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Study of the Polysaccharide Composition of The *Asarum Europaeum L* Plant Growing in Uzbekistan

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ABSTRACT: The aim of the study is to study the polysaccharides contained in the plant (Asarum europaeum L, which was introduced to the Republic of Uzbekistan. Water-soluble polysaccharides, pectin substances and hemicelluloses are isolated from the root part of Asarum europaeum, and their physicochemical parameters and monosaccharide composition have been determined.

KEY WORDS: Asarum europaeum L, carbohydrate complex: water-soluble polysaccharide, pectin substances, hemicelluloses, monosaccharide composition, neutral sugars, acidic sugars, IR spectroscopy.

I.INTRODUCTION

At present, numerous studies are devoted to the search for new plant sources of biologically active substances, methods for the development of phytopreparations are being improved and their areas of application are expanding. In this regard, the search and study of the raw material base of promising wild-growing medicinal plants growing in Uzbekistan, and the identification of new highly productive plant raw materials are undoubtedly relevant. Of greatest interest as a source of biologically active substances is the genus - European hoof (Asarum *europaeum L*), the Kirkazanaceae family (*Aristolochiaceae Juss*) [1].

According to the results of numerous studies, it has been established that the extract of plants of the genus *Asarum* contains a rich complex of biologically active compounds: alkaloids, flavonoids, triterpene saponins, amino acids, coumarins, higher fatty acids, polysaccharides, vitamins of group B, C, E, PP, trace elements, essential oils and others [2]. Thus, the composition of the aerial and root parts of *Asarum* contains many biologically active substances; undoubtedly, the extract of this plant can have a number of physiological effects on living systems.

European Wild Ginger (Asarum *europaeum L* .) Used in folk Medicine as an emetic, expectorant, antibacterial, anti-inflammatory and antispasmodic effect. An infusion of leaves is drunk for diseases of the stomach, liver, kidneys; decoction - for heart disease, alcoholism and poisoning with poisonous mushrooms, nervous excitement, migraine, as a diuretic and for dropsy, with jaundice, malaria, eczema, epilepsy. In addition, a decoction of roots with rhizomes of the cleft hoof is used as a diuretic for kidney diseases. Especially effective is a decoction of underground organs in milk. There is evidence that a decoction of rhizomes increases the amount of male seed. To enhance sexual desire and potency, use the infusion of rhizomes in grape syrup. Plants drink an aqueous infusion of raw materials for diseases of onion, liver, kidneys, broth - for heart disease, alcoholism and poisoning with poisonous mushrooms (as an emetic), nervous agitation, migraine, as a diuretic for dropsy, as well as for jaundice, malaria, eczema, epilepsy. Infusions and decoctions of cleft hoof rhizomes are used for fever, epilepsy, arthritis, kidney and liver diseases, in the treatment of silicosis, inflammation of the upper respiratory tract, stomatitis, gastritis, helminthic invasions, bleeding, tumors of various etiologies, asthma, hysteria, migraine, impotence, oligomenorrhea. Powder of rhizomes with milk is taken for diarrhea. [3.4]

The purpose of this work is a qualitative and quantitative study of the polysaccharide composition of *Asarum europaeum L*, adapted to the climatic conditions of the Republic of Uzbekistan.

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II. MATERIALS AND METHODS

GC analysis of the samples was carried out on a Shimadzu GC-2010 chromatograph with a flame ionization detector, a Shimadzu Rxi-624Sil MS quartz capillary column (30mx0.25mmx1.40μm), the mobile phase rate (N_2) 1.5 ml / min, injector temperature 260 ° C, detector 280 ° C and column temperature 230 ° C. The samples were taken in the form of acetates of aldononitriles [5-8].

The IR spectra of the samples were recorded on an IR Fourier spectrometer, System 2000 (Perkin-Elmer) in KBr pellets. Number of scans 100.

The viscosity of the samples was determined on an Ostwald viscometer with a capillary diameter of 0.75 mm at 22 ^{o}C.

III. EXPERIMENTAL PART

Inactivation of raw materials. 11.52 g of dried and crushed *Asarum europaeum* plant was treated twice with boiling chloroform for 1 hour at a hydromodule of 1: 4 to remove dyes and low molecular weight substances. Further alcohol-soluble sugars extracted twice with boiling 82^{0}C ethanol (1: 4, 1: 3). The alcoholic extracts were separated by filtration, combined and evaporated to a small volume, and analyzed by paper chromatography (BC) in a 6: 4: 3 butanol-n-pyridine-water system. To identify spots, acidic aniline phthalate (1) was used to identify hexose and a 5% alcohol solution of urea - hydrochloric acid (2) for ketosis.

Allocation of VSPP. The remainder of the raw material was extracted twice with cold water at room temperature for 1.5 h at a hydro module of 1: 4, respectively. The extracts were separated by filtration, evaporated to a small volume, and precipitated with a threefold volume of ethyl alcohol. The precipitate that formed was centrifuged (5000 rpm, 10 min), washed, and dehydrated with alcohol. The output of the VRP is 0.72 g.

Isolation of pectin substances (PS). After isolation VRPS amount extracted twice with an equal mixture of 0.5% solutions of oxalic acid and ammonium oxalate at 75 ^{for}C, extraction was carried out at a liquor ratio 1: 4, 1: 3. The extract was separated by filtration, dialyzed against running water, evaporated, and precipitated with a three-fold volume of alcohol. The precipitate was processed in the same way as described above. PV output 0.54 g (from air-dry raw materials).

Isolation of HMC. After isolation of PV, the remainder of the raw material was treated twice with 5% KOH solution at room temperature for 1.5-2 hours, with a hydro module of 1: 3. The extracts were separated by filtration, neutralized with CH_3COOH, dialyzed to remove salts, evaporated to a thickness, and precipitated with three times the volume of alcohol. The HMC precipitate was separated by centrifugation, washed and dried with alcohol, yield 0.65 g.

Complete acid hydrolysis of polysaccharides. Samples of WSPC were hydrolyzed with 1N H_2SO_4 at 100°C for 8 hours, PV and HMC 2n H_2SO_4, 100°C, 20 hours. The hydrolyses were neutralized with barium carbonate, deionized with KU-2 (H^+) cation exchanger , and evaporated. The high-quality monosaccharide composition of PS was studied by BH using known witnesses on Filtrak FN-12 paper in the system butanol-pyridine water 6: 4: 3, developer 1.2.

IV. THE DISCUSSION OF THE RESULTS

Table 1. The content and monosaccharide composition of the carbohydrate complex of *Asarum europaeum L.*

Type of PS	Output, %	Monosaccharide composition						UAc
		Rha	Ara	Xyl	Man	Glu	Gal	
VRPS	6.3	9.8	27.1	13.4	6.8	15.7	27.1	+
PV	4.6	0.6	1.6	2.0	-	49.0	46.8	+
HMC	5.6	25.0	5.0	49.0	3.3	17.1	0.6	+

ВРПС are a yellow-brown amorphous powder, soluble in water with the formation of a non-viscous solution. The relative viscosity of a 1% solution η_{rel} -1.46 (with 1.0%; H_2O).

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In the IR spectrum of the VRPS (Fig. 1), characteristic absorption bands were found: 3405, 2952, 1562, 1406, 1094, 1314, 782, 643, 669 cm '.
The relative viscosity of pectin is η_{rel} -5.0 (with 1.0%; H_2O). In the IR spectrum, absorption bands characteristic of PW (Fig. 2) were found in the region of 1748.1642, 1406, 1317, 1146.1096, 626 cm '. [9-11].
According to the IR spectrum, PV is an esterified polysaccharide. To determine the degree of esterification, titrimetric analysis was carried out, the results of which revealed the content of carboxyl and esterified groups: Kc (free carboxyl groups) - 3.6%, Ke (esterified carboxyl groups) - 44.4%. The data obtained correspond to the degree of esterification - 92.6%, which makes it possible to classify the studied PO as highly esterified pectins. (Table 2)

Table 2. Physicochemical parameters of pectin substances

PS type	Relative viscosity (η)	Ks	Ke	The degree of etherif.
PV	5.0	3.6	44.4	92.5

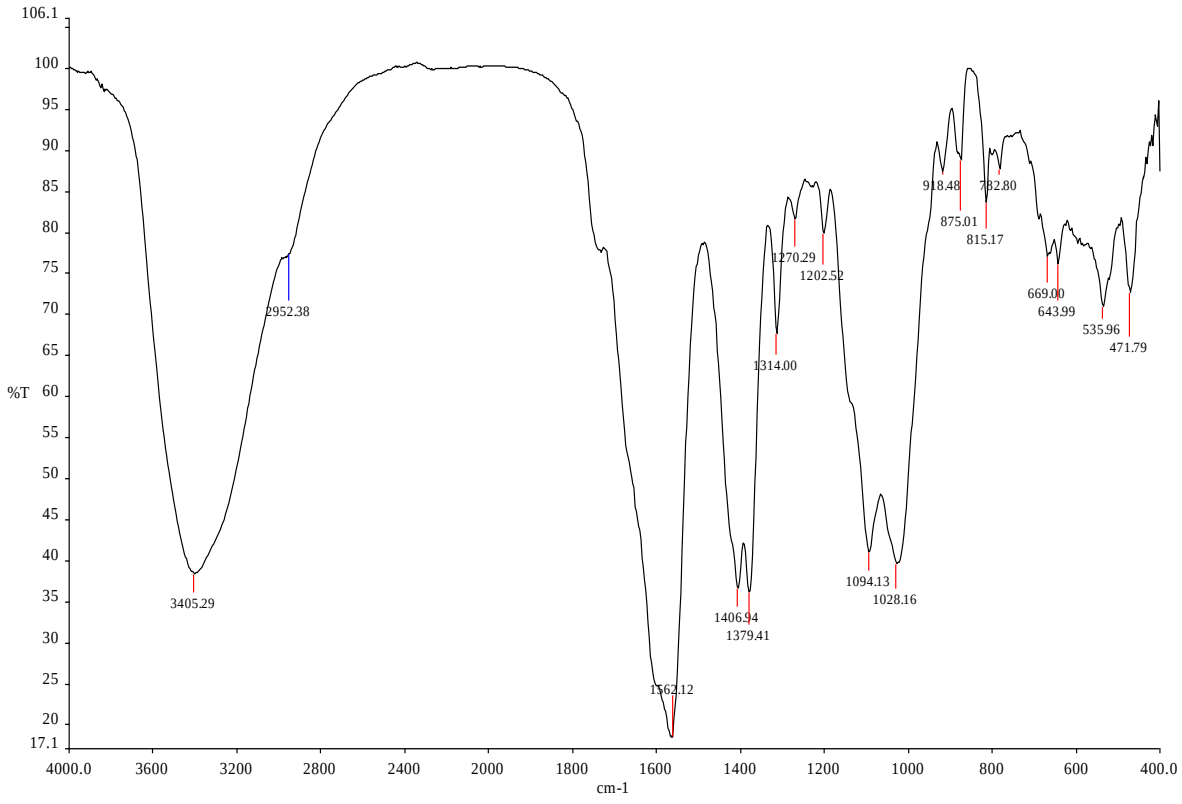

Fig. 1. IR spectrum of VRSL of *Asarum europaeum L.*

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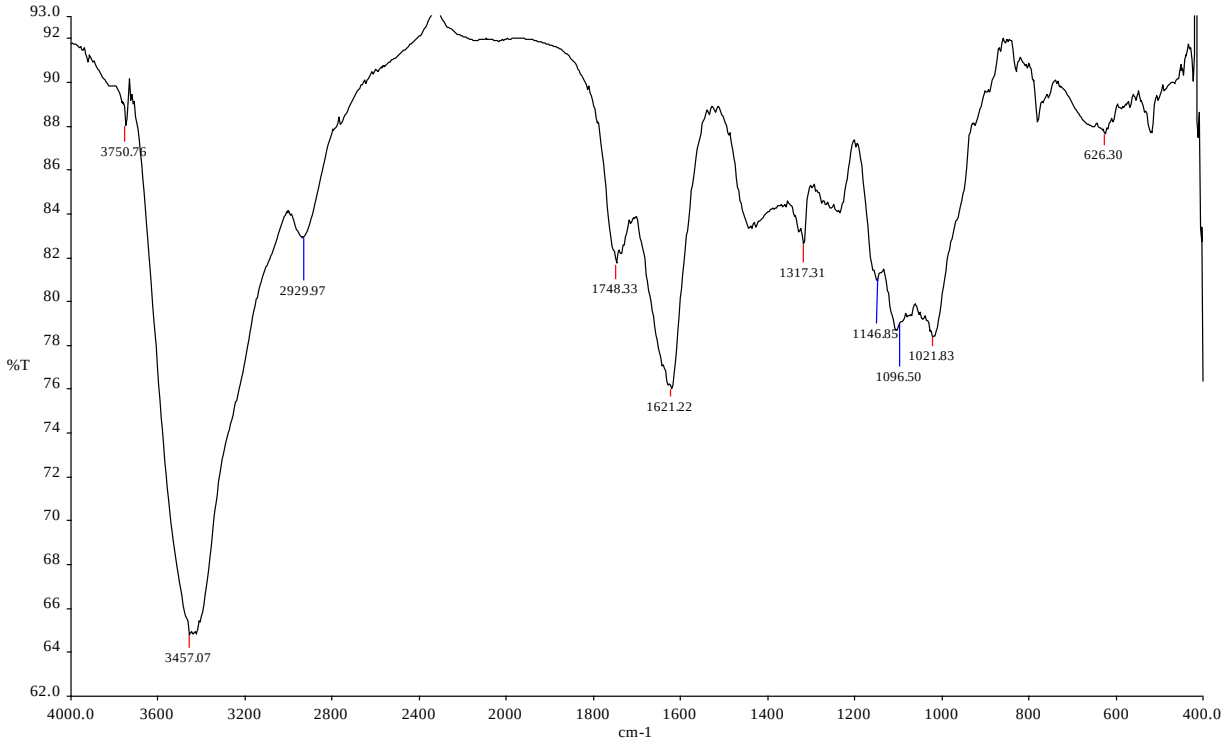

Fig. 2. IR spectrum of PV *Asarum europaeum L.*

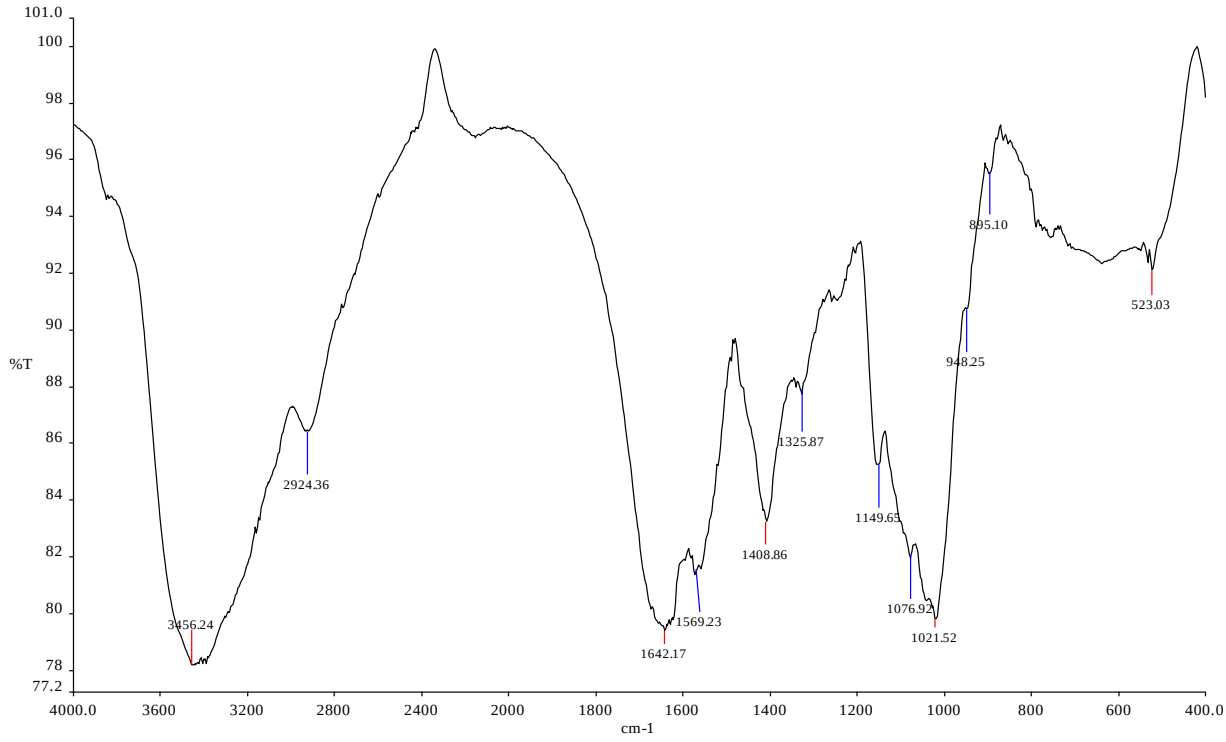

Fig. 3. IR spectrum of HMC *Asarum europaeum L.*

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V. CONCLUSION

Thus, from the root portion Asarum *europaeum L* isolated alcohol-soluble sugars, water-soluble polysaccharides, pectin substances and hemicelluloses. Their qualitative and quantitative characteristics are given. The isolated polysaccharides were analyzed by IR spectroscopy.

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