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COUMARINS OF THE ROOTS OF *Archangelica tschimganica*

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From a methanolic extract of the roots of *Archangelica tschimganica* by separation on a column of alumina (activity grade III) with elution by mixtures of benzene and methanol with increasing concentrations of the latter, we have isolated six individual crystalline substances: (I), $C_{15}H_{16}O_3$, mp 84–85°C; (II), $C_{11}H_{16}O_4$, mp 249–252°C; (III), $C_{24}H_{30}O_3$, mp 61–63°C; (IV), $C_{17}H_{16}O_5$, mp 102–103°C; (V), $C_{17}H_{16}O_6$, mp 105–106°C; and (VI), $C_{17}H_{18}O_7$, mp 124–125°C.

By a comparison of IR spectra and direct mixed-melting point tests with authentic samples, substances (I), (II), and (III) were identified as osthole, xanthotoxol, and umbelliprenin, respectively [1]. The oxidation of (IV) with perphthalic acid in chloroform yielded (V), and treatment of the latter with 10% oxalic acid yielded (VI). Thus, an interrelationship between (IV)–(VI) has been established.

According to their IR and NMR spectra and the reactions described above, substances (IV–VI) have been identified as phellopterin (IV), biakangelicol (V), and biakangelicin (VI) [1].

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