



ACHIEVING EFFICIENCY BY REDUCING NATURAL DECLINE IN APPLE STORAGE

R.K.Tashmanov

Sh.E.Umidov

Tashkent state agrarian university

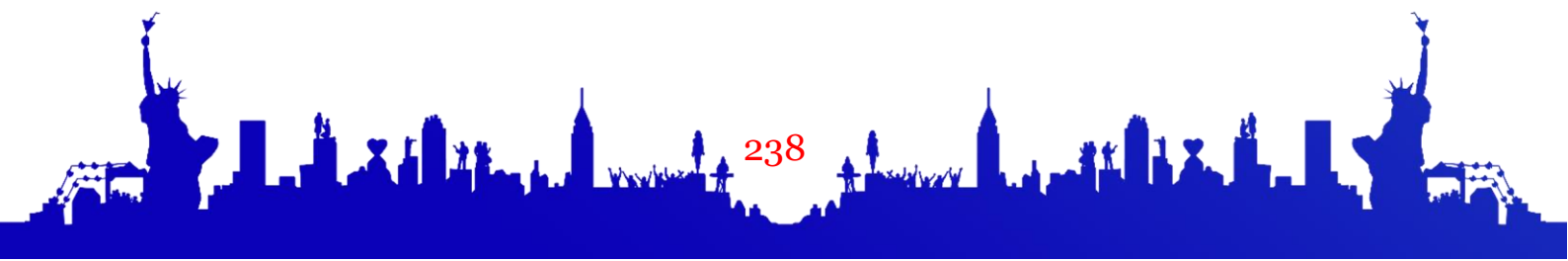
<https://doi.org/10.5281/zenodo.10071395>

Abstract: In this article, the apples grown and stored in Marokand Meva-Sabzavot limited liability company in Jomboy district of Samarkand region were treated with methylcyclopropene drug, Red delicacies, Granny Smith, Scarlet, Pinklady, Golden delicacies, Jiromin, Fuji, Gala and Modi apples. aimed at reducing the natural decline by applying the drug 1-methylcyclopropene to reduce apple fruit decline by applying the drug at acceptable rates to apples after storage.

Keywords: apple, storage, 1-methylcyclopropene, hardness, ethylene, controlled atmosphere, commodity analysis, biochemical parameters, natural reduction

Relevance of experience. Today, the total volume of apple production in the world is more than 80.5 million tons, the leading places are China (respectively 44.45 million tons), USA (4.65 million tons), Poland (3.60 million tons), Turkey (2.93 million tons) and Uzbekistan (1.238 million tons). About 90-95% of apple orchards in the world's leading apple-producing and exporting countries are grown in intensive orchards based on low-growing grafts. In most of the countries where apples are grown, regular research is conducted to create new high-quality commercial varieties of this fruit, to radically increase their production volume, fruit quality and shelf life, in order to gain a prestigious position in the world apple market, which is the most competitive.

The level of study of the problem. Due to the fact that apples do not have the characteristics of long-term storage under normal conditions, it is recommended to store them in warehouses with a controlled gas environment in order to reduce the change in commodity characteristics. The shelf life of an apple fruit depends on its pomological variety, as well as the amount of dry matter in its chemical composition. Air temperature, relative humidity and gas environment in warehouses are the factors that affect their shelf life. A controlled gas environment extends the shelf life of fruits in warehouses by 1.5-2.0 times. Also, apples stored in a controlled gas environment retain more sugar, organic acids, and vitamins than those stored in a conventional manner.





The purpose of the study. Selection of storage-resistant varieties from apples grown in the central regions of Uzbekistan, study of technological features and reduction of natural decline of stored apples.

Research task. Determining the effective method of storage of apple varieties selected for research, researching the technological and biochemical composition of apple varieties, and testing non-traditional methods of pre-treatment in apple storage are defined as the main task of reducing natural decline.

Research objects and methods. Red Delishes, Golden Delishes, Renet Simirenko, Scarlet (Steamored) varieties included in the state register in Uzbekistan and introduced Green Smith, Gala, Pink Lady, Fuji, Modi, Jeromin varieties were selected.

Experimental storage was cooled on the basis of Italian technology and in a controlled gas environment warehouse with the employees of LLC in a subnormal environment (containing 1.5% O₂ and 1.5% CO₂) according to the manual "Refrigeration of products") was conducted. Penitrometer, refractometer, titrimetric, photometric analysis methods were used to determine the optimal level of fruit ripening and biochemical parameters during storage: titratable acids according to GOST ISO 750-2013; hardness of apple core with penetrometer FT-372; Determining the release of product varieties according to GOST R 54697-11.

Discussion of the obtained results. Experiments were carried out on the preservation and natural reduction rates of improving the pretreatment processes of apples before storing them.

Before storage, a solution of different concentrations of 1-MSP (methylcyclopropene) compound was placed in 4 points for free evaporation for 12-24 hours. This experiment was used to determine the optimal concentration of the 1-MSP drug and monitor the amount of natural reduction of the product.

In this, the marketability and natural decline of apples were evaluated after 180 days of storage in controlled gas atmosphere storage warehouses. By applying the 1-methylcyclopropene compound used in these experiments to the storage chambers at the rates of 0.05 g, 0.08 g, 1.0 g, 1.03 g, the biochemical composition of apples stored for 180 days remained unchanged, the shelf life, it was considered acceptable to use 1-methylcyclopropene compound at 0.08 g, so that disease resistance, productivity and natural reduction are minimal.

During the experiments, apple cultivars placed in storage were subjected to different treatments for 180 days in a controlled gas environment (BGM)





warehouse, and the natural decline in apples placed in a common chamber was monitored.

Table 1

Natural shrinkage of apples after different treatments and storage for 180 days in controlled gas environment storage

T/r	Varieties name	In the usual way	1st MSP with 0.05%	1st MSP with 0.08%	1st MSP with 1.00%	1st MSP with 1.03%
1	Red Delishes	8.2	5.6	1.9	4.8	5.2
2	Golden Delishes	7.3	5.2	1.5	4.1	4.9
3	Renet Simirenko	8.6	5.8	2.2	4.5	5.4
4	Scarlet (Staymored)	8.3	5.7	2	4.9	5.3
5	Granny Smith	7.1	5.1	1.6	4.2	5
6	Gala	8.1	5.8	2	4.9	5.1
7	Pink Lady	7.2	5	1.5	4	5.3
8	Fuji	7.4	5.3	1.9	4.4	5.1
9	Modi	7.7	5.6	2.1	4.5	5
10	Jerome	8.6	5.8	2.3	4.5	5.4

According to the table above, the natural decline of apple varieties in the controlled gas environment (BGM) warehouse without any treatment in a **simple way**, compared to the total amount during storage for 180 days, the highest natural decline in the variety Red deliciouses (8.2%), Renet Simirenko (8, 6 %), Scarlet (Staymored) (8.3 %), Gala (8.1 %) and Jerome (8.6 %) were observed.

The apple cultivars under study were treated in chambers with **0.05% 1-methylcyclopropene compound and stored in a controlled gas environment warehouse for 180 days, the natural shrinkage of apples was reduced by 2.0-2.8% compared to the normal method.** For example. Red deliciouses 2.6%, Golden Delishes 2.1%, Renet Simirenko 2.8%, Scarlett (Staymored) 2.6%, Granny Smith 2.0%, Gala 2.3%, Pink Lady 2.2%, Fuji 2.1%, Modi 2.1%, Jerome 2.8% natural decrease was observed. The natural reduction of stored apples under the influence of the applied 0.05% 1-methylcyclopropene compound was determined from 5.1 to 5.8% of the total amount.

That apple cultivars placed for storage in chambers were treated with **0.08% 1-methylcyclopropene compound and the natural shrinkage of**

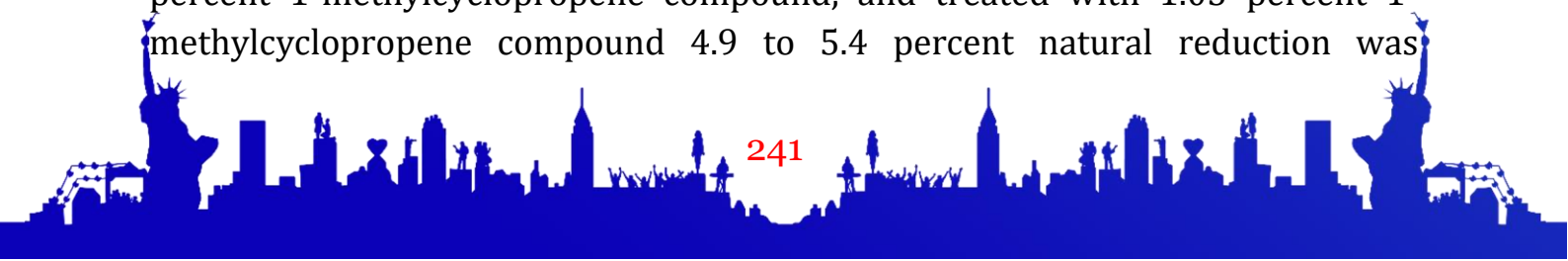


apples stored in a controlled gas environment for 180 days was significantly reduced by 5.5-6.7% compared to the simple method. possible For example. Red deliciouses 6.7%, Golden Delishes 5.8%, Renet Simirenko 6.4%, Scarlet (Steamored) 6.3%, Granny Smith 5.5%, Gala 6.1%, Pink Lady 5.7%, Fuji 5.5%, Modi 5.6%, Jerome 6.3% natural decrease was observed. The natural reduction of stored apples under the influence of the used 0.08% 1-methylcyclopropene compound was observed from 1.5% to 2.3% natural reduction in the cross-section of varieties, and the lowest natural reduction in the conducted experimental options was the 0.08% 1-methylcyclopropene compound. was found to be treated with

The studied apple varieties were treated in chambers with **1.0% 1-methylcyclopropene compound and stored for 180 days in a controlled gas environment warehouse. Compared to the simple method, the natural shrinkage of apples was observed to decrease by 2.9-4.1% in the following varieties.** For example: Red deliciouses 3.4%, Golden Delishes 3.2%, Renet Simirenko 4.1%, Scarlet (Steamored) 3.4%, Granny Smith 2.9%, Gala 3.2%, Pink ledi 3.2%, Fuji 3.0%, Modi 3.2%, Jerome 4.1% natural decrease was observed. The natural reduction of stored apples under the influence of the applied 1.0% 1-methylcyclopropene compound was determined from 4.1 to 4.9% natural reduction compared to the total amount.

Apple varieties suitable for storage were treated in chambers with **1.03% 1-methylcyclopropene compound and** stored in a controlled gas environment warehouse for 180 days . Compared to the normal method, the natural shrinkage of apples was observed to decrease by 1.9-3.2% in the following varieties. For example: Red deliciouses 3.0%, Golden Delishes 2.4%, Renet Simirenko 3.2%, Scarlet (Staymored) 3.0%, Granny Smith 2.1%, Gala 3.0%, Pink ledi 1.9%, Fuji 2.3%, Modi 2.7%, Jerome 3.2% natural decrease was observed. The natural reduction of stored apples under the influence of the applied 1.03% 1-methylcyclopropene compound was determined from 4.9 to 5.4% natural reduction compared to the total amount.

From the analysis of the table, it became clear that the natural reduction of apples stored for 180 days without any treatment in a simple way was from 7.1 to 8.6%, when treated with 0.05% of 1-methylcyclopropene compound, from 5.1 to 5.8%. 1.5 to 2.3 percent when treated with 0.08 percent 1-methylcyclopropene compound, 4.1 to 4.9 percent when treated with 1.0 percent 1-methylcyclopropene compound, and treated with 1.03 percent 1-methylcyclopropene compound 4.9 to 5.4 percent natural reduction was





observed, based on the above data, the lowest natural reduction was observed in apples stored with 0.08 percent 1-methylcyclopropene compound.

Conclusion. The use of 1-methylcyclopropene drug in the storage of apple fruits reduced the natural decline of apple fruits to a minimum level. A concentration of 0.08% of methylcyclopropene causes a decrease in the natural reduction index by 4.5-5% compared to untreated storage.

References:

1. Alekseeva M.M. Commodity research of homogeneous groups of food products of plant origin. Workshop. Kinel 2015. p. 67-68.
2. Sedov E.N. Fundamentally new varieties of apple trees with fruits of high commercial and consumer qualities. Gardening and viticulture. 2017. No. 3.s. 23-30.
3. Shirokov E.P., Polegaev V.I. Storage and processing of crop products with the basics of standardization and certification. Part 1. Potatoes, fruits, vegetables. - M.: "Kolos", 2000.
4. Prichko T.G., Germanova M.G., Smelik T.L. Increasing the efficiency of storing apples during post-harvest treatment with Smartfresh in a controlled atmosphere. Scientific works of SKZNIISIV. Volume 10. 2016. pp. 131-134.
5. Tashmanov RK Organoleptic characteristics of apple fruits, marketability and storage methods. Monograph. Tashkent. "Navruz" publishing house 2021, 33 p.

