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DETERMINATION OF CHEMICAL COMPOSITION AND ANTIOXIDANT ACTIVITY OF LEMON VARIETIES GROWN IN THE NATURAL CLIMATE OF UZBEKISTAN

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ABSTRACT

Chemical methods were used to determine the amounts of minerals, essential oils and carbohydrates of Meyer, Uzbek fertileness, Uzbek Senior and Messen lemons cultivated in the Republic of Uzbekistan. Samples L1, L2, L3 and L4 showed that the preparations have antioxidant properties compared to the standard antioxidant quercetin and the antioxidants glycoside.

KEYWORDS: *Meyer, Uzbek fertileness, Uzbekistan Senior, Messen, mineral, carbohydrate, glycoside, antioxidant.*

INTRODUCTION

Citric acid is one of the main preservatives and antioxidants and plays an important role in the metabolism of living organisms as well as in the food industry. Citric acid has a mildly acidic taste and does not have a strong effect on the mucous membranes of the gastrointestinal tract. [1]. The salts and esters of citric acid are used in the manufacture of products as acidifiers and colour stabilisers. Citric acid in citrus fruit and lemon juice has a concentration of up to 9%, and in some species up to 6-9%. Citric acid is also extracted from sugar-containing raw materials using industrial-scale micro-organisms. Lemon peel is now used to make a number of food additives. [2]. One of these is citric acid E-330, which is widely used as a natural antioxidant.

The purpose of the study is to determine the chemical composition and antioxidant properties of lemons grown in the country, such as Meyer, Uzbek fertileness, Uzbekistan Senior, Messen lemon.

Experiment section.*The following lemon varieties were obtained by extraction from aqueous extracts of Meyer's, Uzbek fertileness, Uzbekistan senior and Messen lemon*.Minerals were determined by quantitative analysis [3].

Determination of antioxidant activity of lemon using the method of autooxidation of adrenalin in vitro. Execution: 2.0 ml of 0.2 M sodium carbonate (Na2CO3-NaHCO3) buffer with pH = 10.65, 56 µl of 0.18% solution of adrenalin (epinephrine) hydrochloride were obtained. 30 µl of antioxidant preparation (lemon) was added and tested on a spectrophotometer (Cary 60 UV-Vis

Agilet Technologies) at a wavelength of 347 nm at intervals of 30 seconds to 10 minutes. The amount tested (concentration of 1 mg of solution in 1 ml) was used as standard. 2.0 ml of buffer with 0.2 M and 0.18% 56 µl (5.46 mM) of adrenalin were used as control. [4].

RESEARCH DISCUSSION

In our research, the amount of minerals in the natural climate of Uzbekistan Meyer, Uzbek fertileness, Uzbekistan senior, Messen lemon was determined using analytical methods [5]. The results obtained are presented in Table 1 below.

TABLE 1 THE AMOUNT OF MINERALS IN LEMON VARIETIES GROWN IN UZBEKISTAN, (RELATIVELY 100 MG)

Lemon type	Potassium	Calcium	Magnesium	Phosphorus	Sodium
Meyer	163	40	12	22	11
Uzbek fertileness	158	38	11.4	21	10
Uzbekistan senior	147	41	12.8	22	9.8
Messen lemon	160	39.2	13.2	23	9.6

From the data presented in Table 1, it was found that the study of Meyer, Uzbek fertileness, Uzbekistan senior, Messen lemon varieties growing in our natural climate is rich in minerals containing sodium, potassium, magnesium, phosphorus and calcium [6].

Comparative analysis of essential oils of Meyer, Uzbek fertileness, Uzbekistan senior, Messen lemon varieties.In our research, a comparative analysis of essential oils from the peel of Meyer, Uzbek fertileness, Uzbekistan senior, Messen lemon varieties was made. As a result, they were found to contain the common limonene and b-pinene.The results obtained are presented in Table 2 below.

TABLE 2 THE AMOUNT OF SOME ESSENTIAL OILS IN THE PEEL OF LEMON VARIETIES GROWN IN UZBEKISTAN, (RELATIVELY 100 GR)

Lemon type	Limonen, %	b-pinen, %
Meyer	72,5-76,4	11,3-18,7
Uzbek fertileness	72,3-76,4	11,7-18,6
Uzbekistan senior	72,7-76,9%	11,3-18,1
Messen lemon	72,3-76,5%	11,7-18,5

The results shown in Table 2 show that in the Meyer lemon peel, the content of limoneii was 72.5-76.4%, while that of b-pinene was 11.3-18.7%. In the Uzbek fertileness bark, limoneii accounted for 72.3-76.4%, while b-pinene accounted for 11.7-18.6%. In the first lemon peel of Uzbekistan, the content of lemons was 72.7-76.9%, and b-pinene was 11.3-18.1%. Messen lemon contained 72.3–76.9% of lemon in lemon peel, while b-pipen accounted for 11.7–18.5% [7].

During our research, it was found that a number of carbohydrates, triterpene, a-pipen and mirsen are present in the peel of Meyer, Uzbek fertileness, Uzbekistan senior, Messen lemon varieties. The results are presented in Table 3.

TABLE 3 THE AMOUNT OF CERTAIN CARBOHYDRATES IN THE PEEL OF LEMON VARIETIES GROWN IN UZBEKISTAN, (RELATIVELY 100 MG)

Lemon type	a-pinen	mirsen	triterpene
Meyer	1.4-1.6	0,93-1,12	2.72-8.27
Uzbek ferileness	1.5-1.4	0,97-1,15	2.88-8.26
Uzbekistan senior	1.6-1.7	0,98-1,14	2.79-8.33
Messen lemon	1.5-1.6	0,94-1,13	2.68-8.42

From the data presented in Table 3, it can be seen that in the Meyer lemon peel, the content of α-pinene was 1.4–1.6%, while that of Mirsen was 0.93–1.12 and that of triterpene was 2.72–8.27. InUzbek fertileness bark, a-pinene was 1.5-1.4%, mirsen was 0.97-1.15 and triterpene was 2.88-8.26. In the first lemon peel of Uzbekistan, the content of a-pinene was 1.6-1.7%, mirsen 0.98-1.14 and triterpene 2.79-8.33. In the composition of Messen lemon peel, a-pinene was 1.5-1.6%, mirsen was 0.94-1.13 and triterpene was 2.68-8.42.

In determining the antioxidant activity, we studied the antioxidant activity of extracts from the peel of Meyer, Uzbek fertileness, Uzbekistan senior and Messen lemon varieties growing in our natural climate [8].

Antioxidant activity of lemons L1 (Meyer), L2 (Uzbek fertiliness), L3 (Uzbekistan senior) and L4 (Messen lemon) was determined by phytochemical examination. The antioxidant activity of lemon is determined by the inhibition of the autooxidation reaction of adrenaline in vitro and prevents the formation of the free form of oxygen. The method is based on the inhibition of the autoxidation reaction of adrenalin, expressed in percent (%) due to the formation and autooxidation of adrenaline over time in the in vitro conditions of drugs.

Antioxidant activity was calculated by the following formula for inhibiting the autooxidation of adrenalin.

$$AA\% = \frac{D1 - D2 \times 100}{D1}$$

Here,

Optical density of adrenalin hydrochloride solution added to D1-buffer;

Optical density of the test extract and adrenalin HCl added to D2-buffer.

The preparations tested used water as solvent. 100/250/500/750/1000 µg/ml were used in in vitro experiments [4]. The results are presented in Table 4.

The antioxidant activity of the preparations was determined by in vitro adrenaline auto-oxidation. Antioxidant activity was assessed by phytochemical studies of the preparations under study.

When the antioxidant activity of the drugs was detected by inhibiting the adrenaline auto-oxidation reaction in vitro, the samples inhibited the formation of the free form of oxygen. L1, L2, L3 and L4 samples were compared with the standard antioxidant glycoside antioxidant. The results showed that preparations derived from lemon have antioxidant properties [9].

CONCLUSION

The results of chemical analysis showed that Meyer, Uzbek fertileness, Uzbekistan Senior, Messen lemon varieties were found to be rich in minerals sodium, potassium, magnesium, phosphorus and calcium. In addition, essential oils were found to contain limonene and *b*-pinene, as well as triterpene and *a*-pipen from hydrocarbons. Samples L1, L2, L3 and L4 showed that the preparations have antioxidant properties compared to the standard antioxidant quercetin and the antioxidants glycoside.

TABLE 4 RESULTS OF ANTIOXIDANT PROPERTIES OF LEMON SAMPLES

№	Matter	Control	Experience	%
1	L1 (10%) 100 mg/ml	0.2890	0.2541	11.28
2	L1 (25%)250 mg/ml	0.2305	0.2122	13.34
3	L1 (50%)500 mg/ml	0.1054	0.1640	13.97
4	L1 (75%)750 mg/ml	0.20551	0.1810	15.54
5	L1 (100%)1000 mg/ml	0.27024	0.2319	16.34
1	L2 (10%) 100 mg/ml	0.2046361	0.1822	14.56
2	L2 (25%)250 mg/ml	0.23685	0.1940	17.19
3	L2 (50%)500 mg/ml	0.20312	0.1657	17.32
4	L2 (75%)750 mg/ml	0.24545	0.1704	17.65
5	L2 (100%)1000 mg/ml	0.23652	0.2245	18.68
1	L3 (10%) 100 mg/ml	0.2345	0.2564	11.43
2	L3 (25%)250 mg/ml	0.2409	0.2122	13.34
3	L3 (50%)500 mg/ml	0.1234	0.1867	13.65
4	L3 (75%)750 mg/ml	0.2051	0.1254	15.39
5	L3 (100%)1000 mg/ml	0.2865	0.2683	16.94
1	L4 (10%) 100 mg/ml	0.2041	0.1462	14.67
2	L4 (25%)250 mg/ml	0.2356	0.1304	17.35
3	L4 (50%)500 mg/ml	0.1902	0.2957	17.65
4	L4 (75%)750 mg/ml	0.2645	0.2594	17.23
5	L4 (100%)1000 mg/ml	0.7834	0.7642	18.78
	Glycoside			10,0%

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