Chemistry of Natural Compounds, Vol. 31, No. 2, 1995

BRIEF COMMUNICATIONS

PLANT POLYSACCHARIDES
I. POLYSACCHARIDES OF *Lagochilus* AND THEIR BIOLOGICAL ACTIVITY

D. A. Rakhimov, M. Kh. Malikova, A. A. Vakhabov, I. O. Ruziev, and T. R. Abdurakhmanov

UDC 547.917

In medical practice, a tincture and extract of intoxicant lagochilus *Lagochilus tumulentus* is used as a hemostatic [1]. However, there are reports on a different direction of the action of an extract of *Lagochilus usunachmaticus* determined by the dose of the preparation: larger doses lead to the development of hypocoagulation, and small doses to hypercoagulation [2]. With the aim of revealing the active principle, we have studied the carbohydrate composition of the epigeal part of *Lagochilus usunachmaticus* Bge. (fam. Labiatae). The plant contains a water-soluble polysaccharide (2.4%), pectin (4.3%), and hemicellulose (6.7%), which were isolated by a known procedure [3].

The water-soluble polysaccharide consisted of a white amorphous powder readily soluble in organic solvents. Rhamnose, arabinose, mannose, galactose, and glucose were detected in the products of its acid hydrolysis.

According to PC and GLC [4], the monosaccharide composition of the pectin was represented mainly by galacturonic acid and arabinose, with small amounts of galactose and rhamnose. The galacturonic acid content according to [5] was 70.2%, the $O-CH_3$ content 5%, $[\alpha]_D^{20}$ + 132°(c 0.5; water). The MM of the pectin was found by viscometry [6] as 60,000. The quantitative characteristics of the pectin, determined by the methods of [7], were as follows (%): free carboxy groups, K_f 3.24; methoxylated carboxy groups, K_e 9.4; degree of methoxylation, λ, 70%. The titrimetric results obtained enabled us to assign the pectin to the high-methoxyl group.

Saponification of the pectin with alkali gave a pectic acid, the monosaccharide composition of which was identical with that of the pectin.

By partial hydrolysis of the pectic acid (1 N H_2SO_4, 3 h, 100°C), we obtained: galacturonic acid, galactose, arabinose, rhamnose, a mixture of oligouronides, and a galacturonan, $[\alpha]_D^{20}$ + 240° (c 0.1, 3 h, water) and a partially degraded pectic acid (25%), consisting only of galacturonic acid residues. The presence of pyranose rings and their α-configuration in the pectin was confirmed by IR spectroscopy [8]. The final product of periodate–nitric acid oxidation was tartaric acid, which is possible if the galacturonan contains pyranose rings with the 1-4 type of bond between the galacturonic acid residues.

The results of a study of the pharmacological properties of the carbohydrate complex in experiments on dogs has shown that it has a low toxicity and possesses a pronounced anticoagulant activity.

REFERENCES

1. M. D. Mashkovskii, Drugs [in Russian], Meditsina, Moscow, Vol. 2 (1984), p. 85.
2. T. Abdurakhmanov and A. S. Pulatov, "The anticoagulant action of an extract of Lagochilus usunachmaticus: Abstracts of Lectures at the Republican Plenum of the Scientific Therapeutic Society [in Russian], Andizhan (1984), p. 211.

Institute of the Chemistry of Plant Substances, Academy of Sciences of the Republic of Uzbekistan, Tashkent, fax (3712) 89 14 75. Translated from Khimiya Prirodnykh Soedinenii, No. 2, pp. 313-314, March-April, 1995. Original article submitted November 7, 1994.

0009-3130/95/3102-0260$12.50

3. M. Kh. Malikova, D. A. Rakhimov, and R. A. Zaidova, Khim. Prir. Soedin., 464 (1993).
4. Yu. S. Ovodov, The Gas–Liquid Chromatography of Carbohydrates [in Russian], Vladivostok (1970), p. 39.
5. Biochemical Methods of Analyzing Fruits [in Russian], Shtiintsa, Kishinev (1984), p. 12.
6. S. G. Kovalenko and S. D. Kurilenko, Ukr. Khim. Zh., **31**, 175 (1965).
7. G. V. Buzina, O. R. Ivanov, and A. B. Sosnovskii, Khlebopekarnaya i Konditerskaya Prom-st., No. 4, 5 (1966).
8. M. P. Filipov, The Infrared Spectra of Pectin Substances [in Russian], Shtiintsa, Kishinev (1978), p. 14.
9. A. G. Gorin, Khim. Prir. Soedin., 80 (1967).