

FACT SHEET

Benefits of Modified Atmosphere Packaging on Banana Storage

Benefits: Enhanced Shelf Life

Extended Freshness: Modified atmosphere packaging (MAP) can significantly delay the ripening process of bananas. MAP allows elevated CO₂ and reduced O₂ levels to develop around fruit. MAP, in combination with refrigeration, slows fruit peel colour development and pulp softening, extending the unripe stage and shelf life.

Reduced Waste: MAP can reduce rates of fruit spoilage by slowing growth of fungal pathogens. Preserving fruit quality and extending the shelf life of bananas contributes to reduced food waste.

Trial work

Objective: Evaluate the effectiveness of MAP to reduce mould development and extend the shelf life of bananas.

Methodology

Green mature Williams Cavendish Ecoganic® banana fruit were stored in 1) industry standard perforated poly liner, 2) PerfoTec® MAP biodegradable bag, and 3) Maze® poly compostable and biodegradable bag for 4 weeks at 13°C to simulate seafreight. The fruit were removed from the packaging and ripened with 100 parts per million of ethylene for 48 hours at 16°C as per commercial practice. Fruit quality was evaluated before ripening and 5, 6 and 7 days post ripening. Peel colour, fruit firmness, defects, mouldy appearance, and stem rot incidence were assessed.



Figure 1. Photograph showing banana fruit inside a PerfoTec® MAP, Maze® bag and perforated poly liner (left to right).

Current prices (≈ \$0.20AUD industry standard perforated poly liner, ≈ \$0.50AUD per Maze® bag and ≈ \$1.00AUD per PerfoTec® MAP liner)

Results Summary

Colour Stage and Firmness: Fruit in the PerfoTec® MAP consistently showed a 41% reduction in rates of peel colour development at the pre-ripening stage, as compared to the industry standard liner. Fruit in the PerfoTec® MAP were also 33% firmer across all ripening stages.

Storing fruit in the Maze® bag also slowed down the ripening process by 5% relative to the industry standard liner. Once the fruit were removed from the MAP and bags, ripening proceeded normally and there was no detectable



Figure 2. Photograph showing banana fruit mouldy appearance on stem.

Defects and Mouldy Appearance: The bananas stored for 4 weeks in the PerfoTec® MAP exhibited a 70% reduction in mouldy appearance scores across all evaluated stages. In particular, at the pre-ripening stage (-3), the mouldy appearance was nearly eliminated (0.03 average), showcasing the effectiveness of MAP to inhibit mould growth.

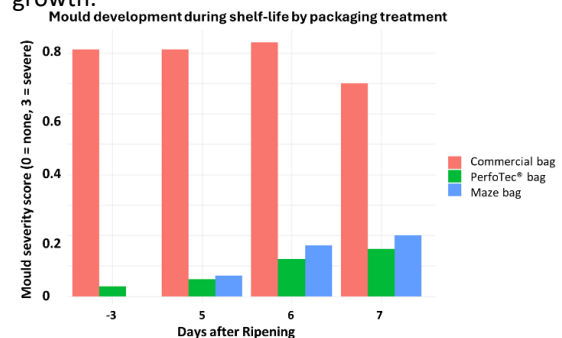


Figure 3. Bananas stored in PerfoTec® MAP showed consistently lower mould scores across all stages of shelf life, demonstrating its effectiveness in inhibiting mould growth.

Fruit in the Maze® bag also showed a reduction in mould development, with zero incidence at the pre-ripening stage (-3), and 3 to 4-fold less mould than fruit in the commercial liner at 7 days after ripening at a colour stage of 6.

Stem Rot; Bananas held for four weeks in the PerfoTec® MAP showed no detected stem-end rot at the pre-ripening check (day -3), and even seven days after ripening—when fruit had reached colour stage 6—the incidence was still less than half that recorded in the commercial liner (≈ 45%), amounting to a 55% reduction in rot.

Fruit in the Maze® bag performed better than those in the industry standard liner but still exhibited more rot than bananas in the PerfoTec® MAP no rot was detected.

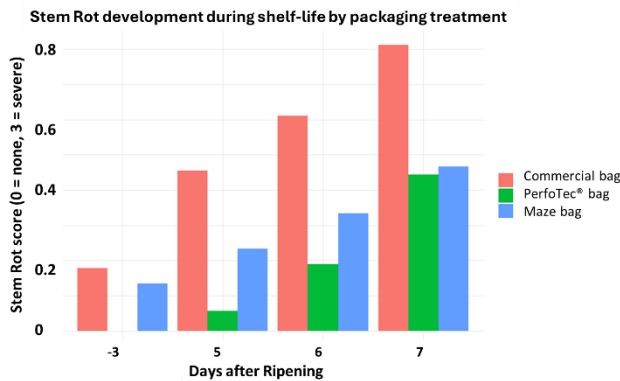


Figure 4. Stem rot was reduced in both PerfoTec® MAP and Maze® bags compared to the commercial bag, with PerfoTec® providing the greatest protection.

Conclusion

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The use of MAP, particularly for long-term seafreight, can significantly reduce mould development and delay the ripening process in Ecoganic® Cavendish bananas, resulting in an extended shelf life. The biodegradable PerfoTec® MAP outperformed both the industry standard liner and Maze® poly bags in maintaining fruit firmness, reducing defects, and preventing mould and stem rot, making it an effective solution for prolonging the freshness and marketability of bananas.

This work underscores the importance of selecting appropriate packaging technologies to enhance the postharvest life of bananas, offering substantial benefits for producers, retailers, and consumers by reducing waste and ensuring quality.

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PACIFIC COAST ECO BANANAS