

SHORT COMMUNICATIONS

QUERCETIN-3,7-DISULPHATE FROM *CENTAUREA ALEXANDRINA*

R.M.A. Mansour, M.F. Abdalla and N.A.M. Saleh
National Research Center, El-Dokki, Cairo, Egypt.

(Received October 22, 1987; revised January 15, 1988)

ABSTRACT. The leaves and stems of *C. alexandrina* were found to contain apigenin-7-glucoside, luteolin-7-glucoside and quercetin-3,7-disulphate.

INTRODUCTION

Centaurea species are known to be rich in flavonoids (1). *Centaurea alexandrina* Del. is common to the Mediterranean North coastal region of Egypt (2). This is the first report on the flavonoids of *C. alexandrina*. In the course of studying the flavonoids of *C. alexandrina*, a compound was isolated which proved to be a sulphated flavonoid. Sulphate conjugates have been reported in nature and new compounds are being increasingly reported. In both the flavone and flavonol series, the most common type is the 7-, and 3-sulphate respectively (3). The present report deals with the identification of apigenin-7-glucoside, luteolin-7-glucoside and quercetin-3,7-disulphate in *C. alexandrina*. Quercetin-3,7-disulphate is reported here for the first time. So far only the 3,7-disulphates of kaempferol and isorhamnetin have been reported (3).

RESULTS AND DISCUSSION

The flavonoids isolated from *C. alexandrina* were apigenin-7-glucoside, luteolin-7-glucoside, quercetin-3,7-disulphate as well as a number of methylated flavonols and C-glycosides. Preliminary results indicated that methylated flavonols contained 6-hydroxylation patterns. The C-glycosides failed to cochromatograph with any of the common C-glycoflavones. Investigation of these compounds shall be carried out at a later stage.

Apigenin and luteolin-7-glucoside. Both compounds gave apigenin and luteolin as well as glucose on acid hydrolysis as well as by enzymic hydrolysis with glucosidase. Both compounds showed UV data identical to apigenin-7-glucoside and luteolin-7-glucoside reported in the literature (4). Furthermore, both compounds co-chromatographed with authentic samples.

Quercetin-3,7-disulphate. This compound gave quercetin on mild acid hydrolysis, which also indicated the presence of an intermediate corresponding to quercetin-7-sulphate. From the aqueous hydrolysate, quercetin was first removed by extraction into EtOAc and the aqueous residue evaporated to dryness (till HCl-free) and then dissolved in 2-3 drops H₂O. This extract was co-chromatographed on paper with KHSO₄ using 20% 0.1N HCl in EtOH as a solvent. On spraying with sodium cobaltous hexanitrite, K⁺ appeared as a yellow green spot and HSO₄⁻ as a white spot on a pale yellow background (R_f 0.20 and 0.66 respectively) (5). Electrophoresis was carried out on Whatman 3 mm for 2hr. at 15 mV/cm (acetate buffer, pH 2). The compound traveled 6 cm (quercetin-3-glucoside remained at the point of application). Chromatographic data: R_f values: BAW = 0.04, PhOH = 0.02, H₂O = 0.42, 15% HOAc = 0.37. UV data (nm) : MeOH = 256sh, 271, 298, 335, 380, NaOMe = 272, 300sh, 418 (stable); AlCl₃ = 264sh, 273, 298sh, 430, AlCl₃-HCl = 269, 298sh, 358, 394; NaOAc = 255, 268, 352,

380sh, NaOAc-H₃BO₃ = 259, 268, 380. That position 7 is occupied is shown by the lack of a shift with NaOAc of band II and the disappearance of the 325 nm shoulder with NaOMe. That either positions 3 or 4' is occupied is indicated by the stable NaOMe spectrum, while the NaOAc-H₃BO₃ and AlCl₃-HCl shifts of band I indicated a free 3',4'-dihydroxylation pattern, thus leaving only position 3 occupied.

EXPERIMENTAL

Plant material. The plant material was collected from the North Coast, about 20 Km West of Alexandria. Identification was carried out by Professor Dr. L. Boulous, NRC. Voucher specimens are deposited at the herbarium, NRC. *Identification of flavonoids.* Air dried leaves and stems (150 g) were extracted with 70% EtOH. The extract was subjected to column chromatography on a polyamide column. Elution was started with H₂O followed by increasing concentrations of EtOH. Flavonoid fractions were further purified using elution techniques on Whatman 3 mm paper and sephadex LH-20 columns. Identification of the flavonoids was carried out according to standard methods of identification (4,6,7).

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