The quantitative determination of the β -carotene and tocopherols was carried out on a single sample [1]. After saponification of the weighed sample, the vitamins were extracted with ether. The ethereal solution was washed with water to neutrality and was dried over Na₂SO₄, and the solvent was distilled off in a current of nitrogen. The residue was dissolved in petroleum ether and passed through a column of Al₂O₃. β -Carotene was eluted from the column with petroleum ether, and tocopherol with a mixture of petroleum ether and diethyl ether in a ratio of 88:12. The amount of β -carotene was determined by measuring the optical density of the solution at a wavelength of 440 nm. To determine the tocopherols we used the color reaction with FeCl₃ in the presence of α, α -dipyridyl, measuring the intensity of the coloration that developed on a FÉK-56 photocolorimeter (with No. 6 filter). The chlorophyll and the combined carotenoids were extracted with 90% acetone, after which the volume of the extracts was measured and their optical density was determined on a Spectromon-204 spectrophotometer at wavelengths of 662, 644, and 440 nm [2].

Of all the plants that we studied, we found the largest amount of pigments and vitamins in the leaves of <u>Sophora alopecuroides</u> L. and <u>Glycyrrhiza glabra</u> L. These plants may form an additional source of obtaining vitamins. <u>Glycyrrhiza glabra</u> is grown on the large scale, but in the pharmaceutical industry only the roots are taken and the epigeal part is not utilized.

An all-sided study of the chemical compositions of the plants will permit the complex and rational use of raw material resources.

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α -pinene derivative possessing retardant properties

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A considerable retardant activity of quaternary ammonium salts derived from α - and β ionones - N,N,N-trimethyl-N-[3-(2,6,6-trimethylcyclohex-2-en-1-yl)-1-methylallyl]ammonium iodide (I) and N,N,N-trimethyl-N-[3-(2,6,6-trimethylcyclohex-1-en-1-yl)-1-methylallyl]ammonium iodide (II) - has been discovered previously [1]. From α -pinene derivatives we have obtained N,N,N-trimethyl-N-[3-(6,6-dimethylbicyclo[3.1.1]hept-2-en-2-yl)-1-methylallyl]ammonium iodide (III), which is of interest in the study of the structure-effect relationships in this series of substances, since it differs from the salts (I) and (II) only by the terpene radical.

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The starting material for the synthesis of this compound was myrtenal [2], which, by the aldol condensation with acetone in 10% aqueous ethanolic KOH (0°C, 16 h), was converted into methyl 3-(6,6-dimethylbicyclo[3.1.1]hept-2-2yl)allyl ketone (IV). The latter, after reduction with lithium tetrahydroaluminate to the alcohol (V), bromination (PBr₃ in pyridine) to (VI), and the treatment of the latter without purification with dimethylamine in ethanol gave the tertiary amine (VII), which, on interaction with methyl iodide, was readily converted into the ammonium salt (III).

The ketone (IV) (yield 62%), $C_{13}H_{18}O$, bp 138-142°C at 14 mm Hg. PMR spectrum (δ , ppm): 0.75, 1.32, 2.15 (s, 3CH₃); 5.90, 7.00 (2 d, J = 15.0 Hz, CH=CH); 5.95 (m, C=CH). The alcohol (V) (89%), $C_{13}H_{20}O$, viscous oil, PMR spectrum (δ , ppm): 0.78; 1.28 (s, 2CH₃); 1.13 (d, J = 6.5 Hz, CH₃); 4.14 (t, CH=O); 5.44 (m, 2C=CH); 6.00 (d, J = 15.0 Hz, CH=CH). The

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Com-	Length of seedlings (% of control, $\overline{X} \pm t_{0,0} \cdot S_m$) in concentration, mg/1				
pound	50	100	200	400	
Wheat					
H H H CCC	$\begin{array}{c} 69.3 \pm 0.8 \\ 85.3 \pm 3.7 \\ 8.9,1 \pm 0.9 \\ 89.0 \pm 1.1 \end{array}$	$\begin{array}{c} 60,1\pm0,6\\ 76,7\pm0,6\\ 67,1\pm0,7\\ 84,2\pm0,8 \end{array}$	$50,1\pm0,559,3\pm0,757,4\pm0,678,7\pm0,5$	$\begin{vmatrix} 36,1\pm0,6\\ 41,8\pm0,4\\ 41,7\pm0,4\\ 74,7\pm0,7 \end{vmatrix}$	
Barley					
I II III CCC	$\begin{array}{c} 62,3\pm 2.4\\ 82,5\pm 1.4\\ 98,3\pm 1.4\\ 90,9\pm 1.2\end{array}$	49,4±1,5 74,7±1,7 97,9±1,9 73,2±1,8	38,5±2,2 54,0±1,9 76,9±1,6 59,3±2,4	25,5±1,2 41,0±1,2 51,9±2,0 48,9±2,2	
	$ \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \end{array}\\ \end{array}\\ \end{array}\\ \end{array}\\ \end{array} \\ \begin{array}{c} \begin{array}{c} \end{array}\\ \end{array} \\ \begin{array}{c} \end{array}\\ \end{array} \\ \begin{array}{c} \end{array}\\ \end{array} \\ \begin{array}{c} \begin{array}{c} \end{array}\\ \end{array} \\ \begin{array}{c} \end{array}\\ \end{array} \\ \begin{array}{c} \end{array}\\ \end{array} \\ \begin{array}{c} \end{array}\\ \end{array} \\ \begin{array}{c} \begin{array}{c} \end{array}\\ \end{array} \\ \begin{array}{c} \end{array}\\ \end{array} \\ \begin{array}{c} \end{array}\\ \end{array} \\ \begin{array}{c} \end{array}\\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} $ } \\ \end{array} \\ \end{array} \\ \end{array} } \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} } \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} } \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} } \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} } \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} } \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} } \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} } \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} } \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} } \\ } } \\ } \\ } } \\ } \\ } } \\ } } } } } } } } } }		$ \begin{array}{cccc} & & + \\ & & & \\ & &$	$\mathbf{n} \cdot \mathbf{R} = \mathbf{N} (CH_3)_3 \cdot \mathbf{I}$ $\mathbf{v} \cdot \mathbf{R} = \mathbf{U}$ $\mathbf{v} \cdot \mathbf{R} = \mathbf{U}H$ $\mathbf{v} \cdot \mathbf{R} = \mathbf{B}\mathbf{r}$ $\mathbf{v} \cdot \mathbf{R} = \mathbf{N} (CH_3)_a$	

TABLE 1. Action of Substances (I-III) on Wheat and Barley Shoots

amine (VII) (32%), $C_{15}H_{25}N$, oil. IR spectrum (v_{max}^{film} , cm⁻¹): 805, 1370, 1450, 1640, 2774. The salt (III) (72%), $C_{16}H_{28}IN$, amorphous, hygroscopic substance. IR spectrum ($v_{max}^{paraffin oil}$, cm⁻¹): 790, 1080, 1150, 1620.

The retardant properties of compound (III) were studied in comparison with the standards (I) and (II) and chlorochloride (CCC) in tests for the inhibition of the growth of wheat and barley shoots. The experiments were performed in triplicate. As can be seen from Table 1, compound (III) was less active in the test on barley than the salts with which it was compared, but it inhibited the growth of wheat more strongly than CCC and at the level of the standards (I) and (II).

IR spectra were taken on a Specord-75 instrument and PMR spectra on a Tesla-467 (60 MHz, TMS, in CCl₄). The analyses of all the compounds corresponded to the calculated figures.

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