

SOME AROMATIC COMPOUNDS FROM DICHLOROMETHANE EXTRACT OF *SALICORNIA RAMOSISSIMA*

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Introduction

Plants have been the most important source of drugs and drug leads in history,^[1] highlighting the fact that they are the basis of the traditional medicine. Indeed herbal medicines still be demanded and their popularity as source of new active compounds for drug discovery is increasing.^[2]

Salicornia ramosissima J. Woods, is an annual halophyte, confined to saline habitats,^[3] widely distributed in the salt marsh of Ria de Aveiro (Portugal) and also present in many salt marshes of the Iberian Peninsula.^[4] Our interest in the phytochemical study of this specie, which belongs to the genus *Salicornia* and family Chenopodiaceae, is based on previous knowledge that plants of this genus presented compounds such as flavonoids,^[5] chromones^[6] and alkaloids^[7] which are well-recognized for their biological activities. *Salicornia ramosissima* was subject to some studies of growth conditions and salinity,^[4,8] but its phytochemical composition remains unknown.

Material and Methods

Collection of the plant: Marinha dos Puxadoiros, Ria de Aveiro (Portugal)

Plant air dried

Aerial parts extract with dichloromethane at room temperature

18.1 g of crude extract

silica gel column chromatography (gradient mixtures of hexane and ethyl acetate)

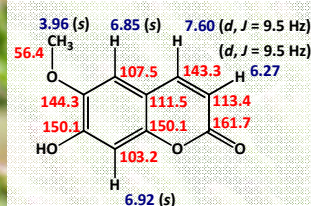
silica gel TLC (different polarity eluent mixtures)

Compounds 1 to 3

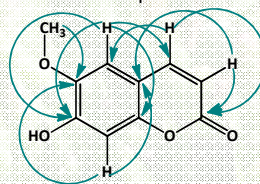
Results and Discussion

The analysis of the dichloromethane extract from *S. ramosissima* aerial parts allowed the isolation of some aromatic compounds, from which we present here the unequivocal structure elucidation of three examples, 7-hydroxy-6-methoxy-2*H*-chromen-2-one 1, commonly known as scopoletin, ethyl *o*-hydroxycinnamate 2 and (*E*)-fatty alcohol ferulic acid derivative 3.

Compound 1



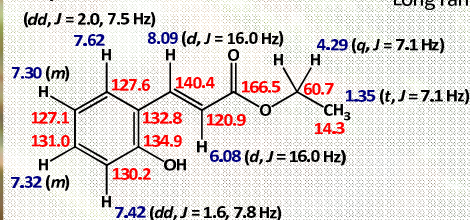
Long range correlations observed in HMBC spectrum



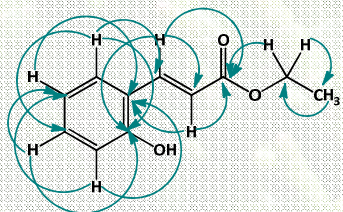
Scopoletin is usually used in traditional Chinese medicine due to its wide range of biological activities, such as anti-inflammatory and antioxidant.^[10] This is a known natural compound but it is reported by the first time in *Salicornia* genus.

Natural hydroxycinnamates are extremely potent antitumor agents, possibly due to the α,β -unsaturated carbonyl moiety that is often employed in the design of anticancer drugs.^[9]

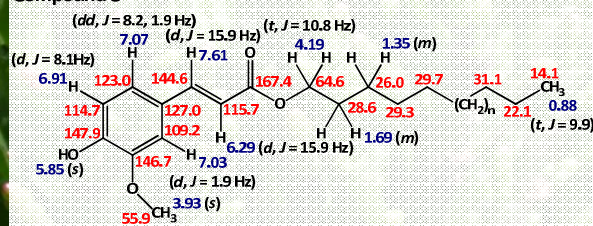
Compound 2



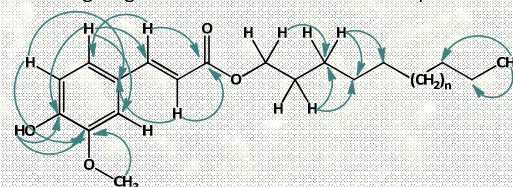
Long range correlations observed in HMBC spectrum



Compound 3



Long range correlations observed in HMBC spectrum



References

- [1] Patwardhan, B.; Vaidya, A.; Chorghade, M., *Curr. Sci. India*, **2004**, *86*, 789-799.
 - [2] Verma, S.; Singh, S.P. *Vet. World*, **2008**, *1*, 347-350.
 - [3] Davy, A.J.; Bishop, G.F.; Costa, C.S.B., *J. Ecol.* **2001**, *89*, 681-707.
 - [4] Silva, H.; Freitas, H.; Caldeira, G., *Rev. Biol.* **1999**, *17*, 193-202.
 - [5] Geslin, M.; Verbist, J.-F., *J. Nat. Prod.* **1985**, *48*, 111-113.
 - [6] Arakawa, Y.; Chiji, H., *Agr. Biol. Chem. Tokio* **1983**, *47*, 2029-2033.
 - [7] Arakawa, Y.; Asada, Y.-Z.; Ishida, H.; Chiji, H.; Izawa, M., *J. Fac. Agr. Kyushu U.* **1982**, *61*, 1-12.
 - [8] Silva, H.; Caldeira, G.; Freitas, H., *Ecol. Res.* **2007**, *22*, 125-134.
 - [9] De, P.; Baltas, M.; Bedos-Beval, F., *Curr. Med. Chem.*, **2011**, *18*, 1672-1703.
 - [10] Pan, R.; Dai, Y.; Gao, X.-H.; Lu, D.Xia, Y.-F., *Vasc. Pharmacol.*, **2011**, *54*, 18-28.
- Background: http://en.wikipedia.org/wiki/File:Salicornia_europaea_MS_0802.JPG, access 11/07/2012

Acknowledgments

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