Quantitative Determination of Allantoin in Dioscorea Rhizome and an Oriental Pharmaceutical Preparation, Hachimi-Gan, by High-Performance Liquid Chromatography

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Several reports have been published on the determination of allantoin in various cosmetics and pharmaceutical products. Most of these are indirect and need cumbersome sample preparation (1–3). In this report, a high-performance liquid chromatographic (HPLC) method is described for the convenient and direct determination of allantoin in *Dioscorea* rhizome [*Dioscorea opposita* Thunb. (Dioscoreaceae)] from an oriental pharmaceutical preparation, Hachimi-Gan, without any cumbersome sample preparation.

Chromatographic separation on a resin-based, strong cation exchanger (H^+), using 1/15 M potassium dihydrogen phosphate as the eluent, monitored at 210 nm. A Hitachi LC 655-12 pump system, a Hitachi 655 spectrometer (Hitachi, Ltd.) used as a detector, and a stainless-steel column (500 mm × 4 mm I.D.) packed with strong cation exchange resin (TSK GEL SCX, 10 µm, Tosoh Co., Ltd., Tokyo, Japan) were used in this study. The analysis was carried out at room temperature and at a flow rate 0.8 ml/min.

About 0.2 g of *Dioscorea* rhizome dry powder or a corresponding amount of powdered Hachimi-Gan was weighed accurately, placed in 10 ml of the HPLC mobile phase, and shaken for 15 minutes. It was centrifuged and decanted. The residue was extracted twice, once with 10 ml and then with 5 ml of the mobile phase, in the same way. The extract was placed in a 25 ml volumetric flask and diluted to 25 ml with the mobile phase. Twenty microliters of this solution were injected into HPLC column. The allantoin content in *Dioscorea* rhizome was caluculated from the peak area.

Allantoin in five commercial samples was determined by the present method. The allantoin content of them varied from 0.11 to 0.72 % and the mean was 0.30 % (CV = 81.73 %). There was therefore, considerable variation in the content of allantoin among the samples.

The present method was employed to estimate the content of allantoin in an oriental pharmaceutical preparation and to assess its suitability for quality control. Hachimi-Gan was selected and analysed as a sample of a preparation which contained *Dioscorea* rhizome as a component. It was found that other crude drugs did not interfere in the determination of allantoin from *Dioscorea* rhizome in Hachimi-Gan, in the chromatograms. Also 98.6 % of the allantoin was recovered during the recovery test.

This method should be useful as a routine method for the quality estimation of *Dioscorea* rhizome and Hachimi-Gan since it is both simple and rapid. Studies on the application of this method to other crude drugs and other oriental pharmaceutical preparations are in progress.

References

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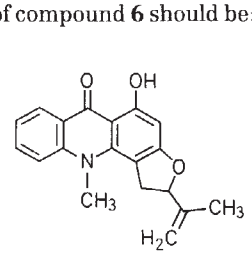
Erratum

Fischer, H., Römer, A., Ulbrich, B., Arens, H. (1988) Planta Med. 54, 398·400.

The structure of compound **6** should be:



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