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B R I E F C O M M U N I C A T I O N

CHEMICAL COMPOSITION OF *Eucalyptus jumanii* CULTIVATED IN THE HUMID GEORGIAN SUBTROPICS

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Seeds of Indian origin were used in 1982 to grow seedlings of *Eucalyptus jumanii* Blacchy et Suickii (Myrtaceae), Juman eucalyptus, at the Kobuletskii experimental station of medicinal plants of the Institute of Pharmacochemistry of the Georgian Academy of Sciences (former ZOS VILR). The plant grew well and reached 12-15 m height. However, flowering did not occur during all these years.

This is an evergreen tree with alternate, broadly lanceolate, unevenly stalked leaves 7-17 cm in length and 3-5 cm in width.

Analyses showed that Juman eucalyptus leaves contain essential oil and flavonoids. A quantitative determination by steam distillation [1] of the essential oil in the air-dried leaves collected monthly from May through October in 1995, 1996, and 1997 showed that the essential-oil content in various samples changed insignificantly from 1.12-1.29 (1995) and 1.14-1.35% (1996). However, significant changes were observed as a function of yearly climatic conditions. Thus, the amount was significantly greater in leaves collected during these months in 1997 than in the previous years (1.53-1.76%).

The essential oil is yellowish and mobile with a characteristic cineol odor and specific weight 0.912-0.990. GLC detected in the essential oil obtained by us monoterpene hydrocarbons, α- and β-pinene, myrcene, ocimene, camphene, the terpene alcohol linalool, and cineol oxide [2]. The cineol content was 40-55% and less than in the essential oil of official eucalyptus species (60%) [1].

Paper and thin-layer chromatography of the alcohol—water extract revealed four flavonoids. Ethanol (45%) was most effective for isolating these. A crystalline substance (F1) precipitated from the extract upon standing at room temperature. The mother liquor left after separating F1 was evaporated. The watery liquid was chromatographed on a polyamide column with elution by $CHCl_3$ and then $CHCl_3$—C_2H_5OH (9:1). Three pure crystalline flavonoids, F1, F2, and F3, were isolated. Their physicochemical properties and a direct comparison with authentic samples identified the isolated flavonoids as rutin, quercitrin, and quercetin [3-6].

Acidic and enzymatic hydrolysis and UV spectra with diagnostic reagents confirm the structures.

Rutin (F1) crystallized from methanol, mp 199-202°C, $[\alpha]_D^{20}$ -69.1° (*c* 0.1, methanol). UV spectrum (MeOH, λ_{max}, nm): 259, 265, 369; $C_{27}H_{30}O_{16}$ [4, 5].

Quercitrin (F2) crystallized from ethanol, mp 183-184°C, $[\alpha]_D^{20}$ -73.5° (*c* 1.0, ethanol). UV spectrum (MeOH, λ_{max}, nm): 256, 265, 301, 350, $C_{21}H_{20}O_{11}$ [4, 6].

Quercetin (F3), mp 302-305°C, $C_{15}H_{10}O_7$ [3-5].

The total yield of flavonoids was up to 5% [3].

Thus, the study of the accumulation of rutin demonstrated that its biosynthesis in Juman eucalyptus leaves accelerates in February (4.01%) until April (5.52%) and then slightly decreasese (4.91%). It again increases from August to a maximum in December (5.56%).

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