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SHORT REPORTS

INDOLE GLUCOSINOLATES OF *CAPPARIS SPINOSA*

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Key Word Index—*Capparis spinosa*; Capparaceae; indole glucosinolates.

Abstract—The occurrence of glucobrassicin, neoglucobrassicin and 4-methoxy-glucobrassicin in roots of *Capparis spinosa* is demonstrated by HPLC and mass spectral methods, and discussed with respect to the detection of a 4-methoxy-oxindole in roots of *Capparis tomentosa*.

INTRODUCTION

Recently Dekker *et al.* [1] reported the presence of 3-hydroxy-3-methyl-4-methoxyoxindole in root extracts of *Capparis tomentosa*. Methoxylation at the 4-position is characteristic for an indole glucosinolate, and common in Brassicaceae [2–5]. As the preparation methods used for the isolation of this oxindole do not exclude its eventual artificial formation from a corresponding glucosinolate, shoot and root material of *C. spinosa* have been analysed for the presence of indole glucosinolates. Moreover, this investigation appears useful considering that the occurrence of aromatic glucosinolates in Capparaceae has received only scant attention to date.

RESULTS AND DISCUSSION

In contrast to leaf and shoot material of the genus *Capparis*, where aliphatic glucosinolates are predominant [6], and only trace amounts of 3-indolylmethyl-glucosinolate (glucobrassicin), are detectable, methanolic extracts from roots were found to contain 4-methoxy-3-indolylmethylglucosinolates in reasonable amounts, as shown by HPLC analysis. (Tables 1 and 2). Although, like in many Capparaceae [7], the 1-methoxy-3-indolylmethyl-glucosinolate (neoglucobrassicin) dominates, this presence of 4-methoxy-3-indolylmethyl glucosinolate could be proven by chromatographic and mass spectrometric methods (Table 2). The tissue-specific distribution of glucosinolates in higher plants is thus confirmed.

As air-dried plant material was used for the isolation of oxindoles by Dekker *et al.* [1], and because thioglucoside glycohydrolases (myrosinases) and indole oxidases come into contact with the substrates under these conditions, a possible artificial formation of the new oxoindole compound from corresponding glucosinolates by uncontrolled reactions cannot be excluded.

EXPERIMENTAL

Plant material. Plants of *Capparis spinosa* were a gift from the Botanical Garden, University Giessen and kept until use in the greenhouses of the University Ulm at 21±2° under natural light conditions.

Extraction. Leaves and washed roots (10 g each) were extracted in boiling MeOH [8], dried *in vacuo* and prepared for HPLC-separation of desulphoglucosinolates according to the methods of ref. [4].

HPLC. The separation of the desulphoglucosinolates was accomplished by a gradient elution: 20 min linear from 20 to 60% MeOH in H_2O with a flow rate of 2 ml/min. The column (300 × 3.9 mm) was packed with Nucleosil 10 C_{18} (Machery Nagel). Indole compounds were detected by UV-absorption (280 nm).

Mass spectra. Electron impact mass spectra were obtained with a Carian MAT 711 mass spectrometer using an emission current of 400 μA at 70 eV.

Table 1. Retention time (R_t) on HPLC and content of indole desulphoglucosinolates in roots and leaves of *Capparis spinosa*

	R_t (min.)	Root	Leaf
4-Hydroxy-3-indolylmethyl glucosinolate	4.1	tr*	tr
3-Indolylmethylglucosinolate	7.3	95	11.5
4-Methoxy-3-indolylmethyl glucosinolate	10.4	125	tr
1-Methoxy-3-indolylmethyl glucosinolate	13.8	675	tr

*Glucobrassicine equivalents in μg/g fr. wt); tr = trace.

Table 2. Partial data of mass spectra (EI, 70 eV) of desulphoindolglucosinolates isolated from *Capparis spinosa*

	a*	b	c			
4-Hydroxy-3-indolyl methyl glucosinolate	146 (13)† 147 (56)	172 (38) 171 (45)	188 (35)			
3-Indolylmethyl glucosinolate	130 (100)	155 (92) 156 (63)	172 (6)			
4-Methoxy-3-indolyl methyl glucosinolate	160 (25)	186 (73)	204 (4) 202 (3)	171 (100)	145 (13)	
1-Methoxy-3-indolyl methyl glucosinolate	160 (21)	186 (52)	202 (1) 204 (4)	171 (21)	145 (11) 146 (26)	155 (100)

The relative intensity is in parentheses.
*a = R^+; b = R–C≡N^+; c = R–CH=NOH^+; R = indolylmethyl.

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FATTY ACIDS OF *MENTHA* SEED LIPIDS

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Key Word Index—*Mentha*; Labiatae; seed lipids; fatty acids.

Abstract—Analyses of fatty acids of seed lipids in five species of *Mentha* from different localities in Serbia are reported.

Samples of five species of *Mentha* collected in different localities in Serbia (Fig. 1) were analysed for fatty acid composition of seed lipids. Results (Table 1) suggest low intraspecific variability of fatty acid composition and show that seed oils of all investigated species belong to the high linolenic acid type of seed oils as is usual for members of Saturejoideae sensu Wunderlich (i.e. Labiatae with trinucleate and hexacolpate pollen) [1, 2].