



Executive Summary of Food Waste Reduction Case Studies

September 25, 2019

PAC FOOD WASTE published its first *Food Waste Reduction Case Studies* project report in January 2017, identifying 19 global packaging case studies for food loss and waste reduction. This report has now been revised and updated to include an additional 10 case studies and all can be found on the [PAC website](#). Our goal is to continue to highlight and celebrate the value of packaging and to be a catalyst for food waste packaging solutions.

The Value of Packaging

Food loss and waste is a huge challenge in North America with latest studies estimating that we spend \$265B on more than 100M tons wasted food every year. And yet, consumers tend to believe that packaging is a bigger environmental issue than food waste despite evidence indicating otherwise. This report is intended to highlight the value of packaging in helping to reduce food loss and waste by protecting the product, extending shelf life and promoting behavior change in the home. It considers six food value chain areas where packaging can play a key role to help reduce food waste covering raw material transportation through to the consumer's home. Also, the packaging solutions presented in each case study typically impact perishable foods i.e. fresh produce and refrigerated items but also include some shelf stable items.



The case studies reflect various developing and in-market solutions (some of which have existed for many years e.g. micro perforations, modified atmosphere packaging where the innovation is in the application).

FIGURE 1 – Food chain areas identified in the case studies

Function Type	Benefits
Protect Product	Food handling and safety, damage protection, product monitoring, tamper proofing, cold chain management
Extend Shelf Life	Barrier technology, spoilage and contamination prevention
Promote Behaviour Change	Dosage and portion control, re-sealable features, freshness indicators

Key Findings – Packaging Solutions for Food Waste Reduction

PROTECT PRODUCT

Packaging Technology	Case Study Examples	Solution and Impact to Food Chain Areas
Reusable pallet systems	IFCO Polymer Logistics	Robust packaging materials reduce hygiene risks and physical damage to perishable goods during storage and transport.  
Thermal protective packaging	DowDuPont	Cargo covers provide thermal protection to sensitive cargo and improve cold chain management. 
Temperature indicators	Timestrip® Avery Dennison	Smart label and data logger indicate temperature breach to improve cold chain management.  
Sensors (oxygen, carbon dioxide)	Xiamen University and Fujian Institute of Research	Smart labels detect oxygen within packaging to determine whether food products are tampered or counterfeit

EXTEND SHELF LIFE

Packaging Technology	Case Study Examples	Solution and Impact to Food Chain Areas
Modified atmosphere packaging (MAP)	Tempo Plastics Sunset® Innovia Films Amcor RAP SINTEF Sealed Air IRRI Freshbox	Controlled atmosphere packaging allows shelf life extension through gas permeability by using micro-perforations, active barrier film technology.
		
Ethylene absorbers	It's Fresh! Chantler Packaging	Strip and film increase shelf life by absorbing ethylene and reducing premature aging and degradation of fresh produce.
		
Antimicrobial packaging	NanoPack cronogard®	Antimicrobial film and filler extend shelf life by inhibiting bacterial growth on food products.
		
Sensors (oxygen, carbon dioxide)	Sensor Spot Insignia Technologies SINTEF Infratab UWI Technology ITENE and Kao Chimigraf	Sensors work in conjunction with MAP to monitor oxygen or carbon dioxide levels to increase shelf life.
		

PROMOTE BEHAVIOUR CHANGE

Packaging Technology	Case Study Examples	Solution and Impact to Food Chain Areas
Sensors (oxygen, carbon dioxide)	Insignia Technologies SINTEF Infratab UWI Technology ITENE and Kao Chimigraf	Sensors work in conjunction with MAP to monitor oxygen or carbon dioxide levels to provide consumers with an accurate way to detect true food spoilage.
Product removal	LiquiGlide™	Permanently wet, liquid-impregnated surface coating enables consumers to remove food products entirely from packages.
Portion packaging	Fyffes & Midlands Co-op Bemis Mother Parkers	Right-size packaging for sale or consumption prevents food waste by allowing for controlled portions or doses.

Reducing food waste provides a wide range of benefits across the packaging value chain:

- Reduction of lost inputs used to produce food that is wasted (e.g., water, fertilizer, pesticides, fuel and packaging);
- Cost savings to businesses, consumers and municipalities;
- Reduction in carbon dioxide emissions from energy use and transport; reduction in methane emissions from landfills (methane is a potent greenhouse gas); and
- Increased food system productivity and efficiency

These benefits directly impact packaging manufacturers and suppliers, retailers, waste handlers and consumers.

It is important to note that the packaging solutions listed in the summary chart on the previous pages are not the only options to tackle food waste. Other technologies are actively being developed.

Next Steps

PAC FOOD WASTE works to unite leading North American organizations throughout the packaging value chain to collaboratively explore, evaluate, and mobilize sustainable packaging solutions for the prevention and reduction of food waste. PAC FOOD WASTE invites you to publicly document and [share your packaging case studies](#) as we continue to promote the value of packaging and its role to help reduce food waste.

Your feedback is welcome and appreciated. Please send your questions and comments to Alan Blake, PAC FOOD WASTE Director, at alanblake7@gmail.com.

Thanks to Karishma Chandok, PAC intern, who helped in the research and writing of this report.

Disclaimer

The conclusions and views expressed in this report do not necessarily reflect the views of every PAC FOOD WASTE Member Company or Affiliate. Please also note that PAC is not in any way or form promoting these companies or the selected packaging solutions but rather sharing them as examples of what industry is offering.

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P-Plus® lidding film extends shelf life of strawberries

COMPANY/ ORGANIZATION	
FOOD CHAIN AREA	
ISSUE ADDRESSED	<p>Strawberries normally have a very short shelf life, of only 1 to 3 days. The quality and shelf life of the fruit in part depend on post-harvest storage conditions. Many varieties of strawberries exist, each with their specific respiration rate requiring specific storage conditions.</p>
SOLUTION	<p>Amcor's P-Plus® lidding film on trays can extend the shelf life of strawberries. Through micro-perforation technology, the film's permeability is able to match the product's respiration rate. Amcor investigated shelf life extension across all varieties and throughout the entire season, and it developed an extensive range of tailored permeability films designed to maintain freshness and extend the shelf life of fresh produce.</p>
EXPECTED BENEFITS	<p>Extended shelf life and reduced food waste: The film has been shown to increase the shelf life of strawberries to at least 4 days from packing. The quality and taste were maintained throughout the additional days of shelf life for all varieties of strawberries. The film has also been shown to help reduce in-store food waste by up to 50%.</p> <p>Convenience: The film is applicable to almost all substrates and formats.</p> <p>Environmental sustainability: It is recyclable.</p>
CASE LINK	www.amcor.com
CONTACT INFORMATION	<p>Amcor Rigid Plastics Brampton Mail: 95 Biscayne Crescent, Brampton, ON L6W 4R2 Canada Tel: 905-450-5579</p>