

LUTEOLIN 7-GLUCOSIDE AND HYDROXYCOUMARINS IN CANARY ISLANDS *SONCHUS* SPECIES

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Abstract—Leaf phenolics have been identified in twenty species of *Sonchus* (Compositae–Cichorieae) from the Canary Islands. Luteolin and/or its 7-glucoside occur in all but one species. The following hydroxycoumarins have been detected: cichoriin, found in 15 species, aesculin, in 5 species, and scopoletin, in all 20 species.

INTRODUCTION

THE ENDEMIC species of the genus *Sonchus* (Tribe Cichorieae) found in the Canary Islands are characterized by their robust woody habit. Gonzalez *et al.*^{1–6} have reported a number of terpenoids from various species (*S. jacquini*, *S. pinnatus*, *S. radicans*, *S. hierrense*). However, so far there has been no analysis of the phenolic compounds of *Sonchus*. A study has, therefore, been made of the flavonoids in the leaves of 20 species of *Sonchus* collected in the Canary Islands.

RESULTS

Two dimensional paper chromatography of dried leaf extracts of twenty species of *Sonchus* revealed two major flavonoids with a dull ochre colour in UV light changing to bright yellow or light green with NH₃ and three coumarins with blue, mauve and pink fluorescence in UV light. The compounds with the dull ochre reaction in UV light were identified as the flavone luteolin and its 7-glucoside, the latter yielding luteolin and glucose as the only products of acid hydrolysis. Since free luteolin may have been released from the 7-glucoside during the drying of the leaf specimens it is not regarded here as a separate character from the 7-glucoside. However, the free aglycone and/or its 7-glucoside were found in all but one (*S. gonzalezpadroni*) of the 20 species studied. Luteolin is, of course, well known as a common constituent in the Compositae (Harborne⁷) and characteristically

¹ A. G. GONZALEZ and A. RODRIGUEZ DE LEON, *Anales Real Soc. Espan. Fis. y Quim.* **LIX**, 615 (1963).

² A. G. GONZALEZ, J. L. BRETON and J. BERMEJO, XXVII Congreso Luso-Espanol para el Progreso de las Ciencias 99–100 (1964).

³ A. G. GONZALEZ, J. L. BRETON, J. BERMEJO and C. HERNANDEZ, *Anales Real Soc. Espan. Fis. y Quim.* **LXII**, 635 (1966).

⁴ A. G. GONZALEZ, J. L. BRETON and J. BERMEJO, *J. Chem. Soc. (C)*, 1298–1301 (1966).

⁵ A. G. GONZALEZ, J. L. BRETON, J. BERMEJO and M. FAJARDO, *Tetrahedron Letters* **36**, 3475 (1967).

⁶ A. G. GONZALEZ, J. L. BRETON, J. BERMEJO and A. BILLAR DEL FRESNO, *Anales Real Soc. Espan. Fis. y Quim.* **LXIV**, 893 (1968).

⁷ J. B. HARBORNE, *Comparative Biochemistry of the Flavonoids*, Academic Press, London (1967).

occurs as a leaf constituent, replacing flavonols in the more highly advanced and herbaceous angiosperm families. It is, however, interesting to find it occurring in these *Sonchus* species since this group of plants are considerably more woody in habit than the majority of composites, and the presence of the more 'primitive' leaf flavonoids, the flavonols kaempferol and quercetin, might have been expected.

The compounds fluorescent in UV light were identified by standard procedures as the hydroxycoumarin cichoriin, its isomeric glucoside aesculin and scopoletin. Cichoriin, which was first isolated from *Cichorium intybus* (Cichorieae), is relatively uncommon in nature, but it has been detected in a genus closely related to *Sonchus*, i.e. in *Launaea* (*L. arborescens*) (Batt.) Murb.).³ Cichoriin was found in the following species: *S. abbreviatus* Link, *S. brachylobus* Webb & Berth., *S. capillaris* Svent., *S. fauces-orci* Knoche, *S. filifolius* Svent., *S. gummifer* Link, *S. hierrensis* (Pitard) Boulos, *S. jacquinocephalus* Svent., *S. leptcephalus* Cass., *S. microcarpus* Boulos, *S. pinnatus* Aiton, *S. platylepis* Webb & Berth., *S. radicans* Aiton, *S. tectifolius* Svent. and *S. tuberifer* Svent., but it was absent from *S. ortunoii* Svent., *S. oleraceus* L., *S. acaulis* Dum.-Cours., *S. jacquini* DC. and *S. gonzalez-padroni* Svent. It is interesting to note that the species lacking it, apart from the widespread annual *S. oleraceus*, are all forest cliff plants with similar morphology and ecological requirements.

The other two hydroxycoumarins aesculin and scopoletin are fairly common in the plant kingdom. Scopoletin was present in all the *Sonchus* species examined and aesculin in *S. microcarpus* Boulos, *S. filifolius* Svent., *S. abbreviatus* Link, *S. tectifolius* Svent., and *S. jacquini* DC.

EXPERIMENTAL

Plant material. Material of twenty species of *Sonchus* was collected by one of us (D.B.) in the Canary Islands during the period October 1968 to August 1969 and voucher specimens are deposited in the Herbarium of the Department of Botany, The University, Reading, U K. (RNG).

Isolation and identification. The compounds were isolated from dried leaves by extraction with 90% EtOH at room temp. and were chromatographed on No. 3 paper in BAW and H₂O respectively. Identifications were made by co-chromatographing with authentic samples on No. 1 paper in the four solvents BAW, PhOH, H₂O and 15% HOAc and by spectral comparisons

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