

KAEMPFEROL AND QUERCETIN FROM *Nigella arvensis*

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We have studied the epigeal part of *Nigella arvensis* L., family Ranunculaceae Juss.

The plant was extracted with 70% ethanol. The extract was deposited on a column of polyamide sorbent and eluted first with water until flavonoids appeared in the eluate, and then with 70% ethanol. The combined flavonoids were heated in 10% hydrochloric acid on the water bath for 6 h. In the hydrolytic process the absence of C-glycosides was established [1]. The hydrolysate was diluted with water and passed through a column of polyamide sorbent. After the column had been washed with water to neutrality, the aglycones were desorbed with 96% ethanol, and the solution was evaporated and rechromatographed, being eluted with mixtures of chloroform and ethanol. Three substances were isolated.

The first substance had mp 273-275°C, R_f 0.46 (60% acetic acid) and 0.56 [benzene-ethyl acid-formamide (70:30:2:1)], λ_{max} in ethanol 265, 296, and 370 nm. UV spectroscopy showed the presence of free 3-, 5-, 7-, and 4'-hydroxy groups [2]. Phloroglucinol and p-hydroxybenzoic acid were found in the products of alkaline degradation.

The results obtained, and also a chromatographic comparison with an authentic sample, enabled this substance to be identified as 3, 4', 5, 7-tetrahydroxyflavone or kaempferol.

The second substance had mp 311-313°C, R_f 0.35 (60% acetic acid) and 0.14 [benzene-ethyl acetate-acetic acid-formamide (70:30:2:1)], λ_{max} in ethanol 270, 310, and 375 nm. UV spectroscopy showed the presence of free hydroxy groups in positions 3, 5, 7, 3', and 4'. Phloroglucinol and protocatechuic acid were found in the products of alkaline degradation.

By its physicochemical properties, UV spectroscopy, and a comparison with an authentic sample, the substance was identified as 3, 3', 4', 5, 7-pentahydroxyflavone or quercetin.

The third substance, having R_f 0.55 (60% acetic acid) and 0.93 [benzene-ethyl acetate-acetic acid-formamide (70:30:2:1)] could not be obtained in the crystalline state.

This is the first time that kaempferol and quercetin have been isolated from *Nigella arvensis* L.

LITERATURE CITED

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