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PRANTSCHIMGIN CONTENT OF METHANOLIC EXTRACT OF ROOTS OF *Ferulago platycarpa*

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Umbelliferae (Apiaceae) is a large family containing mainly coumarins and volatile oils. *Ferulago platycarpa* Boiss. & Bal. is a perennial endemic species growing in Nevsehir, Turkey [1]. In addition, species of the genera *Ferula* and *Prangos* are also known by these names, and although they have other usages, they are, mainly used as aphrodisiacs in Turkey [2]. In this study, we determined the prantschimgin content of methanolic extracts obtained from the roots of *F. platycarpa* by HPLC. Prantschimgin was identified for the first time from *Prangos tschimganica* B. Fedtsch [3] and, among the *Ferulago* genus, for the first time from the roots of *F. meioides* (L.) Boiss. [4]. It is reported to be present in some other *Ferulago* species as well [5–8]. It has a furocoumarin structure and is found to be the major component of the roots of the methanolic extract of *F. platycarpa.*

By using the calibration curve that we obtained with the standard substance, we determined the prantschimgin content of the methanolic extract of the roots to be 1.90%. When we compared this value with other *Ferulago* species, we found, for *F. meoides* [4]: a coumarin mixture (15 g) was obtained from 500 g roots, which yielded 4 fractions. Fraction II weighed 7.15 g (1.76%) and contained prantschimgin along with felamedin and a little oxypeucedanin. For *F. aucheri* Boiss. [5]: 500 g of aerial parts extracted with $CHCl_3$ and EtOH yielded 18 g residue after evaporation and was fractionated with petroleum ether, $CHCl_3$, and EtOH. As a result, 37 mg of prantschimgin was obtained. For *F. sylvatica* (Bess.) Reichenb. [6]: 4.8 g semi-solid mass was obtained from 250 g of shade dried flowers extracted with petroleum ether. This semi-solid mass consisted of prantschimgin and umbelliferone (quantities were not reported). For *F. capillaris* (Link ex Sprengel) Coutinho. [7]: 1) 460 g of aerial parts extracted with hexane was concentrated to yield 24 g extract, which was reported to contain 3.7 g of prantshimgin; 2) 1200 g of roots extracted with benzene gave 91 g extract and, after crystallization in benzene, yielded 51 g of a mixture of oxypeucedanin and prantschimgin. The mother liquor also gave 6 g of prantschimgin. For *F. brachyloba* Boiss. and Reuter [7]: 700 g roots extracted with benzene yielded a crystalline precipitate of 23 g on cooling which contained oxypeucedanin, prantschimgin, and aurapten. This crude precipitate was recrystallized in methanol to afford oxypeucedanin and prantschimgin (15 g). For *F. isaurica* Pesmen and *F. syriaca* Boiss [8]: the prantschimgin contents of the chloroform fractions of the roots of these two *Ferulago* species (500 g) (extracted and fractionated using the same method and investigated with similar HPLC conditions) were found to be 1.17% and 0.91% respectively.

The plant material was collected from the locality mentioned below, and voucher specimens are kept in Ankara Universitesi Eczacilik Fakultesi Herbaryumu (AEF): Nevsehir, Uchisar, Gemil Mountain (North Slope), 1450 m, collected and identified by Erdogan Satir, 4/7/2004 AEF 23713.

The roots were coarsely powdered; 100 g of these powdered roots were extracted with a sufficient amount of methanol for 8 h at room temperature three times with a Velp Scientifica brand magnetic stirrer. The extract was filtered and evaporated to dryness with a rotary evaporator; 8.7 mg of this dry extract was weighed in a volumetric flask, dissolved in methanol, and brought up to 10 mL with the same solvent. Standard substance, obtained and identified from *F. isaurica* [9], was also dissolved in methanol. Solutions having different concentrations were prepared from this stock standard solution in order to prepare the calibration curve; 1 μL of the root extract and these standard solutions were injected to the HPLC device (HP 1100 Agilent HPLC System: G1 379A Degasser, G1 311A Quaternary Pump, Detector: DAD at 320 nm; Column: Spherisorb C_{18} 4.6 mm × 250 mm). The mobile phase consisted of methanol–water (3:1) with a flow rate of 0.5 mL/min. Injections were repeated for 5 times, and almost the same results were obtained with each injection. The external standard method was used to

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identify and verify the peak belonging to prantschimgin within the extract, and its quantity was determined according to the calibration curve of the standard substance (slope: 2.787434, intersection: –0.7668, r^2 0.99328).

Although not having significant quantities compared to some other *Ferulago* species, we think that this furanocoumarin is one of the major compounds present in the roots and can serve as a chemotaxonomic character for the genus *Ferulago* and may also be responsible for the biological effect.

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