

THE BEHAVIOR OF APPLES TREATED WITH THE ETHYLENE BIOSYNTHESIS INHIBITOR 1-MCP IN THE POST-HARVEST PERIOD

PESTEANU Ananie, <https://orcid.org/0000-0002-8985-7101>

Technical University of Moldova, Chisinau, Republic of Moldova

Corresponding e-mail: ananie.pesteanu@h.utm.md

Stable and high-quality apple harvests must be accompanied by the use of progressive methods of fruit preservation in the post-harvest period, which ensure fruit resistance to disorders caused by fungal diseases due to the application of growth regulators based on 1-methylcyclopropene.

The apple fruits studied were of the Gala Dark Baron variety, grown on the M9 rootstock, in the intensive culture system. To determine the effectiveness of treatment with ethylene biosynthesis inhibitors, the following experimental scheme was developed: 1. Control, no treatment; 2. Fitomag, 0.44 g/m³; 3. Grand Fresh, 60 g/m³; 4. Grand Fresh, 68 g/m³. The fruits of the control and treated variants were placed in rooms with a normal atmosphere (CO₂ - 0.03%; O₂ - 21%). Storage temperature 0...+1 °C and humidity 92-95 %. The storage period was 150 days.

The firmness of apples in the control variant during the storage period decreased from 9.5 to 6.2 kg/cm², and in the variants treated with the ethylene biosynthesis inhibitor, it was 7.2 kg/cm². After five months of fruit storage, the firmness of apples in the control variant decreased by 34.8%, and in the variants treated with the ethylene biosynthesis inhibitor by 24.2-28.4%.

During the storage period of apples, the maximum intensity of ethylene emission was recorded in the control variant 3.4-13.7 ppm. Post-harvest treatment of fruits with Fitomag and Grand Fresh products reduced the intensity of ethylene emission to 1.8-2.7 ppm.

Treatment of apple fruits with Fitomag and Grand Fresh products contributed to maintaining the firmness of the fruits and reducing the intensity of ethylene release, both during storage and during the “shelf life” period.

The DA-Meter index allows determining the ripening of fruits based on the degradation of chlorophyll content, which decreases with the intensification of the process of ethylene emission from the apple. If in the case of the control variant the ripening index of apples was 0.44, then in the variants treated with the growth regulators Fitomag and Grand Fresh, it was 0.49-0.54.

Higher natural loss of fruits was observed after 5 months of storage in the control

variant - 3.8 %. Treatment of fruits with preparations based on 1-MCP (Fitomag and Grand Fresh) reduced the studied parameter, constituting 1.7-2.6 %. The difference between the variants treated with the ethylene biosynthesis inhibitor Grand Fresh, constituted 0.9 % in favor of the dose of 68 g/m³.

The share of fruits damaged by *Botrytis cinerea* during storage in the Fitomag variant at a dose of 0.44 g/m³ was 1.2 %, and when using the Grand Fresh growth regulator at a dose of 68 mg/m³, such fruits were not detected. Keeping these apples for 7 days at room temperature (+18–22 °C) led to a slight increase in the share of fruits affected by fungal diseases, but not as in the control variant.

Treating fruits with products based on the ethylene biosynthesis inhibitor 1-MCP before placing in storage influenced the firmness of apple pulp, the share of ethylene emitted by fruits and increased the values of the DA-Meter index, increased the yield of standard fruits, decreased the degree of natural perishability, *Botrytis cinerea* diseases and extended the “shelf life” period of apples compared to the control variant.

Keywords: inhibition, ethylene, firmness, ripening, DA-Meter, physiological diseases

Funding. The research was supported by the Institutional Project, subprogram 020407 “Development and implementation of good practices of sustainable agriculture and climate resilience” GREEN, implemented at the Technical University of Moldova.