

**EFFECT OF PRE-COOLING DURATIONS ON ETHYLENE
PRODUCTION AND RIPENING QUALITY OF 'REGAL RED COMICE'
PEARS (*Pyrus communis* 'Comice')**

ABSTRACT

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'Regal Red Comice' (*Pyrus communis* 'Comice') is a European pear cultivar resulting from a natural mutation of the 'Doyenné du Comice', characterized by its red skin. This cultivar is considered a premium variety, highly valued for its rich sweetness, smooth texture, and attractive appearance. Similar to other European pears, 'Regal Red Comice' requires sufficient pre-cooling to initiate proper ripening, particularly for ethylene production. This study aimed to evaluate the effect of pre-cooling durations (2, 3, and 4 months at 1 °C) on the ripening behaviour and postharvest quality of 'Regal Red Comice' pears. The main parameters observed included ethylene production, fruit firmness, weight loss, and simple sugar composition (glucose, fructose, sucrose, and sorbitol) during ripening at 15 °C.

The results showed that pre-cooling for 3 months led to earlier ethylene production, optimal softening, and better texture retention. In contrast, a 2-month pre-cooling treatment resulted in delayed ripening, while 4 months caused excessive softening and higher weight loss. Although simple sugar contents did not significantly differ across treatments, the high total sugar content and low glucose-to-fructose ratio suggest a high and consistent sweetness potential regardless of pre-cooling duration. Overall, a 3 month pre-cooling period at 1 °C was found to be the most balanced treatment to maintain quality and ensure stable ripening in 'Regal Red Comice' pears.

Keywords: 'Regal Red Comice', pre-cooling, ripening, ethylene, texture, weight loss, sugar content, cold storage.

PENGARUH LAMA WAKTU PENDINGINAN AWAL TERHADAP PRODUKSI ETILENA DAN KUALITAS PEMATANGAN BUAH PIR 'REGAL RED COMICE' (*Pyrus communis* 'Comice')

INTISARI

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'Regal Red Comice' (*Pyrus communis* 'Comice') merupakan kultivar pir Eropa hasil mutasi alami dari pir 'Doyenné du Comice' yang memiliki warna kulit merah. Kultivar ini dianggap sebagai kultivar premium yang dihargai karena rasa manisnya yang kaya, tekstur lembut, dan warna kulit yang menarik. Seperti jenis pir Eropa lainnya, 'Regal Red Comice' memerlukan pendinginan awal (*pre-cooling*) yang cukup untuk dapat memulai proses pematangan buahnya, terutama produksi etilena. Penelitian ini bertujuan untuk mengevaluasi pengaruh lama *pre-cooling* (2, 3, dan 4 bulan pada suhu 1°C) terhadap perilaku pematangan dan kualitas pascapanen pir 'Regal Red Comice'. Parameter utama yang diamati meliputi produksi etilena, kekerasan buah (*firmness*), penyusutan bobot, dan komposisi gula sederhana (glukosa, fruktosa, sukrosa, dan sorbitol) selama proses pematangan buah pada suhu 15°C.

Hasil penelitian menunjukkan bahwa *pre-cooling* selama 3 bulan menghasilkan produksi etilena lebih awal, pelunakan buah yang optimal, serta mempertahankan tekstur dengan baik. Sementara itu, perlakuan *pre-cooling* selama 2 bulan menunjukkan keterlambatan pematangan, dan 4 bulan menyebabkan pelunakan berlebih serta penyusutan bobot yang tinggi. Meskipun kandungan gula sederhana pir 'Regal Red Comice' tidak menunjukkan perbedaan signifikan pada setiap perlakuan, kadar gula total yang tinggi dan rasio glukosa terhadap fruktosa yang rendah menunjukkan potensi rasa manis tinggi dan konsisten terlepas durasi *pre-cooling*. Secara keseluruhan, durasi *pre-cooling* selama 3 bulan pada suhu 1°C ditemukan sebagai perlakuan yang paling seimbang dalam mendukung proses pematangan sekaligus mempertahankan mutu buah.

Kata kunci: 'Regal Red Comice', pendinginan awal, pematangan, etilena, tekstur, susut bobot, kandungan gula, penyimpanan dingin.

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GRAPHICAL ABSTRACT

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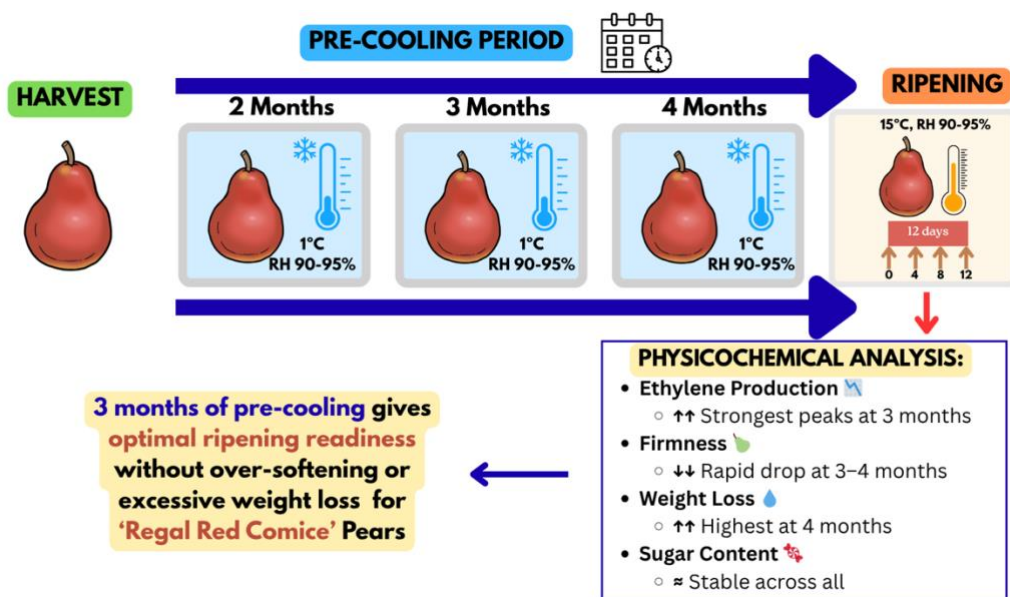


Figure 1.1 Graphical Abstract

A visual summary showing how 2, 3, and 4 months of pre-cooling at 1°C affect ethylene production, firmness loss, weight loss, and sugar stability during ripening at 15°C. Three months provides the best balance between chilling requirement fulfilment and quality preservation.