A PHYTOCHEMICAL STUDY OF SOME CASSIA SPECIES CULTIVATED IN EGYPT

SAMIA M. EL-SAYYAD and SAMIR A. ROSS

Pharmacognosy Department, Faculty of Pharmacy, Assiut University, Assiut, Egypt

Plants of the genus *Cassia* are rich in polyphenol and anthraquinone content. *Cassia javanica* Linn., *C. didymobotrya* Fres. and *C. nodosa* Buch-Ham. are recorded to have many medicinal uses (1). *C. javanica* Linn. was the subject of many studies (2-6), while *C. didymobotrya* and *C. nodosa* were studied only preliminarily (7,8). A variation in the components present in *C. javanica* cultivated in Egypt with those reported previously instigated this investigation.

RESULTS AND DESCUSSION

The ether fraction of the ethanol extract of *C. javanica* leaves was found to contain wax, α-amyrin, β-amyrin, unknown sterol, kaempferol, kaempferol-3-methylether, kaempferol-7-methylether, traces of quercetin, emodin, and two anthraquinones. These anthraquinones were obtained in a mixture and separated by preparative silica gel chromatography. The first anthraquinone showed absorption maxima at 278, 286 (sh), 530 nm and the second at 225, 278 and 440 nm, which exhibited bathochromic shifts on addition of sodium hydroxide.

From the ethyl acetate fraction, quercetin, rhein, and sinapic acid were separated along with leucocyanidin. Pelargonidin chloride was the product of acid hydrolysis of the leucocyanidin.

The ether fraction of *C. didymobotrya* leaves was found to contain chrysophanol and aloe-emodin, while, ethyl acetate contained kaempferol-3-rhamnoside and isoquercitrin.

Kaempferol was present in the ether fraction of *C. nodosa* leaves, and its 3-rhamnoside was present in the ethyl acetate fraction.

EXPERIMENTAL

PANT MATERIALS.—*C. javanica* leaves were collected from the Plants Island at Aswan. *C. didymobotrya* and *C. nodosa* leaves were collected from public gardens at Assiut and on the university campus. All were identified and authenticated by the Botany Department, Faculty of Science, and the Horticulture Department, Faculty of Agriculture, Assiut University.

EXTRACTION AND ISOLATION.—Each sample (1 kg) was extracted in a percolator with 70% ethanol, concentrated and fractionated between ether and ethyl acetate. The fraction residues were chromatographed over silica gel columns and eluted with solvents of increasing polarities. Preparative silica gel and pc (Whatman no. 3 mm) and the systems ethyl acetate-methanol-water (100:16:14) and *n*-butanol-acetic acid-water (4:1:5) were used, respectively. For co-chromatography, silica gel and toluene-ethyl formate-formic acid (5:4:1) and cellulose and chloroform-acetic acid-water (50:45:5) were used (9).

C. javanica leaf constituents: wax (36 mg), whitish-yellow plates (methanol), mp 65°, negative for sterols, tlc; silica gel benzene-ethyl acetate (4:1), Rf=0.95, ir (KBr): 2950, 2905, 1660, 1370, 790 cm^{-1}; α-amyrin (17 mg); β-amyrin (11 mg); β-sitosterol (51 mg); unknown sterol (7 mg), white plates (methanol), mp 180-182°, positive reactions for sterols (10), tlc: silica gel and benzene-ethyl acetate (4:1) Rf: 0.83; kaempferol (19 mg); kaempferol-3-methylether (21 mg); kaempferol-7-methylether (25 mg); quercetin (5 mg); emodin (12 mg) (11,12); unknown anthraquinone I (traces), tlc: silica gel and ethyl acetate-toluene (7:1) Rf=0.21, positive reactions for anthraquinones, uv λ max (MeOH): 278, 286(sh), 530 nm, +NaOH: 282, 294, 550 nm; unknown anthraquinone II (traces, red), tlc: Rf=0.39, positive reactions for anthraquinones, uv λ max (MeOH): 225, 278, 440 nm, +NaOH: 230, 290, 450(sh) (12); rhein (15 mg) (12); sinapic acid (9 mg) (13); leucocyanidin (amorphous, pale brown from acetone, 94 mg), tlc: silica gel and toluene-ethyl formate-formic acid (5:4:1) of products of acid hydrolysis Rf=0.17, pelargonidin chloride (14).

C. didymobotrya leaf constituents: chrysophanol (8 mg); aloe-emodin (12 mg); rhein (13 mg) (12);

kaempferol-3-rhamnoside (16 mg), hydrolysis: kaempferol and rhamnose (11); isoquercetrin (19 mg), hydrolysis: quercetin and glucose (11).

C. nodosa leaf constituents: kaempferol (29 mg); kaempferol-3-rhamnoside (32 mg).

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