As we see, 47% of the mass of all the carotenoids consisted of provitamin-A-active substances: β-carotene, β-zeaxanthene, α- and β-cryptoxanthins, and an α-carotene isomer. Six out of the 13 carotenoids detected were present in an isomerized state, but they amounted to only 15.6% on the mass of the carotenoidc.

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AUSTRICIN FROM Artemisia juncea

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Artemisia juncea Kar. et Kir. — a plant widely distributed on the territory of Kazakhstan — grows in the steppe and desert zones on detrital, clayey, and rocky slopes of hills and mountains [1]. There are contradictory statements in the literature concerning the presence of sesquiterpene lactones in A. juncea. According to M. I. Goryaev [2], the epigeal part of this wormwood gathered in Alma-Ata province contained α-santonin. According to K. S. Rybalko [3, tauremisin has been detected in A. juncea.

With the aim of determining the composition of the sesquiterpene lactones in this species of wormwood more precisely, we have made a chemical study of samples of A. juncea gathered in the environs of the village of Dzhezdy, Dzhezkagan province, and in the environs of the village of Aksuek, Dzhambul province, Kazakhstan.

The epigeal part of A. juncea (2.0 kg) was extracted with chloroform five times. The extract was evaporated under vacuum. The total extractive substances so obtained (137.7 g) were treated three times with a mixture of ethanol and water (2:1). The aqueous alcoholic phase was extracted with chloroform. After evaporation of the solvent under vacuum a cream-colored residue was obtained (59.6 g), which was chromatographed on a column of type KSMG silica gel at a ratio of material to support of 1:24.

The fractions (250 ml) from the chromatographic separation were distributed in the following sequence; 1-12 (benzene); 13-74 (benzene—ether (4:1)); 75-156 (benzene—ether (1:1)); 157-209 (ether); 210-230 (ether—acetone (9:1)); 231-241 (ether—acetone (1:1)); 242-254 (acetone).

Fractions 75-156 deposited a colorless crystalline substance with the composition $C_{15}H_{18}O_4 \cdot H_2O$ mp 152-154°C (alcohol), R_f 0.81 (ethyl acetate).

The interaction of the substance with acetic anhydride in pyridine gave an acetate derivative with the composition $C_{17}H_{20}O_5$, mp 190-192°C (alcohol); R 0.9 (ethyl acetate).

On the basis of its known physicochemical constants, the results of chemial transformations, and IR and PMR spectra, the substance isolated from A. juncea was identified as the known guaianolide austricin [4].

Thus, from the epigeal part of Artemisia juncea collected in Central and Southern Kazakhstan we have isolated a sesquiterpene lactone of the guaianolide type, austricin, but have been unable to establish the presence of eudesmanolides. The results obtained confirm the hypothesis that species of the Junceum Poljak section are more closely connected with the Artemisia section of the subgenus Artemisia L. than with the subgenus Seriphidium (Bess.) Rouy., since guaianolides are more characteristic for this section [5, 6].

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SYNTHESIS OF 5α-CHOLEST-7-ENE-3β,5,6β-TRIOL AND ITS 6α-ISOMER

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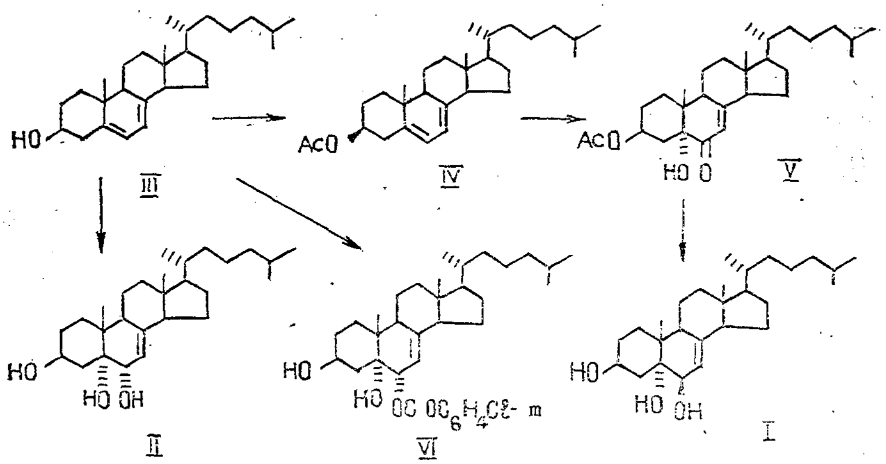
One of the hydroxysteroids of the bryozoan *Myriapora truncata* [1] and of a number of marine sponges [2, 3] is 5α-cholest-7-ene-3β,5,6β-triol (I). In natural materials one must also expect the presence of the compound isomeric with it at C_6 — 5α-cholest-7-ene-3β,5,6α-triol (II), which has recently been synthesized [4]. In continuation of an investigation on the synthesis of trihydroxysteroids of marine invertebrates [5, 6], we have developed convenient methods for obtaining compounds (I) and (II) from 7-dehydrocholesterol (III).



The Jones oxidation ($H_2Cr_2O_7$, acetone, 0°C, 0.5 h) of the acetate (IV) obtained in the usual way from 7-dehydrocholesterol led to 3β-acetoxy-5-hydroxy-5α-cholest-7-en-6-one (V). Yield 48%, mp 232-237°C (hexane—ether). Reduction of the 3β-acetoxy-6-ketone (V) with lithium tetrahydroaluminate (ether, 20°C, 40 min) gave the required triol (I). Yield 89%, mp 207-210°C (hexane), lit. [2]: mp 227-229°C. In an attempt to synthesize the 3β,5,6α-triol by the method of Miglinolo et al. [4], using the m-chloroperbenzoic acid oxidation of 7-dehydrocholesterol (III), we obtained the 6-m-chlorobenzoate (VI). Yield 9%, mp 88-93°C. The extremely low yield of compound (VI) forced us to develop an alternative method of obtaining the triol (II). The Criegee cis-hydroxylation of 7-dehydrocholesterol (OsO_4, pyridine, 20°C, 19.5 h) led to the desired compound (II) in a single stage. Yield 34%, mp 238-242°C (hexane—chloroform), lit. [4]: mp 231-232°C.

The structures of all the compounds synthesized were shown unambiguously with the aid of IR, PMR, and mass spectra. The spectroscopic characteristics for the steroids (I) and (II) that we had obtained agreed well with those known from the literature [2, 4].

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