

4. Short-term visual memory impairment also became apparent under EO contents of 0,5 and 1,0 mg/m³ and it wasn't marked under EO content of 2,0 mg/m³.

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The article concerns influence of *Juniperus Virginiana* essential oil on psychoemotional state, mental activity and human memory depending on its content: 0,5; 1,0; 2,0 mg/m³. *Juniperus Virginiana* essential oil in all studied contents had an euphoric effect on people being tested, but it didn't influence on their workability self-rating; contents 1,0 и 2,0 mg/m³ decreased situational anxiety. Objective tests showed improvement of mental activity and short-term memory impairment with essential oil content 0,5 and 1,0 mg/m³, and a lack of effect with content 2,0 mg/m³.

Key words: *essential oil, Juniperus Virginiana L., psychoemotional state; mental activity, memory.*

SOUTHERN HORTICULTURE

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VARIABILITY OF APPLE FRUIT CHEMICAL COMPOSITION DURING STORAGE

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Introduction

Vital functions of fruits during ripening after harvest is directly connected with biological peculiarities of sort, storing conditions. Biochemical variations in apple fruits during storage determine level of their storeability [1, 2]. Long-term storage success depends upon correct sort, meant for this purpose. Investigation of domestic and abroad sorts identifies their specificity during storage. Revealing of biochemical characteristics of diverse sorts and the most capable varieties for long-term storage will inspire economical efficiency of horticulture and proof actuality of researches mentioned-above.

Objects and methods of the research

During investigation variability of apple fruit chemical composition (10 perspective apple sorts belonged to the collection of Crimean pomological station in Sevastopol) was studied while storage in the fridge. The main research objective was to reveal sorts with the highest level of storeability and highest parameters of fruit chemical composition. The fruits were storing on the shelves in a fridge with regulated temperature. While storing air temperature made 2,0 – 3,0°C, relative air humidity – 90-95%.

Fruit analysis was carried out before storing and after it. Content of dry substances, free acids (in terms of malic acid), ascorbic acid, phenol compounds (catechines, anthocyanins, leukoanthocyanins, flavonols). Chemical analysis was conducted at laboratory of Biochemistry of the Crimean pomological station using common methods [3], and revealing of flavonoids – by method of L.I. Vigorov [4].

Results and discussion

Study of dry substances in fruits while storing gives an idea about biochemical processes in fruits and their trend. According to studied sorts, in most cases content of these components in fruits reduced by the end of storage, in comparison with data before it. Only in fruits of the following sorts content of dry substances increased a bit (0,7 to 0,9%) : Waine Spur Delicious, Golden Delicious, Spigold (table 1). In fruits of Electra sort this increasing was more considerable (3,9%). Decreasing of moisture level caused rise of dry substances content in these fruits, what was probably connected with peel structure. Sugars level in apple fruits got the highest point of variation (table 1). On average in fruits of all sorts sugar content (both total sugar and sucrose) went down in the end of storing. Though Electra, Spigold, Galia Beauty were marked as sorts with increasing total sugar content. Carola and Waine Spur Delicious didn't change the concentration of this components. Variation of all sorts was quite different. Considerable changes in sucrose and monosaccharide content were noted. Proportion of sucrose to monosaccharide reduces inversely (sucrose content decreases, monosaccharide content increases mainly) in the end of storage. This proportion is extremely different for sorts. As to the following sorts the proportion sucrose:monosaccharide was more considerable (0,19 to 0,5): Golden Delicious, Summerland, Waine Spur Delicious; in fruits of Carola, Spigold, Goljohn, Electra this proportion decreased not much.

Content of free acids changed greatly. On average all sorts had a tendency to decreasing of these substances by the end of storage. Only in fruits of Electra sort their content kept unchanged. There is an assumption this sort is capable to be stored more, as by the end of storing content of dry substances and sugars in fruits was the same in comparison with initial data.

Concentration of ascorbic acid in fruits of two sorts (Goljohn and Ducat) reduced by the end of storing in comparison with input parameters, and it had a tendency to considerable growth for a number of apple sorts: Spigold, Spilove, Summerland).

Table 1

Variation of chemical composition in apple fruits while storing (average over 3 years)

Sort	Terms of analysis	Dry substances, %	Saccharides %		Proportion of sucrose to monosaccharides	Acidity (in terms of melic)	Ascorbic acid, mg/100g	Storing period, days
			Sum	Including sucrose				
Waine Spur Delicious	Before storage	15,3	13,2	3,0	0,29	0,35	5,2	209
	By the end of storage	16,0	13,5	1,2	0,10	0,21	7,3	
Galia Beauty	Before storage	14,5	9,6	0,7	0,08	0,41	5,3	220
	By the end of storage	13,9	11,3	2,0	0,22	0,35	6,8	
Golden Delicious	Before storage	17,9	15,6	7,0	0,81	0,28	4,2	196
	By the end of storage	18,7	15,4	3,6	0,31	0,21	4,9	
Goljohn	Before storage	15,0	12,1	2,7	0,29	0,48	5,6	220
	By the end of storage	14,7	11,5	2,4	0,26	0,21	3,9	
Ducat	Before storage	21,2	16,5	5,7	0,53	0,41	7,9	159
	By the end of storage	19,0	14,2	2,8	0,25	0,35	5,6	
Carola	Before storage	18,0	12,6	3,5	0,39	0,62	5,3	158
	By the end of storage	16,4	12,7	2,3	0,22	0,41	7,3	
Summerland	Before storage	16,3	12,0	3,8	0,46	0,55	2,3	217
	By the end of storage	13,6	10,7	0,9	0,09	0,28	7,1	
Spigold	Before storage	13,2	10,5	2,5	0,31	0,35	4,2	166
	By the end of storage	14,1	11,3	2,3	0,26	0,14	7,2	
Spilove	Before storage	19,7	12,5	2,7	0,28	0,35	2,6	208
	By the end of storage	15,8	12,9	1,4	0,12	0,14	7,0	
Electra	Before storage	18,0	13,7	2,4	0,21	0,35	3,8	196
	By the end of storage	21,9	14,7	1,6	0,12	0,35	4,4	

The main polyphenols in apple fruits chemical compositions are catechines and leucoanthocyanins. Stored sorts differed a lot by content of these components in fruits (table 2). In fruits of Goljohn, Spigold and Summerland sorts a total content of catechines and leucoanthocyanins didn't exceed 126,0 mg/100g, but the same parameters for sorts Golden Delicious, Carola and Electra are much higher – more than 200mg/100g.

Average content of phenol compounds for all sorts was heightened.

Variations of catechines contents in fruits of all sorts is different. In fruits of 5 sorts (Waine Spur Delicious, Goljohn, Ducat, Summerland, Spigold) their concentration was higher in the end of storing, though other sorts (Galia Beauty, Golden Delicious, Spilove, Electra) had this number decreased, and only sort Carola kept the initial data of catechines content.

Leucoanthocyanins content in fruits of 5 sorts was reduced during the storage (Carola, Electra and etc.), Ducat, Summerland and Spigold raised this number. As to sorts Galia Beauty and Goljohn, there weren't reported any considerable changes in the end of storage.

Concerning anthocyanins concentration, it tended to increasing for majority of sorts by the end of storage. This concentration was considerably reduced in fruits of Ducat and Carola.

Table 2

Variation of phenol compounds content (mg/100 g) in apple fruits while storing (average over 3 years)

Sort	Terms of analysis	Catechines	Anthocyanins	Leukoanthocyanins	Flavonols	Total flavonoids	Storing period, days
Waine Spur Delicious	Before storage	100,1	0,57	95,1	9,8	205,6	209
	By the end of storage	105,7	0,80	92,0	18,2	216,7	
Galia Beauty	Before storage	65,8	0,22	66,8	9,8	142,6	220
	By the end of storage	49,7	0,34	66,8	11,9	128,7	
Golden Delicious	Before storage	100,1	0,43	107,7	18,2	226,3	196
	By the end of storage	84,0	0,57	79,4	6,3	170,3	
Goljohn	Before storage	56,7	0,34	63,0	13,3	133,3	220
	By the end of storage	79,8	0,73	66,8	23,8	171,1	
Ducat	Before storage	79,8	0,43	69,9	11,2	161,3	159
	By the end of storage	97,3	0,38	109,6	14,7	222,0	
Carola	Before storage	105,7	0,38	107,7	23,8	237,6	158
	By the end of storage	105,7	0,22	69,6	15,4	190,9	
Summerland	Before storage	51,8	0,38	73,7	19,6	145,5	217
	By the end of storage	78,4	0,70	89,5	13,3	181,9	
Spigold	Before storage	54,6	0,27	64,9	9,8	129,6	166
	By the end of storage	69,3	0,22	82,5	9,8	161,8	
Spilove	Before storage	81,9	0,38	92,0	23,8	198,1	208
	By the end of storage	75,6	0,57	86,3	19,6	182,1	
Electra	Before storage	158,2	0,55	139,2	11,2	309,2	196
	By the end of storage	139,3	0,84	102,1	47,6	289,8	

Flavonol concentration didn't have any regular variations.

Conclusions

As a result of the research sorts characterized by high parameters of chemical composition by the end of storage and a good storability were marked out: Waine Spur Delicious, Spilove, Summerland. As to key parameters of fruit chemical composition, the sorts mentioned-above surpassed the control sort Golden Delicious. Their storability was much higher as well.

Ducat, Electra and Carola were marked out as sorts with a bit lower level of storability in comparison with control sort Golden Delicious, but much better by most of chemical parameters.

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The article presents three-year investigation of 10 introduced apple sorts their chemical composition before storing and in the end of it. The following sorts were marked as varieties combined high parameters of fruit chemical composition by the end of storing and good storability: Waine Spur Delicious, Spilove, Summerland.

Key words: *apple tree, sorts, biochemical variations, chemical composition, dry substances, sugars, free acids, ascorbic acid, catechines, anthocyanins, leucoanthocyanins, flavonols, storability.*

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POSSIBILITY TO INCREASE HARVEST OF EARLY TABLE GRAPE CULTIVAR UNDER CONDITIONS OF SOUTHWEST ZONE OF THE CRIMEAN VITICULTURE

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Introduction

Viniculture as a branch of plant cultivation is of great economic importance, connected with primary processing of vine, one of the most valuable dietary and food staff. Historically viniculture having quite a small share of agricultural territories (up to 4,4% in the Crimea) significantly affects on regional socio-economic development, filling the state and local budgets. One of the principle task for this sector is expansion of table vine production to keep its quantity consumed – no less than 5,2 kg/person/year in the Crimea – and considerably to increase its consumption in other regions [1, 6]. Thereby researches aimed at solving of these tasks are quite current.

High and stable vine crops are possible if to carry out complex of agrotechnical measures, which could provide regular growth and development of vine bushes and protect crop from pests and diseases [1, 2].

At present the principle method of vine plants protection from diseases is a chemical method, which assumes applying of various fungicides – contact and systematic. As to modern preparations, certified for vine plants, there are strobilurines which possess quite important physiological properties besides fungicidal action: phytohormonal effect on plant growth which results increasing of photosynthesis intensity and its productivity, lowing of plant breath intensity, reduction of water evaporation by leaves. Investigations conducted on annual cultures revealed antioxidant property of strobilurines, which favored rise plant resistance to drought, temperature variation, over illumination and etc. [11, 7, 8, 10].