

PROANTHOCYANIDINS IN THE ROOTS AND RHIZOMES OF *POTENTILLA ALBA* (ROSACEAE)

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REFERENCES

1. Smyk G. K. 1976. Using of white cinquefoil as new medicinal plant, restoration of its natural reserves and culture opportunities. In: *Novyye kultury v narodnom khozyaystve i meditsine*. Pt 1. P. 41—42. (In Russian)
2. Tomczyka M., Lattéb K. P. 2009. *Potentilla* — a review of its phytochemical and pharmacological profile. — *J. Ethnopharm.* 122: 184—204.
3. Bashilov A. V. 2010. Use of *Potentilla alba* L. as a raw pharmaceutical material in Republic of Belarus. — *Ekologicheskiy vestnik*. 3: 85—89. (In Russian)
4. Kurkin V. A., Khisyamova D. M., Shaykhutdinov I. Kh., Luzhnov N. D. 2014. Comparative phytochemical research of the underground part of the representatives of genus *Potentilla* within the development of resource-saving technologies. — *Izvestiya Samarskogo nauchnogo tsentra Rossiyskoy akademii nauk*. 1(3): 772—775. (In Russian)
5. Hiller K. 1994. *Potentilla*. Hagers Handbuch der Pharmazeutischen Praxis. Berlin; Heidelberg; New York. P. 254—269.
6. Maldonado P. D., Rivero-Cruz I., Mata R., Pedraza-Chaverri J. 2005. Antioxodant activity of A-type proanthocyanidins from *Geranium niveum* (Geraniaceae). — *J. Agric. Food Chem.* 53(6): 1996—2001.
7. Ljujic B. T., Kostic M. J., Jankovic S. M. 2015. Antioxidant and anti-inflammatory activity of *Potentilla reptans* L. — *Acta Poloniae Pharm. Drug Res.* 72(1): 137—145.
8. Oszmianski J., Wojdylo A., Lamer-Zarawska E., Swiader K. 2007. Antioxidant tannins from Rosaceae plant roots. — *Food Chem.* 100(2): 579—583.
9. Sheriyeva F. K. 2015. Farmakognosticheskoye izucheniye lapchatki beloy — *Potentilla alba* L., intodutsirovannoy na Severnom Kavkaze: Dis ... kand. farm. nauk [Pharmacognostic examination of

- white cinquefoil — *Potentilla alba* L., introduced to the North Caucasus: Auth. Abstr. Cand. Sci. (Pharmacology) Diss.]. Volgograd. 121 p. (In Russian).
10. Ossipova S., Ossipov V., Haukioja E., Loponen J., Pihlaja K. 2001. Proanthocyanidins from mountain birch leaves: quantitation and properties. — *Phytochem. Anal.* 12(2): 128—133.
 11. Karonen M., Leikas A., Loponen J., Sinkkonen J., Ossipov V., Pihlaja K. 2007. Reversed-phase HPLC-ESI-MS analysis of birch leaf proanthocyanidins after their acidic degradation in the presence of nucleophiles. — *Phytochem. Anal.* 18(5): 378—386.
 12. Bos M. A., Vennat B., Meunier M. T., Pouget M. P., Purrat A., Fialip J. 1996. Procyanidins from tormentil: antioxidant properties towards lipoperoxidation and antielastase activity. — *Biol. Pharm. Bull.* 1(19, 1): 146—148.
 13. Schleep S., Friedrich H., Kolodziej H. 1986. The first natural procyanidin with a 3,4-cis-configuration. — *J. Chem. Soc., Chem. Commun.* 5: 392—393.
 14. Choudhary A., Radhika M., Chatterjee A., Banerjee U. C., Singha I. P. 2015. Qualitative and quantitative analysis of *Potentilla fulgens* roots by NMR, matrix assisted laser desorption/ionisation with time-of-flight MS, electrospray ionization MS/MS and HPLC/UV. — *Phytochem. Anal.* 26(1): 161—170.
 15. Gu L. W., Kelm V. A., Hammerstone J. F., Zhang Z., Beecher G., Holden J., Haytowitz D., Pior R. L. 2003. Liquid chromatographic/electrospray ionization mass spectrometric studies of proanthocyanidins in foods. — *J. Mass Spectrometry.* 38(12): 1272—1280.
 16. ChemSpider; <http://www.chemspider.com/>
 17. The Human Metabolome Database (HMDB); <http://www.hmdb.ca/>
 18. METLIN; https://metlin.scripps.edu/metabo_search_alt2.php
 19. PubCem; <https://pubchem.ncbi.nlm.nih.gov>.
 20. Karonen M., Ossipov V., Sinkkonen J., Loponen J., Haukioja E., Pihlaja K. 2006. Quantitative analysis of polymeric proanthocyanidins in birch leaves with normal-phase HPLC. — *Phytochem. Anal.* 17(3): 149—156

