On the basis of the integral intensities of the signals with chemical shifts of 82.2 and 81.4 ppm, the glucofructans had 2 → 1-β- and 2 → 6-β-bound fructofuranose residues in a ratio of 1.2:1. A chemical shift of 93.3 ppm is characteristic for the signal of the anomeric carbon atom of a terminal glucopyranose residue attached to C-2 of a fructofuranose residue in the inulin part of a glucofructan.

The onions contained 3.4% of total polysaccharides (isolated by ammonium oxalate and oxalic acid) consisting of residues of galacturonic acid and of neutral sugars: rhamnose and xylose in a ratio of 2:1 with traces of arabinose and galactose.

The alkali-soluble polysaccharides consisted of hemicelluloses A and B, with yields of 1.7 and 2%, respectively. They were found to contain rhamnose, xylose, and glucose residues.

The results obtained show that a predominant amount of oligo- and polyglucofructans is characteristic for the onions *A. karataviense*. It has been shown that the glucofructan contains inulin and levan types of bond.

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DEGRADATION OF A GLUCOMANNAN AND A MANNAN UNDER THE ACTION OF γ-RADIATION

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UDC 547.917

The extensive development of atomic energy and the continuous expansion of fields of use of ionizing radiation (IRs) in the national economy is attracting particular attention to the investigation of the processes of the radiation degradation of high-molecular-mass compounds.

The actions of IRs on cellulose, starch, carboxymethylstarch, dextran, and pectin has been considered in [1-3]. The degradation of linear polysaccharides under the action of γ-radiation has been studied to the smallest degree up to the present time.

The aim of our work was to investigate the radiation degradation of natural linear polysaccharides and to study radioisotopes from the point of view of their use in hematology. Linear polysaccharides natively acetylated in plants were investigated: a mannan from *Ungernia ferganica* Vved. [4] and a glucomannan from *Eremurus regelii* [5], which have β-1—4 glucosidic bonds. The mannan and the glucomannan were dissolved in water and the solutions were subjected to γ-irradiation in glass bottles with doses of from 0 to 4.0 Mrad in a RKh-γ-30 apparatus at a dose rate of 40.3 r/sec (NIIKhTTs of Minmedbioprom). The relative viscosities were measured in an Ostwald viscometer at 20°C. The results of analysis are given in Table 1.

It can be seen from Table 1 that the radiolysis of aqueous solutions of the mannan and the glucomannan was accompanied by a fall in the viscosities of the solutions and in the yields of polysaccharides, i.e., the process of degradation was predominant.

When the mannan and the glucomannan were irradiated in the solid state (in the form of powders in glass bottles) with a dose of 4 Mrad for 24 h, a degradation process was again observed. The relative viscosities of 1% solutions before radiolysis

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Institute of Chemistry of Plant Substances, Academy of Sciences of the Uzbek SSR, Tashkent. Translated from Khimiya Prirodnykh Soedinenii, No. 1, pp. 111-113, January-February, 1990. Original article submitted March 21, 1989.

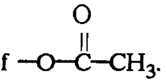
0009-3130/90/2601-0090$12.50

TABLE 1. Change in the Relative Viscosity of a 2% Solution of the Glucomannan during Radiolysis, and Their Yields

Irradiation dose, Mrad	Time of irradiation, h	Mannan		Glucomannan	
		τ_{rel}	yield, % of the initial	τ_{rel}	yield, % of the initial
0,5	3	3,5	87,5	27,6	--
1,0	6	2,26	57,5	12,6	75,6
1,5	9	1,94	51,2	8,2	65,6
2,0	12	1,7	46,2	5 65	61,2
2,5	15	1,47	32,5	4.8	60.6
3,0	18	1,41	30,0	3,75	58,6
3.5	21	1.35	27,5	3,65	55.6
4,0	24	1,32	25,0	3,0	50,1

were 125.0 and 7.7, and after radiolysis 4.3 and 4.2, respectively. Consequently, on radiolysis the relative viscosities for the mannan and the glucomannan fell by factors of approximately 40 and 2, respectively.

The IR spectra of the initial polysaccharides and of the mannan and glucomannan that had been γ-irradiated with doses of from 0.5 to 4.0 Mrad were obtained. The spectra were recorded on a UR-20 double-beam spectrophotometer. Tablets with KBr were prepared from 4.5-5 mg of a polysaccharide and 200 mg of KBr. The rate of scanning the spectrum was 64 cm^{-1}/min and the chart speed 10 mm/100 cm^{-1}. Slit program 4. The most probable interpretation of the IR spectra of mannans and glucomannans according to the literature [6, 7] appears as follows:

Stretching vibrations:
3400 cm^{-1} — associated OH groups, high-intensity absorption band;
2800, 2940 cm^{-1} — CH_2 and CH_3 groups, medium-intensitv absorption band;
1740 cm^{-1} — C=O groups, weak absorption band of  $-O-\overset{O}{\overset{\|}{C}}-CH_3$.
Deformation vibrations:
1600 cm^{-1} — OH groups, medium-intensity maximum;
1480 cm^{-1} — methylene groups, medium-intensity absorption band;
1380 cm^{-1} — methyl groups, medium-intensity absorption band;
1000-1100 cm^{-1} — C—O and C—C bonds, high-intensity absorption band.

All the other absorption bands had very low intensities and were not characteristic.

A comparison showed that there were no appreciable changes in the IR spectra of the γ-irradiated monomannan glucomannan in comparison with the unirradiated polysaccharides. The number of absorption bands remained the same, no new bands appeared and none disappeared, and there were no shifts in the absorption maxima. However, it must be mentioned that in the IR spectra of the mannan after 6-h γ-irradiation with 1 Mrad the peak intensities of all the absorption bands and, especially, that of the bands at about 1600 and 1080 cm^{-1} had risen appreciably. The contours of the absorption bands had become narrower and more symmetrical. The changes in the spectral parameters that have been mentioned were probably due to the depolymerization of the polysaccharides without an appreciable change in the individual groupings forming them. In contrast to the mannan, an increase in the peak intensity of the absorption bands of the functional groups in the spectra of the glucomannan was observed after γ-irradiation for 15 h with a dose of 2.5 Mrad. Consequently, glucomannans are more resistant to γ-radiation than mannans.

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LIPIDS OF MACROPHYTE MARINE ALGAE.
I. FATTY-ACID AND PHOSPHOLIPID COMPOSITION
OF *Rhodophyceae*

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UDC 577.115:528.26:547.953

In recent years ever greater attention has been devoted to the lipids and fatty acids of macrophytic marine algae. This is due to the fact that red algae contain high concentrations of polyunsaturated fatty acids, particularly eicosatetraenoic and eicosapentaenoic acids, the proportion of which may reach 73%. The phospholipid content of red algae has been studied inadequately [4].

We have now investigated the fatty acid compositions (Table 1) and phospholipid compositions (Table 2) of eight species of red algae of the Black Sea belonging to the class *Rhodophyceae*.

As GLC analysis of the fatty acids isolated from total lipid extracts of the red algae showed, the main acids characteristic for these algae are eicosatetraenoic and eicosapentaenoic. The sum of these fatty acids ranged in the various species from 27.2 to 61.2%. High concentrations were also found for the 16:0 acid (18.4 to 52.1%). In the analysis of the phospholipids of the red algae it was shown, with the aid of two-dimensional micro-TLC, that the main phospholipid was phosphatidylcholine, its amount in the various species ranging from 61.6 to 77.8% (Table 2).

An unidentified lipid was identified for all the species of red algae investigated, its amount ranging from 2.7 to 10.3% of the sum of the phospholipids.

The freshly gathered algae were comminuted, and the lipids were extracted as in [5]. The total lipids and phospholipids were determined by published methods [6, 7]. The chromatographic systems given in [8] were used for separating the phospholipids.

TABLE 1. Fatty Acid Compositions of Red Algae (weight, %, GLC)

Fatty acid	Chondoria dasyphylla	Corallina granifera	Gelidium latifolium	Laurencia coronopus	Polysiphonia elongata	Callithamnion corymbosum	Ceramium strictum	Phyllophora nervosa
14:0	9.7	0,5	2,1	4,2	3,3	0,7	5,6	3,9
15:0	—	0,6	—	0,9	—	—	—	1,1
16:0	27,4	18,4	24,3	31,0	29.4	25,9	52.1	41,2
16:1	14,3	2,3	4,4	5 1	10.9	3,4	5.6	7,1
16:2	0,9	0,5	—	0.5	0.7	—	0,9	—
16:4	0,6	—	—	0.7	0,5	—	—	1,0
18:0	1.4	0,9	3,2	2,2	1,6	2,2	1,6	3,2
18:1	11,8	6,6	10,1	9,3	11,3	6,0	0,8	2,1
18:2	3,2	3,4	2.3	1,7	3,0	2,6	—	1,2
18:3	2.7	3,7	2,0	0,9	1,4	3,5	1,4	0,9
18:4	0,8	1,9	0,6	0,7	—	—	—	0,7
20:4	5,8	5,1	21,5	11,6	3.4	12,3	5.9	32,5
20:5	21,4	56,1	29.5	31,2	34,5	43,4	26,1	5,1

Institute of the Ecology of the Volga Basin, Academy of Sciences of the USSR, Tol'yatti. Translated from Khimiya Prirodnykh Soedinenii, No. 1, pp. 113-115, January-February, 1990. Original article submitted March 30, 1989.

0009-3130/90/2601-0092$12.50