ACADEMY OF SCIENCES
OF THE REPUBLIC OF UZBEKISTAN

80
years of
AS RUz

O'SIMLIK MODDALARI KIMYOSI INSTITUTI
O'ZBEKISTON FA TOSHKENT

ACAD. S.Yu. YUNUSOV INSTITUTE OF THE CHEMISTRY
OF PLANT SUBSTANCES

INTERNATIONAL SCIENTIFIC
CONFERENCE

Actual Problems of the Chemistry of Natural Compounds

ABSTRACTS

March 15–16, 2023
Tashkent

PECTIN SUBSTANCES OF *Scutellaria adenostegia* AND *Scutellaria comosa* AND THEIR ANTIMICROBIAL ACTIVITY

A. Siddikova, R. K. Rakhmanberdyeva, M. H. Malikova

S.Yu. Yunusov Institute of the Chemistry of Plant Substances Academy of sciences of the Republic of Uzbekistan st. Mirzo-Ulugbek, 77, 100170 Tashkent
e-mail: Siddiqova1987@mail.ru, *(90)318 65 68*

From aerial parts of *Scutellaria adenostegia* and *Scutellaria comosa* by extraction with 0.5% solutions of ammonium oxalate and oxalic acid the pectin substances with yield PS-Sa- 4.3% and PS-Sc-3.5% respectively were isolated.

PS are amorphous powders of light yellow colour, completely soluble in water, forming a viscous solution with η_{rel} - 3.18 and 5.25 (p1%;0.1% H_2O). The molecular weight of the pectins is 310 and 288 kDa, respectively.

Table 1. Pectin substances of *S. adenostegia* and *S. comosa*

PS	Monosaccharide composition, %					UAc (%)	Kc,%	Ke,%	DE %
	Gal	*Glc*	*Ara*	*Xyl*	*Rha*				
PS-Sa	13.4	4.6	67.4	-	19.2	90	9.0	10.6	54.0
PS-Sc	5.6	1.0	11.7	-	5.5	85	2.7	2.16	44.4

To determine the monosaccharide composition of PS hydrolysed with 2 n H_2SO_4, 100℃, 24 h and identified mainly galacturonic acid, rhamnose, arabinose, glucose and galactose. Table 1 shows that the pectin substances differ in the quantitative content of monosaccharides. In PS-Sa the main monosaccharide is arabinose (67.4%).

By titrometric analysis the content of free (Kc) and - esterified carboxyl (Ke) groups was established (Table 1). The degree of esterification (DE) of PV-Sa was 54% and PS-Sc - 44.4%. Consequently, PV-Sa belongs to highly esterified and PS- Sc to low esterified pectins. The study of PS by IR- spectroscopy identified a number of the following characteristic absorption bands: 832 cm^{-1} characteristics of pectins having α-configuration of glycosidic bonds between D- GalA residues and 889 cm^{-1} characteristics of 1,4 type of this bond. An absorption band in the region of 1749 cm^{-1} shows the oscillation of the carboxylic group and 1370 cm^{-1} shows the presence of methoxy groups. Ionized carboxyl bound to metals is reflected by absorption bands of 1420 and 1601 cm^{-1}.

The antimicrobial activity of pectin substances against opportunistic pathogens was studied. The results showed that PV-Sa and PS-Sc effectively inhibited the growth of Pseudomonas aeruginosa 003841/114 (17 and 15 mm), Proteus mirabilis 9 (16 mm), and Bacillus subtilis VCM (13 and 14 mm), but both pectins had no inhibiting effect on the growth of *Escherichia coli* 002673/477 and *Candida albicans*. It should be noted that PS-Sa showed sensitivity to *Staphylococcus aureus* and the diameter of the growth inhibition zone was 17 mm.

Thus methoxylated pectins with antimicrobial activity were isolated from the aerial parts of *S. adenostegia* and *S. comosa*.