

Methodology for storing fresh raspberry fruit using MAP (Modified Atmosphere Packaging)

Key words: raspberry, quality, storability, MAP packaging

Introduction

Raspberries are compound fruits, consisting of many drupelets. The ripening pattern allows classifying the fruit as non-climacteric. They are soft, juicy, and extremely delicate. Raspberries are one of the most fragile and perishable fruits, easily damaged. They are characterized by a very high respiration rate. Under normal atmosphere conditions at 0°C, the fruit can be stored for no longer than 2-5 days, depending on the cultivar. During storage, various packaging technologies may be used to maintain the quality of the fresh fruit. The modification of the gas composition inside the package slows down the fruit metabolism and microorganisms' growth. It is well known that lowering oxygen (O₂) concentration and increasing carbon dioxide (CO₂) concentration is desirable to preserve fresh raspberry quality. The most common disorders during this period are juice leakage, dehydration, decay, and moulds/rots growing.

Harvesting of fruit intended for storage

The fruit intended for storage should be harvested at the commercial maturity stage, not over-ripe. Manual harvesting should be carried out very gently, directly into individual packages. Only the highest quality fruit can be stored fresh (free of injury, decay, uniformly colored, and firm).

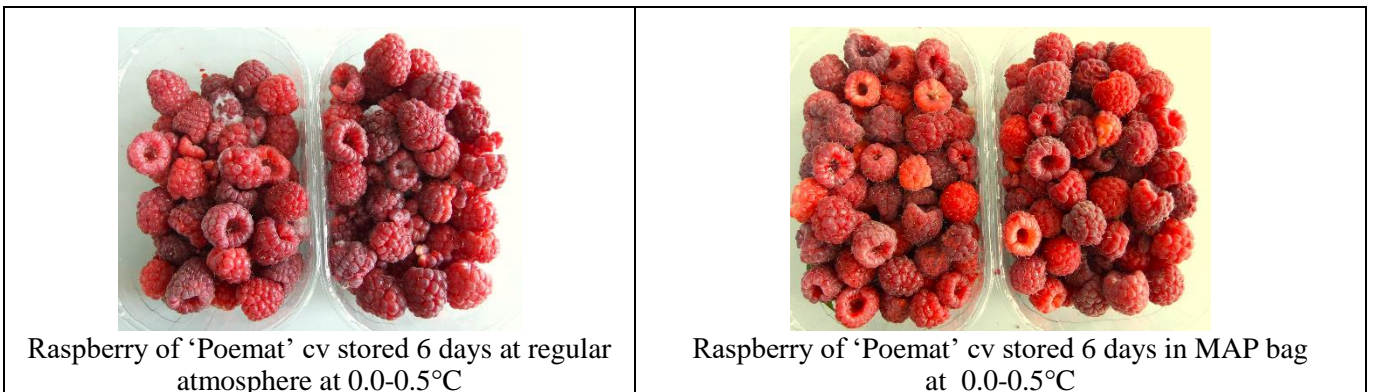
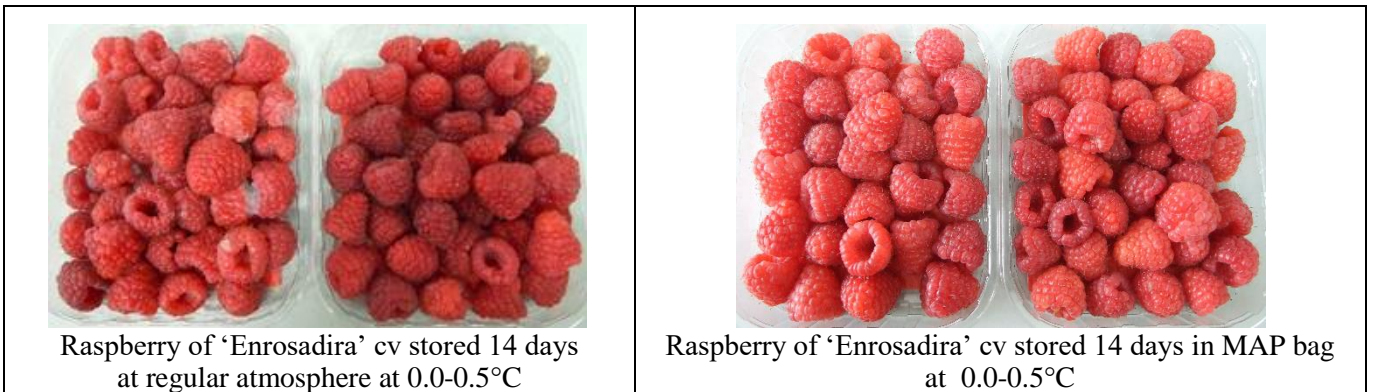
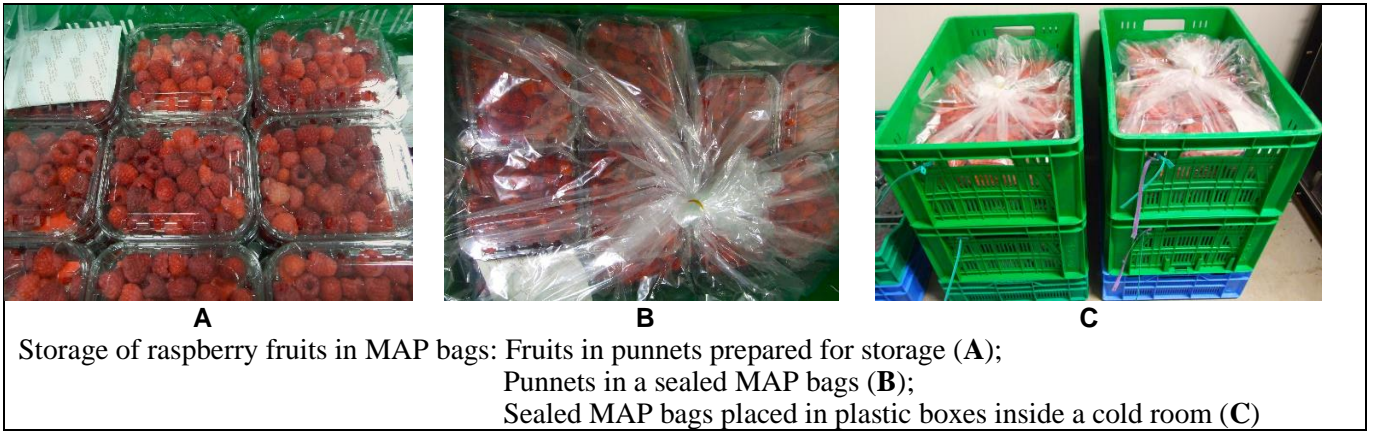
Cooling and storage conditions

Harvested fruit (packed into punnets) should be cooled to storage temperature (approximately 0°C) as quickly as possible, preferably using forced air-cooling. Then, cold fruit should be packed in MAP bags, in the amount recommended for a given package. In our experiment, we also tested the usefulness of the ethylene-absorbing sachet (EAS) to extend the storage life of fruits. For this purpose, EAS was placed into the packages and the package closed tightly with a rubber band or a special clip. To avoid the risk of water condensation on the fruits (reaching the dew point), all the above-mentioned activities should be performed in a cold store.

The packed fruit should be stored at a temperature range from 0°C to 0.5°C. The concentration of CO₂ inside the packaging (obtained as a result of fruit respiration) should remain at the level of 10-18% during storage. However, too high a CO₂ concentration may cause off-flavor. In our experiment (using Xtend[®] bags as MAP packaging), raspberry fruits of 'Poemat' cv (grown at an open field) were stored for up to 6 days and of 'Enrosadira' cv (grown under cover) for up to 14 days.

The storage conditions obtained in this way allow the fruit to maintain good quality and limit decay without the need to use a standard controlled atmosphere conditions. Fruit remaining in closed packaging can be placed for up to 3 days at a temperature of 10°C (shelf life conditions).

Regardless of the temperature and storage atmosphere, the length of storage of the raspberry fruits strongly depends on the constraints of the incidence of fungal diseases.



The methodology was tested and adopted at Laboratory of Postharvest Physiology of Horticultural Products at the National Institute of Horticultural Research, Skierniewice, Poland

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