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BRIEF COMMUNICATIONS

POLYSACCHARIDES OF PLANT TISSUE CULTURES. I. POLYSACCHARIDES OF A CALLUS CULTURE OF *Ajuga turkestanica*

D. A. Rakhimov and N. A. Shadmanova

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The production of biologically active substances by the tissue and cell culture method is finding ever greater practical use.

Viable callus tissue containing ecdysteroids has previously been obtained from the ovary of an intact *Ajuga turkestanica* (Rgl)Brig plant. Ecdysterone forms the basis of an "Ékdisten," a preparation with a tonic and anabolic action that has been introduced into medical practice by the Institute of the Chemistry of Plant Substances, Academy of Sciences of the Republic of Uzbekistan.

In addition to the desired product, the biomass of the culture contains carbohydrates. In the present communication we give the results of a study of the carbohydrate fragments of callus tissue (CT) and native plants of *Ajuga turkestanica*. Chemical analysis permitted a comparison of the cell mass grown in culture and that obtained by the natural method.

Ajuga turkestanica (epigeal part) and the tissue culture were treated with alcohol at 82°C to eliminate alcohol-soluble substances, pigments, and compounds of low molecular mass. Then, to extract the polysaccharides, the residues of the plant and of the CT biomass were treated successively with water, oxalate buffer, and alkali. The polysaccharides were precipitated from the extracts with alcohol. As a result, the aqueous extract yielded water-soluble polysacharides (WSPS), the buffer solution pectin substances (PcSs), and the alkaline solution hemicelluloses (HMC A and B). After acid hydrolysis, the monosaccharide compositions of all the polysaccharide preparations obtained were determined by PC and GLC [4]. The yields of the polysaccharides and the results of the quantitative analysis of the monosccharide composition are given in Table 1.

In the quantitative respect, there was a larger amount of WSPS in the CT biomass than in the plant. The WPSP for the plant and the CT had the same monosaccharide composition but differed by the ratios of the sugars. Conversely, the amount of PcS was slightly higher in the plant. The PcS consisted of a white water-soluble powder soluble in water with the

TABLE 1

Index	Callus tisue biomass				Epigeal part of the plant			
	WSPS	PcS	HMC		WSPS	PcS	HMC	
			A	B			A	B
Yield of PS, % on the air-dry raw material	7.2	7.0	7.2	5.9	3.9	8.0	1.3	4.0
	Ratio of the monosaccharides							
Rhamnose	6.3	3.0	2.0	2.2	10.0	6.0	-	1
Arabinose	17.3	9.0	2.1	13.0	26.7	11.3	-	2.5
Xylose	1.0	Tr.	1.0	1.0	2.0	2.0	33.0	9.5
Mannose	3.3	-	-	Tr.	1.0	-	-	4.6
Glucose	10.6	1.0	2.0	3.6	4.8	1.0	1	8.9
Galactose	71.6	18.3	4.6	2.7	48.0	4.0	-	5.0

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formation of a viscous colloidal solution. Their quantitative characteristics, obtained by the methods of [5], are given below (%):

Pectin	Kf	Ke	λ	OCH3	N	[α]D	Ash
Biomass (CT)	10.8	2.7	20.0	2.8	2.9	+66.0	4.85
Plant	4.5	6.3	58.0	5.6	1.8	+74.0	2.6

Galacturonic acid and neutral sugars were found as components of the PcS. In the CT, galactose and arabinose predominated, and, in the plant, arabinose and rhamnose.

In the CT, the alkali-soluble polysaccharides of the HMC were present in considerably larger amounts than the other polysaccharides.

On the basis of the results obained it can be stated that the polysaccharide fractions of callus tissue of *Ajuga turkestanica* and the native plant differ with respect to their chemical compositions.

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