ring, suggested for the treatment of androgen receptor-associated diseases.⁷

Sitosterol (5), sandaracopimarinol (6) and sugiol (7) are compounds already isolated from dichloromethane extract from leaves of *Juniperus brevifolia*.^{3a} Compound 6 is cytotoxic against Hela and MCF-7 tumor cell lines and antibacterial.^{3b}



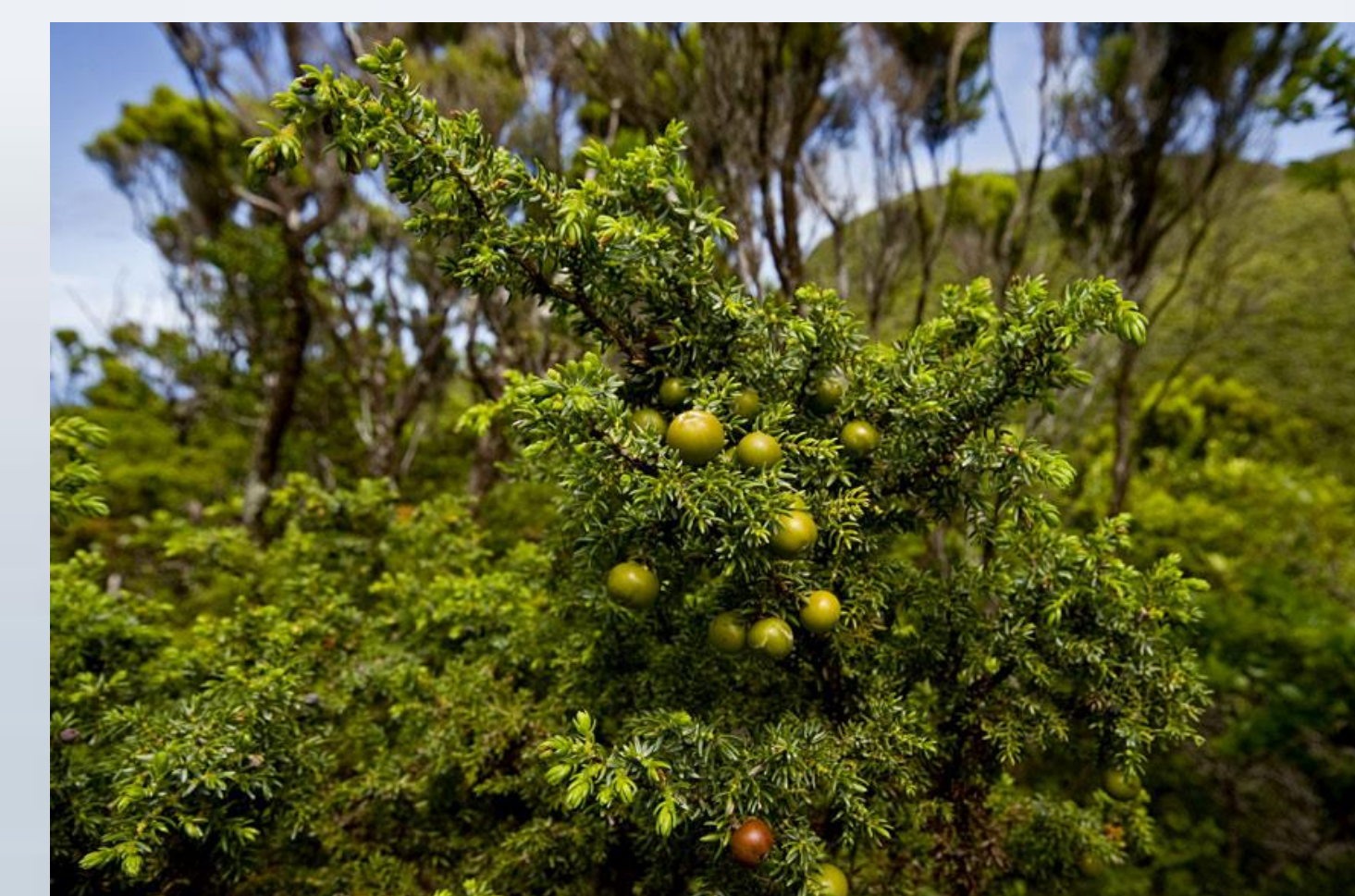
A triacylglycerol of saturated fatty acid (4), was also isolated from bark of *Juniperus brevifolia*.

In conclusion, from the bark of *Juniperus brevifolia*, were isolated 7 compounds, mainly diterpenes. Compound 2 is identified for the first time in *Juniperus brevifolia* while compound 3 is reported here for the first time in *Juniperus* genus.

The presence of diterpenes, well known for their bioactivities, can partially explain the durability of the *J. brevifolia* wood when protected by the bark and showed the potential of this species as source of drugs.

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MATERIAL AND METHODS

Plant collected in Pedreira, S. Miguel (Azores) in June 2001 (AZB-Ana Seca-1)

Bark (517 g) was air-dried, powered and extracted with hexane, CH₂Cl₂, acetone and EtOH using a soxhlet apparatus (24 h each)

Hexane extract (8.3 g)

Acetone extract (25.9 g)

Silica gel CC (gradient mixtures of hexane and ethyl acetate)

Liquid-liquid partition with hexane, CH₂Cl₂ and CHCl₃.

Silica gel TLC (different polarity eluent mixtures)

CH₂Cl₂ fraction

Compounds 1-4

Silica gel CC and TLC (different polarity eluent mixtures)

Compounds 1, 5-7



ACKNOWLEDGEMENTS

Thanks are due to Fundação para a Ciência e a Tecnologia (FCT, Portugal), the European Union, QREN, FEDER, COMPETE, for funding the Organic Chemistry Research Unit (QOPNA) (project PEst-C/UI0062/2013) and the Portuguese National NMR Network (RNRMN). M. Martins is grateful to CNPq, Conselho Nacional de Desenvolvimento Científico e Tecnológico – Brasil, for the scholarship granted.