QUANTITATIVE DETERMINATION OF ASCORBIC ACID IN Rosa FRUITS

I. A. Biryuk and V. V. Petrenko

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The officinal method for the quantitative determination of ascorbic acid in Rosa fruits [1] is characterized by difficulties in fixing the end-point of the titration, which affects the accuracy of the results obtained. We have developed a method for determining the vitamin with the use of ninhydrin and spectrophotometry in the visible region.

It has been established experimentally that the optimum conditions for the formation of the colored product are: 80% aqueous solution of dimethylformamide (DMFA) as solvent, 0.01 N solution of ammonia as catalyst, and the temperature of the boiling water bath.

Rose fruits were collected on the territory of Zaporozhe province with a moisture content of 5.06%. The preparation of the fruits, the taking of a weighed sample, and the making from it of an aqueous extract with a volume of 300 ml were carried out in accordance with GF XI [State Pharmacopeia of the USSR, XIth edition] ([1], vol. 2, p. 38). From this extract, 10 ml was transferred to a 25 ml measuring flask and was made up to the mark with water. (2 ml) Of this dilution was placed in a test-tube, and was treated with 2 ml of a 6% solution of ninhydrin in 80% DMFA and with 0.25 ml of a 0.01N solution of ammonia, and the tube was heated in the boiling water bath for 5 min. After cooling, the solution was transferred to a 25 ml measuring flask and was made up to the mark with 80% DMFA solution and carefully mixed.

An experiment with a standard 0.03% solution of ascorbic acid (C_0 = 0.0024 g/100 ml) and a control not containing this acid was carried out simultaneously. The optical densities of the solutions undergoing analysis were measured against a background of the control with the aid of SF-26 instrument at 415 nm in cells with a layer thickness of 1 cm.

The concentration was calculated from the formula

$$C\% = \frac{A \cdot 225}{A_0 \cdot (100 - a)},$$

where A and A_0 are the optical densities of the solution under investigation and the standard solution respectively;

a – is the loss in weight in the drying of the raw material, %; and

225 – is a calculating factor taking into account the dilutions and concentrations of the solution subjected to spectrophotometry.

In parallel we made a determination of ascorbic acid by the method adopted in GF XI [1] and that given in [2], according to which a 0.05 N solution of KIO_3 is used as the standard solution, 1 ml of it corresponding to 0.0044 g of ascorbic acid.

The comparative metrological characteristics of the results are given in Table 1. An analysis of the figures shows that the results obtained by the officinal method were some-

TABLE 1

Metrological characteristics	Method		
	officinal [1]	iodoatometric [2]	proposed
f	5	5	5
$\overline{X}$	$8{,}530 \cdot 10^{-1}$	$9{,}880 \cdot 10^{-1}$	1,088
S^2	$6{,}270 \cdot 10^{-4}$	$1{,}417 \cdot 10^{-3}$	$4{,}610 \cdot 10^{-4}$
S	$2{,}502 \cdot 10^{-2}$	$3{,}764 \cdot 10^{-2}$	$2{,}148 \cdot 10^{-2}$
P	95%	95%	95%
$t(p, f)$	2,57	2,57	2,57
$\pm\Delta X$	$6{,}43 \cdot 10^{-}$	$3{,}949 \cdot 10^{-2}$	$5.52 \cdot 10^{-2}$
$\pm E$, %	7,54	9,787	5,07

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what lower than those obtained by the method that we have developed and by the iodatometric method. The latter can apparently be explained by the use of a highly dilute solution of the titrant – a 0.001 M solution of sodium 2,6-dichlorophenolindophenolate – and the poor contrast of the color change at the end-point.

LITERATURE CITED

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2. B. A. Davrov and A. M. Shtenberg, Methodological Handbook on the Determination of Vitamins C, B, D, and A, and Carotene in Food Products and Vitamin Preparations [in Russian], Moscow (1950).

ESSENTIAL OIL AND LIPIDS OF LEMONS OF THE VARIETY Yubilienyi

I. Tolibaev, Kh. S. Mukhamedova, M. Talipova, and V. N. Plugar'

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Citrus oils (lemon, mandarin, etc.) are widely used in the production of detergents, perfumery, and cosmetics [1-3] and in the food industry as aromatizing agents.

We have investigated lemons of the variety Yubilienyi grown in the lemon groves of Tashkent province. We studied the essential oils contained in the peel and albedo of the fruit, and the lipid compositions of the seeds and the peel. Referred to the weight of the fruit, the peel amounted to 9% at a moisture content of 14.7%, and the albedo to 27% at a moisture content of 12.3%.

The essential oil was isolated by steam distillation [4]. It was found that the bulk of the essential oil was localized in the lemon peel (1.7% of the weight of the peel), and only 0.2% in the albedo.

The essential oils from the two anatomical parts of the plant had the same color (pale yellow or colorless), a pronounced agreeable lemony smell, and a sharp taste. The physicochemical indices of the essential oil from the peel were as follows: d_4^{20} 1.475, n_D^{20} 0.866, $[\alpha]_D^{20}$ + 69°, acid No. 0.65 mg KOH.

According to the results of TLC and chromato-mass spectroscopy, the oil consisted mainly of limonene (98%; M^+136 (10); main fragmentary ions, m/z: 121, 107, 94, 93, 92, 79, 68, 67 [5]) and there was 2% of α- and β-pinenes and citral as impurities.

The neutral lipids (NLs) of the lemon seeds were obtained by extracting the dried and ground seeds with petroleum ether. Their oil content was 29.7% at a moisture content of 17.8%; the oil content on the absolutely dry substance was 36.1%.

By TLC (systems 1-4) the following components were found in the NLs: hydrocarbons, sterol esters, triacylglycerols (TGs), hydroxyacylglycerols, free fatty acids, diacylglycerols, sterols, and monoacylglycerols.

The main components were the TAGs. The phospholipids (PLs) were isolated from the seeds by Folch's method [6]. The total yield of PLs was 0.5% of the weight of the defatted seeds. By TLC (systems 5 and 6) four components were detected in the total phospholipids: phosphatidylcholines, phosphatidylethanolamines, phosphatidylinositols, and N-acylphosphatidylethanolamines. The fatty acid compositions of the total NLs and PLs were determined:

	10:0	12:0	14:0	16:0	16:1	18:0	18:1	18:2	18:3	ΣS	ΣU
NLs	Tr.	0,2	0,2	21,3	0,6	Tr.	21.6	49.1	7,0	21,7	78,3
PLs	0,9	1,0	1.1	30,2	3.5	3,2	18,5	40,8	0,8	36,4	63,6

Institute of Chemistry of Plant Substances, Uzbekistan Academy of Sciences, Tashkent.

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