

BRIEF COMMUNICATION

PHENOLIC COMPOUNDS OF *Euphorbia ferganensis* B. Fedtsch.

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The spurge family (Euphorbiaceae) contains ~160 plant species, of which 33 grow in Uzbekistan [1].

Extracts of various Euphorbiaceae species have been used from antiquity in Tibetan medicine in the composition of some multicomponents preparations and Chinese medicine as antihelmintics and in middle Asia as a cure for various skin diseases [2].

Phenolic compounds from studied Euphorbiaceae species possess bactericidal activity. They are recommended for treating and prophylaxis of dysentery, diarrhea, and viral infections, including AIDS [3, 4].

We studied phenolic compounds of *Euphorbia ferganensis* B. Fedtsch. by the previous method [5]. Total polyphenols (yield, 9.1% from air-dried raw material) were isolated from the plant roots. Paper chromatography using 1-BAW (butanol—acetic acid—water, 40:12:28) showed that the polyphenols separate into nine compounds. Column chromatography using silica gel with elution by CHCl_3 — CH_3OH (17:3, 17:4, 17:5) fractionated the total polyphenols into three parts.

The first fraction contains one compound; the second, three with R_f values 0.80, 0.75, and 0.38 (system 1). Rechromatography on a polyamide column with elution by CHCl_3 — CH_3OH (9:1, 8:2) gave the pure compounds. The third fraction yielded five pure compounds with R_f values 0.68, 0.40, 0.35, 0.25, and 0.18 after rechromatography on a silica-gel column with gradient elution by diethylether—ethylacetate with increasing ethylacetate concentration.

Compound 1. White crystals (water), mp 221-223°C, R_f 0.51, system 2 (butanol—acetic acid—water, 4:1:5, upper phase). Identified as gallic acid.

Compound 2. Yellow crystals, mp 184-185°C, R_f 0.80 (system 2), λ_{max} 349, 255 nm (ethanol). Acid hydrolysis produces quercetin and rhamnose. Identified as quercetin-3-O-rhamnoside (quercitrin).

Compound 3. Yellow crystalline powder, mp 306-308°C, R_f 0.75 (system 2), λ_{max} 372, 258 nm (ethanol). KOH fusion forms phloroglucinol and protocatecheic acid. Identified as quercetin.

Compound 4. Light yellow crystalline powder, mp 175-176°C, R_f 0.38 (system 2), $[\alpha]_{\text{D}} -69^\circ$ (c 0.5, ethanol), λ_{max} 360, 265 nm (ethanol). Acid hydrolysis forms kaempferol and glucose. Identified as kaempferol-3-O-glucoside.

Compound 5. Amorphous white compound, R_f 0.68 (system 1), 0.31 (system 2), $[\alpha]_{\text{D}} +40^\circ$ (c 0.9, acetone), λ_{max} 265, 221 nm (ethanol). Total acid hydrolysis gives glucose and gallic and ellagic acids in a 1:1:1 ratio. Identified as 3-O-galloyl-4,6-hexahydroxydiphenoyl- β -D-glucose.

Compound 6. Yellow hygroscopic powder, mp 353°C, R_f 0.40 (system 2), $[\alpha]_{\text{D}} -137^\circ$ (c 0.5, methanol), λ_{max} 285, 224 nm (methanol). Total acid hydrolysis gives glucose and gallic and ellagic acids in a 1:1:2 ratio. Identified as geraniin [6].

Compound 7. White amorphous powder, mp 218-220°C, R_f 0.35 (system 1), $[\alpha]_{\text{D}} -40^\circ$ (c 0.5, methanol), λ_{max} 285, 242 nm (methanol). PMR spectrum (ppm): 4.06, 4.04, 4.03, 3.99 (s, CH_3), 3.65 (dd, J = 8 and J = 9 Hz, gluc. H-2), 6.55 (d, J = 6 Hz, H-5), 6.70 (dd, J = 13 Hz, gluc. H-6), 7.15 (s, galloyl-H). Total acid hydrolysis gives glucose, gallic acid, and the 3,4,3'-trimethylester of ellagic acid [7] in a 1:1:1 ratio. Identified as 1-O-galloyl-4,6-trihydroxy-3,4,3'-trimethoxydiphenoyl- β -D-glucose, a new and previously undescribed compound.

Compound 8. Dark brown amorphous powder, R_f 0.25 (system 1), 0.38 (system 3, 2% $\text{CH}_3\text{CO}_2\text{H}$), 0.52 (system 4, 15% $\text{CH}_3\text{CO}_2\text{H}$). Total acid hydrolysis gives glucose and gallic acid in a 1:2 ratio. Identified as 2,3-di-O-galloyl- β -D-glucose.

Compound 9. White amorphous powder, R_f 0.18, 0.36, 0.41 (systems 1, 3, 4), $[\alpha]_{\text{D}} +28.6^\circ$ (c 0.7, acetone), λ_{max} 279, 218 nm (methanol). Total acid hydrolysis gives glucose and gallic acid in a 1:3 ratio. Identified as 1,2,3-tri-O-galloyl- β -D-glucose.

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