

Saving the planet with (the right amount of) packaging

LOZANO R. (1,2), BRONLUND J. (2), EAST A. (2), KRUGER W. (3), PATTERSON L. (3), GRAY-STUART E. (2)

1 Massey AgriFood Digital Lab, Massey University, Palmerston North, New Zealand

2 School of Food and Advanced Technology, Massey University, Palmerston North, New Zealand

3 Zespri International, Mount Maunganui, New Zealand

There is increasing global focus on improving sustainability and environmental outcomes. Many industries are working to eliminate single use plastics throughout the supply chain to have packaging systems made of reusable, recyclable, or compostable materials. Many supply chain packaging systems will need to be redesigned to meet these sustainability demands. Fresh produce storage often relies on the use of plastic packaging as a barrier for prevention of moisture loss (and subsequent product loss). Alternative strategies or materials that reduce plastic usage need to be considered across a range of sustainability metrics. The objective of this study is to develop a mathematical model framework that will allow future optimisation of packaging configurations to deliver quality kiwifruit while fulfilling sustainability demands. The model framework will be created through sub-models that predict internal conditions within the packaging system for any given combination of dimensions, material selection, and dynamic conditions in the supply chain. Fruit loss (as dictated by moisture loss) will be estimated using these sub-models. A Life Cycle Assessment model will quantify the resulting environmental impact of both the packaging and fruit loss. This will help in determining the best balance between the packaging format and materials, and their role in protecting the product. The framework can be used as a basis for continual development of sustainable packaging systems and supply chains that best meet specific market demands.

Keywords: Sustainability, plastics, supply chain, fruit loss, shelf-life