



## Efficacy of Using Different Concentrations of 1-Msp Drug Solution before Storing Apples in a Controlled Gas Chamber

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**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, and the apple varieties Red Delishes, Granny Smith, Scarlet, Pinklady, Golden Delishes, Jiromin, Fuji, Gala and Modi were treated. It has been shown that the use of methylcyclopropene is effective in maintaining the quality of apple fruits by applying the drug at acceptable rates to apples after storage.

**Keywords:** apple, storage, methylcyclopropene, hardness, ethylene, controlled atmosphere, commodity analysis, biochemical parameters.

**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 apple-growing countries, in order to gain a prestigious position in the world apple market, which is the most competitive, regular research is conducted to create new high-quality commercial varieties of this fruit, to radically increase their production volume, and the quality and shelf life of the fruit. Currently, in countries such as the USA, Poland, Turkey, and Japan, which are the leaders in apple cultivation and export around the world, this fruit is used for preserving, selling and selling apples such as Red Delishes, Golden Delishes, Granny Smith, Gala, Gala, Pink Lady, Jiromin, and Fuji. high-quality world-famous varieties have been created.

**Level of study of the problem.** As apples do not have a long shelf life under normal conditions, it is recommended to store them in a controlled atmosphere. 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. Controlled atmospheric environment extends the shelf life of fruits by 1.5-2.0 times. Also, apples stored in a controlled atmosphere retain more sugar, organic acids, and vitamins than conventionally stored apples.

**The purpose of the study.** It consists of choosing storage-resistant varieties from the apple varieties grown in the central regions of Uzbekistan, studying agrobiological and technological characteristics, and improving the technology of apple storage.

**Research task.** The main task is to determine the effective method of storage of apple varieties selected for research, to study the technological, organoleptic and biochemical composition of apple varieties, to test non-traditional methods of preliminary processing of apples in storage.

**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.

The experimental storage was cooled based on Italian technology and controlled atmosphere management with the employees of the LLC was carried out in a subnormal environment (containing 1.5% O<sub>2</sub> and 1.5% CO<sub>2</sub>) according to the "Refrigeration of Products" manual. Penitrometer, refractometer, titrimetric, photometric analysis methods were used to determine the optimal level of fruit ripening and biochemical parameters during storage: soluble dry matter according to GOST 29030-91; Total sugar according to GOST 8756-13.87; Titratable acids according to GOST ISO 750-2013; hardness of apple core with penetrometer FT-372; Production of varieties according to GOST R 54697-11; GOST 34151-2017- determination of vitamin C.

**Discussion of the obtained results.** Experiments were conducted on the effect of improving the pre-treatment processes of apples before storing them on the level of storage.

Before storage, a solution of 1-MSP (methylcyclopropene) with different concentrations was placed in 6 points for free evaporation for 12-24 hours in a hermetic storage chamber. Through this experiment, the task of determining the optimal concentration of the drug 1-MSP was performed.

In this, organoleptic and market characteristics were evaluated after apple fruits were stored in controlled gas storage warehouses for 180 days. The organoleptic evaluation was evaluated according to five indicators in a 5-point system, and based on the importance coefficient of each indicator, it was transferred to a 100-point evaluation system. This was done according to the criteria prepared on the basis of the methodology developed by Ye.P.Shirokov and V.I.Polegayev.

**Table 1 Organoleptic evaluation of apples after different processing and storage in RGS for 180 days (2020-2022)**

Varieties	Fresh	in a simple way	0,05%, 1-MSP	0,08 %, 1-MSP	1,00%, 1-MSP	1,03%, 1-MSP
Red Delishes	96,4	78,1	82,9	91,6	87,7	84,8
Golden Delishes	97,2	78,7	83,6	92,3	88,5	85,5
Renet Simirenko	91,6	74,2	78,8	87,0	83,4	80,6
Scarlet (Staymored)	91,5	74,1	78,7	86,9	83,3	80,5
Green Smith	93,1	75,4	80,1	88,4	84,7	81,9
Gala	90,8	73,5	78,1	86,3	82,6	79,9
Pink Lady	98,0	79,4	84,3	93,1	89,2	86,2
Fuji	95,5	77,4	82,1	90,7	86,9	84,0
Modi	93,7	75,9	80,6	89,0	85,3	82,5
Jerome	94,1	76,2	80,9	89,4	85,6	82,8

From the above tables, the organoleptic indicators of apple cultivars suitable for storage were evaluated and summarized after 180 days of storage in a controlled gas environment (RGS) warehouse after being treated with 1-methylcyclopropane compound in a simple way and at different rates (Table 1).

According to him, fresh apples are considered to be of high quality before storage. We store these apples in different environmental warehouses in different seasons of the year in order to ensure that they are on the table of people all year round. One of these is a controlled gas environment repository. Apples are stored well in a controlled gas environment warehouse. It is known from researches that the apple fruit emits the most ethylene gas when stored for a long time. Our proposed method aims to improve the quality of apples in storage by stopping or slowing down the release of ethylene gas from apples in storage, increasing shelf life and disease resistance.

After 180 days of storage of apple varieties from a controlled gas environment warehouse without any treatment, the highest score in organoleptic evaluation was Red delishes (78.1 points), Golden delishes (78.7 points), Fuji (77.4 points), Jiromin (76, 2 points), the lowest grades were observed in

Gala (73.5 points), Renat Simirenko (74.2 points) and Scarlet (Steymored) (74.1 points).

According to the results of organoleptic evaluation of storable apple varieties treated with 0.05% 1-methylcyclopropane compound and stored for 180 days in a controlled gas environment (RGS) warehouse, the lowest score was Gala (78.1 points), Scarlet (Staymored) (78.7 points), Renat Simirenko (78.8 points). Similarly, the highest scores were given to Red Delishes (82.9 points), Golden Delishes (83.6 points), and Pink Lady (84.3 points). The organoleptic quality index of apples when stored by treatment with 0.05% 1-methylcyclopropane during storage was slightly improved than when stored without any treatment.

During our research, we treated apple varieties from controlled gas environment storage in chambers with 0.08% 1-methylcyclopropane compound and after storage for 180 days, the highest organoleptic evaluations were Red delishes (91.6 points), Golden delishes (92.3 points), Pink Lady (93.1 points), Fuji (90.7 points), Jiromin (89.4 points) and Green Smith (88.4 points) were evaluated. During storage, the organoleptic quality indicators of apples stored by treatment with 0.08% 1-methylcyclopropane improved compared to the organoleptic quality indicators when stored with 0.05% 1-methylcyclopropane.

The difference in the organoleptic indicators of apples stored by processing the cells with 0.08% 1-methylcyclopropane compound compared to those treated and stored with 0.05% 1-methylcyclopropane compound was 8.5 to 8.7 points. we can see that the level has increased.

According to the results of organoleptic evaluation of apple varieties treated with 1.0% 1-methylcyclopropane compound and stored for 180 days in a controlled gas environment (RGS) warehouse, the highest score was Red delishes (87.7 points), Golden delishes ( 88.5 points), Pink Lady (89.2 points) was evaluated. During storage, the organoleptic indicators of apples were treated with 0.08% 1-methylcyclopropane compound during storage, and the appearance of the stored apple varieties from the organoleptic quality indicators, it was noticed that the color, taste, consistency and aromas decreased.

In our experiments, after being treated with 1.03% 1-methylcyclopropane compound and stored for 180 days in a controlled gas environment (RGS) warehouse, according to the organoleptic evaluation results, the highest score was Red delishes (84.8 points), Golden delishes (85 .5 points), Pink Lady (86.2 points) varieties were evaluated. Organoleptic indicators of apples during storage by treating storage chambers with 1.03% 1-methylcyclopropane. Organoleptic quality (appearance, color, consistency and aroma) we can notice that it has decreased even more.

**Conclusion.** By applying the 1-methylcyclopropane 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 organoleptic quality of apples stored for 180 days in quality indicators was determined. If we observe the changes in the indicators, the use of 0.08 g of 1-methylcyclopropane compound with good organoleptic indicators, storability, disease resistance and marketability was considered effective.

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