

BAICALEIN AND SCUTELLAREIN DERIVATIVES IN
THE LEAVES OF *Plantago major*

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The chemical composition of the biologically active substances of the leaves of *Plantago major* L. (rippleseed plantain) has been studied inadequately. The leaves of this plant have been found previously to contain the iridoid glycoside aucubin, vitamin K, ascorbic acid, a polygalacturonide pectin, bitter and tannin substances, carotene, and a small amount of alkaloids [1-7]. The present paper gives the results of an investigation of the flavonoid compounds from the leaves of the rippleseed plantain.

The plant material, collected in October, was extracted with hot water (1:20). After cooling, the extract was mixed with a fourfold volume of 96% ethanol, and the precipitate that deposited was filtered off. The filtrate was evaporated in vacuum at 40-50°C until the ethanol had been eliminated, and the aqueous residue was extracted successively with chloroform, ether, and ethyl acetate. The extracts were evaporated and the residues were analyzed by one- and two-dimensional paper chromatography in the following systems: 1) benzene-ethyl acetate-acetic acid-formamide (74:24:2:1); 2) butanol-acetic acid-water (4:1:2); 3) 15% acetic acid. Two flavonoids were found in the ethereal fraction, with R_f 0.50 and 0.63 (system 1); and 10 flavonoid substances were found in the ethyl acetate fraction in systems 2/3, with R_f 0.14/0.13; 0.21/0.13; 0.26/0.23; 0.35/0.09; 0.35/0.12; 0.42/0.17; 0.50/0.29; 0.50/0.37; 0.65/0.25; and 0.64/0.37.

By chromatography on a column of polyamide, the ether fraction yielded two crystalline substances (solvent 20-30% ethanol) with mp 300°C (yield 0.07%), R_f 0.50 (system 1/2), and mp 264-265°C (yield 0.1%), R_f 0.63 (system 1).

The melting points and IR spectra of these substances corresponded to those for authentic samples of scutellarein and baicalein, respectively. Baicalein was also found among five substances and scutellarein among three substances of the ethyl acetate fraction of the leaves of the rippleseed plantain. This is the first time that baicalein and scutellarein have been found in the leaves of this plantain.

The IR spectra (KBr tablets) were taken on an NR-20 spectrophotometer by A. K. Mitsyura.

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