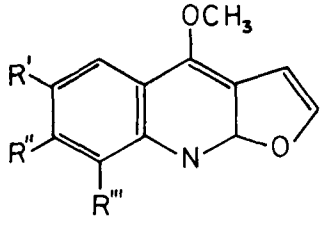
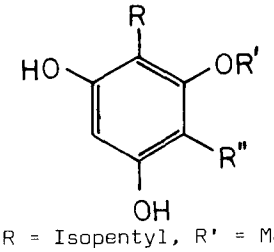
THE ALKALOIDS OF ACRONYCHIA PEDUNCULATA (L.) MIQ. (RUTACEAE)

I.H. Bowen, R. Dennis, and S.J. Osborne, Pharmacognosy Research Laboratory, Dept. of Pharmaceutical Chemistry, Faculty of Pharmaceutical Sciences, Sunderland Polytechnic, Sunderland. SR2 7EE

A phytochemical study of the leaves, stem and fruit of Acronychia pedunculata from Hong Kong has yielded the two furoquinoline alkaloids skimmianine (1) and kokusaginine (2), and one isofuroquinoline alkaloid. The Sri Lankan variety of Acronychia pedunculata (L.) Miq. (syn. A. laurifolia Bl.) yielded kokusaginine (0.1%) in the leaves, and evolitrine (3), (0.05%), in the timber (De Silva et al 1979). The Indian variety of Acronychia laurifolia (Bl.) collected in Madras did not contain these alkaoids but yielded the phenolics acronylin (4), and demethylacronylin (5), (Banerji, et al, 1974; Biswas and Chatterjee, 1970).
The major alkaloid in the petroleum spirit and chloroform extracts of the leaves, stem and fruit is kokusaginine (2), (0.0075%), a creamish solid, m.p. 172°C, which gave a mass spectrum with a molecular ion at m/e 259 and the remainder of the fragmentation pattern identical to the reported MS of kokusaginine ((Clugston and MacClean, 1965). The minor alkaoid in the methanol extract of the leaves, stem and fruit is skimmianine (1), (0.0035%), a white solid, m.p. 175°C, identified by direct comparison of it's spectral characteristics with those of an authentic sample. A third alkaloid was isolated from the petroleum spirit and chloroform extracts of the leaves. The spectral data indicates an isofuroquinoline nucleus with two $-OCH_3$ substituents. This is the first report of the alkaloids of the fruit of A. pedunculata, and also the first report of an isofuroquinoline alkaloid in this species of Acronychia.
The variation in alkaloid distribution in plants from different geographical sources is interesting. Additional information on the species would be necessary for chemotaxonomic conclusions to be drawn.
A separation of kokusaginine and skimmianine by high performance liquid chromatography (HPLC) has been developed. A separation of furoquinoline alkaloids by HPLC has not previously appeared in the literature and the difficulties in achieving a separation of two very similar isomers are discussed. The initial experimentation was performed using authentic samples of the two known alkaloids. The developed method was then applied to plant extracts with a minimum of 'cleaning up'. It is hoped that this will be developed into an easy and fast quantification and separation of this class of alkaloids.





1 R' = H, R'' = R''' = OCH_3

2 R' = R'' = OCH_3, R''' = H

3 R' = R''' = H, R'' = OCH_3

4 R = Isopentyl, R' = Me, R'' = COMe

5 R = Isopentyl, R' = H, R'' = COMe

De Silva, L.B., De Silva, U.L. et al. (1979) Phytochemistry, 18, 1255.
Banerji, J., Rej., R.N. & Chatterhee, A. (1974). Ind. J. Chem, 11, 693.
Biswas, G.K. & Chatterjee, A. (1970). Chem. Ind. 654.
Clugston, D.M. & MacClean, D.B. (1965). Can. J. Chem. 43, 2516