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FLAVONOIDS FROM VIOLET FLOWERS OF *SYRINGA VULGARIS*

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Two flavonolds were isolated from the fresh violet flowers of *Syringa vulgaris* and identification carried out through spectroscopy showed them to be rutin and kaempferol-3-0-rutinoside.

Key words: Rutin; Kaempdweol-3-0-rutinoside, Droplet Counter Current chromatography

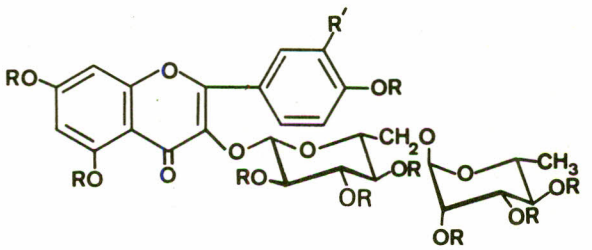
INTRODUCTION

The genus *Syringa* belongs to the family Oleaceae and *Syringa vulgaris* L. is the only member found in Switzerland [1,2]. *Syringa vulgaris* is cultivated as an oranamental plant. In the past it was used in the folkloric medicine to dispet fevers [3].

As work on the white flowers of *Syringa vulgaris* has already been carried qut by Birkofer *et al.* [4] and it has been shown that it contains acteoside, neoacteoside and (4-hydroxy-β-phenylethyl)-β-D-glucopyranoside. To the best of our knowledge of these authors no work on the violet flowers of *Syringa vulgaris* has so far been reported and therefore it was thought worthwhile to isolated and identify the chemical constituents.

EXPERIMENTAL

Fresh violet flowers of *Syringa vulgaris* were collected near Zurich, Switzerland, in June 1981. These were then cut into small pieces and extracted with methanol under reflux at 40°. The extract was concentrated in vacuum and to it water was added and insoluble material removed by filtration through celite. The filtrate was shaken with petroleum ether and the soluble part was discarded. The aqueous phase was reduced and lyophilized to give crude mixtutre glycosides. A portion (60 g) of it was subjected to a polyamide (500 g) column chromatography. First it was eluted with water and then after with methanol. The methanolic fraction of polyamide column was further chromatographed on silica gel column and followed by Droplet Counter Current Chromatography (DCCC), (chloroform-methanol-isopropanol-water, 5:6:1:4), which furnished two flavonoid I and II, rutin (40 mg) [5] and kaempferol-3-o-rutinoside (70 mg) [5].



I. R = H, R' = OH = Rutin
Ia R = Ac R' = OAc = Rutin nonaacetate
II R = R: = H = Kaempferol-3-0-rutinoside
IIa R = Ac R' = H = Kaempferol-3-0-rutinoside decaacetate

RESULTS AND DISCUSSION

The structure identification of compound I and II was done on the basis of UV, IR, MS and NMR spectroscopy. Compound I was isolated as yellow amorphous powder. It possesses the chemical composition $C_{27}H_{30}O_{16}$, molecular weight 610, melting point 183.6°, optical rotation $[\alpha]_D^{20}$ = + 13.62° (c = 0.52; MeOH), UV absorption in λ_{max}^{DMSO} at 261 at 261 and 363 (log ε = 4.31 and 4.21) nm. Infrared (IR) spectrum in KBr displayed peaks of functional groups at 3400, 1660, 1600, 1510, and 1460 cm^{-1} which were assigned to OH, C=O,C=C, aromatic ring respectively. The ^1H- and ^{13}C-NMR data are given in Table 1. The NMR and physico-chemical data showed that the compound is a flavonoid, rutin [5].

Compound II possesses the chemical composition $C_{25}H_{30}O_{15}$, molecular weight 594 (EI-MS), melting point 154.48° and UV absorption in λ_{max}^{DMSO} = 261.2, 359 nm (log ε = 4.32 and 4.27). IR (KBr) spectrum showed peaks at 3400, 1700, 1705, 1635, 1520, 1440 cm^{-1}, which were

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Table 1. ^{1}H and ^{13}C-NMR data of rutin (I) and kaempferol-3-O-rutinoside (II)

H at C/ C-atom	I		II		II	I
	ppm	J in Hz	ppm	J in Hz	ppm	ppm
2	–		–		156.45 s	156.42 s
3	–		–		133.17 s	133.21 s
4	–		–		177.33 s	177.23 s
5	–		–		161.16 s	161.15 s
6	6.17,	1.6	6.21, d,	2.0	98.73 d	98.79 d
7	–		–		164.25 s	164.54 s
8	6.36, d,	1.6	6.42, d,	2.0	93.71 d	93.59 d
9	–		–		156.50 s	156.50 s
10	–		–		103.91 s	103.73 s
1"	5.32,d,	7.4	5.30,d,	7.2	101.31 d	101.19 d
2"					74.12 d	74.00 d
3"					76.34 d	76.80 d
4"	3.05 – 3.83*		3.12 – 3.93*		70.55 d	70.49 d
5"					75.70 d	75.76 d
6"					66.94 t	66.92 t
1"'	4.39,s,		4.56,s,		100.72 d	100.65 d
2"'					70.30 d	70.28 d
3"'	3.05 – 3.83*		3.12 – 3.93*		69.89 d	69.92 d
4"'					71.78 d	71.79 d
5"'					68.18 d	68.15 d
6"'	1.00, d,	6.4	1.00,d,	6.4	17.66 q	17.61 q
1'	–		–		120.86 s	121.08 s
2'	7.53, d,*		8.00,d,	8.9	130.82 d	115.17 d
3'	–		6.90,d,	8.9	115.05 d	144.71 s
4'	–		–		159.85 s	148.42 s
5'	6.84,d,	7.8	6.90,d,	8.9	115.05 d	116.18 d
6'	7.55, dd*		8.00,d,	8.9	130.82 d	121.52 d

The spectra were recorded in DMSO-d_6 (TMS) at 300 (^{1} H-NMR) and 75.5 (^{13}C-NMR) MHz.
(*) The signals are not clear due to overlapping.

assigned to hydroxyls, carbonyl groups, C=C and aromatic ring respectively. Acetylation of the compound at room temperature revealed it to be nonacetate. The ^{1}H- and ^{13}C-NMR data are given in Table 1.

The identification of these compounds was achieved by comparison with authentic samples and the spectroscopic salient features [5]. Till to date the presence of these compound have not been reported from the fresh violet flowers of *Syringa vulgaris.*

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