atom of the genin underwent the effect of glycosylation and resonated at 78.66 ppm. The other carbon atoms of the D-glucose residue under consideration resonated at (ppm): 74.92 (C-2), 78.28 (C-3), 71.26 (C-4), 77.68 (C-5), and 62.97 (C-6).

The facts presented determined substance (4) as 20R,24S-epoxycycloartane-3β,6α,25-tetraol 6,25-di-O-β-D-glucopyranoside 3-O-β-D-xylopyranoside. Astragalaoside VII isolated from Astragalus membranaceus Bunge has an identical structure [8].

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LINK BETWEEN CHEMICAL STRUCTURE AND MEMBRANOTROPIC ACTIVITY OF GLYCOSIDES OF BETULAFOLIENETRIOL AND ITS 3-EPIMER

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Triterpene glycosides of ginseng are attracting the attention of research workers by the unique nature of their medicobiological action [1]. Analogs of ginseng glycosides have been synthesized from betulafolienetriol, isolated from the leaves of Far Eastern birches, and its 3-epimer – 20(S)-protopanaxadiol [2]. We have studied the membranotropic activity of ginsenoside Rb_1, isolated from ginseng roots, and its synthetic analogs.

Experiments on bilayer lipid membranes were performed by a method described previously [3], except that in place of α-monoolein we used Span-80 (Loba-Chemie). The results (Fig. 1) showed that ginsenoside Rb_1 (I), the molecule of which contains two glycosidic residues, at C-3 and C-20, exerts a destabilizing action on a lipid bilayer. The presence of cholesterol in the membrane decreases the efficacy of the action of the glycoside. With a decrease in the number of glycoside residues in the glycoside molecules, their activity rises. The most active glycoside was (VIII), in which a glucose residue is attached to the aglycon at C-3. It was approximately 20 times more active than glucoside (I). The configuration (α or β) of the 3-OH group had no appreciable influence on the membranotropic activity of the glycosides in relation to a lipid bilayer. The introduction of cholesterol into the membrane substantially decreased the efficacy of the action of the ginsenoside Rb_1 (I) and its synthetic analogs – glycosides of 3-epibetulafolienediol (II, IV, VI, and VIII), while the efficacy of the glycosides on betulafolienetriol (III, V, VII, and IX) rose substantially. The results obtained on model lipid membranes correlate with those for biological activity.

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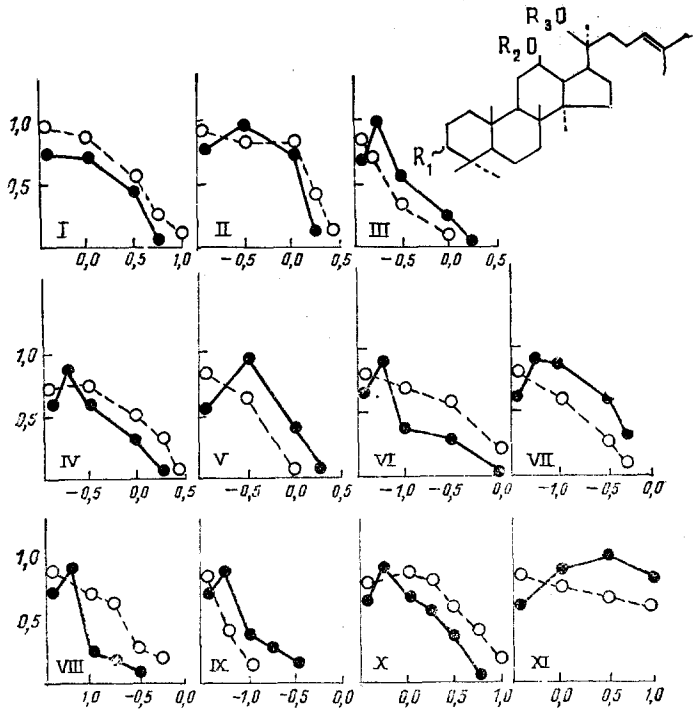

Fig. 1. Influence of triterpenoids of the dammarane series on the probability of formation of black spots (P) in colored lipid (●) and lipid-cholesterol (○) films. Along the axis of coordinates – P; along the axis of abscissas – log C, μg/ml.

Substance	R_1	R_2	R_3
I	β-OGlc(1—2)Glc	H	Glc(1—6)Glc
II	β-O-Glc	H	Glc
III	α-O-Glc	H	"
IV	β-O-Glc	Glc	H
V	α-O-Glc	Glc	H
VI	β-OH	Glc	H
VII	α-OH	Glc	H
VIII	β-O-Glc	H	H
IX	α-O-Gl	H	H
X	β-OH	H	H
XI	α-OH	H	H

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