FOOD WASTE REDUCTION CASE STUDIES

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Proud  Member

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Disclaimer

The conclusions and views expressed in this report do not necessarily reflect the views of every PAC FOOD WASTE Member Company or Affiliate.

INTRODUCTION

PAC FOOD WASTE held its inaugural meeting on December 5, 2013 in Toronto where members agreed that there is a significant amount of useful research available related to food waste. As a result, PAC FOOD WASTE launched this project that outlines an approach for collecting, organizing and accessing this information. The project objectives are as follows:

- To identify and build an inventory of global packaging case studies for food waste reduction
- To construct a PAC FOOD WASTE web portal containing a searchable database of global case studies on reducing food waste.

Reducing food waste is expected to provide a wide range of benefits across the value chain in the following areas:

a. Packaging suppliers – reduced packaging development costs, expanded product offerings
b. Retailers – less food waste throughout the retail supply chain (e.g. at stores), less packaging, reduced operating costs
c. Waste handling – less food contamination in the waste-processing stream, less packaging, reduced operating costs, potentially improved packaging recyclability
d. Consumers – reduced food waste that typically occurs in the home

PAC FOOD WASTE will continue developing the case studies database through the PACit! Knowledge Center available on the PAC website – pac.ca.

METHODOLOGY

The PAC FOOD WASTE project team developed a template to provide an overview of the case study along with searchable keywords so that users can find relevant case studies quickly. There are six (6) food chain areas identified in the template:

1. Raw material transportation
2. Manufacturing / processing
3. Warehousing / storage
4. Finished goods transportation
5. Point of purchase – Retail or Food Service
6. Consumer

When selecting appropriate case studies, it was agreed that studies less than 10 years old would be included to ensure relevance. The approach has been to look for recent and relevant examples from:

- Researchers in peer-reviewed journals
- Corporations
- Research organizations and industry groups

In the future, PAC FOOD WASTE would like to create a knowledge-sharing forum by inviting member organizations to publicly document and share their case studies via PACit!

CASE STUDIES

Case Study 1: IFCO Systems

TITLE	Reusable plastic containers (RPCs) for fresh produce transport
COMPANY / ORGANIZATION	IFCO
FOOD CHAIN AREA	1. **Raw material transportation**
KEYWORDS	reusable plastic containers, RPC, transport, shipping, fresh produce, temperature control
ISSUE ADDRESSED	Fresh produce shrink occurs due to physical damage and quality loss from inadequate temperature control. During transport from grower-shippers to retail stores, approximately 10-15% of produce is rendered unsalable.
SOLUTION	Reusable plastic containers (RPCs) reduce fresh produce shrink by increasing temperature control and reducing physical damage. A smooth interior reduces mechanical damage while ventilation allows for faster cooling and field heat removal. Containers are easy to assemble, ergonomic, and reduce the need for box cutters and staples. A patented wave-bottom design maximizes pack-out while strong sidewall support increases sturdiness. Pallets can also be cross-stacked, further increasing their stability. 
EXPECTED BENEFITS	**Increased temperature control:** Product in RPCs was better hydrated and in better condition than product in wax boxes. Removal of field heat was twice as fast compared to cardboard. **Reduced physical damage:** Studies show that 0.8% more produce arrived damaged in disposable packaging vs. reusable packaging. **Improved resource efficiency:** Compared to cardboard box systems, RPCs produce 82% less solid waste; 39% lower total energy requirements; and 29% less greenhouse gas emissions. **Reduced supply chain costs:** Savings of up to $1 per case have been identified. In particular, the ergonomic and stackable design of RPCs drives 20-40% labor reductions in distribution centers.
CASE LINK	http://www.rpckiosk.com/pdf/waste-reduction-with-ifco-rpcs-november-2013-1.pdf http://www.ifco-us.com/america/na/en/biz_rpc/grower/index.php
CONTACT INFORMATION	**IFCO Systems US LLC** **Mail:** 3030 N Rocky Point Drive, Suite 300, Tampa, FL, 33607 USA **Telephone:** 813-463-4100

Case Study 2: Heinz

TITLE	Replacing pallecon liner bags with direct product feeding reduces packaging and product waste
COMPANY / ORGANIZATION	Heinz Single Service Limited
FOOD CHAIN AREA	**1. Raw material transportation** **2. Manufacturing / processing**
KEYWORDS	pallecon, direct feed, processing, sauce, polyethylene lining bags
ISSUE ADDRESSED	Pallecons were used as an intermediary means of storing and transporting sauce from the production site to the packing site. Sauce was filled into food-grade polyethylene-lining bags that, once emptied, were disposed of to landfill, carrying a residual amount of sauce inside. Re-use of these bags was not possible.
SOLUTION	The processing plant eliminated the use of pallecons and plastic liner bags by directly feeding the product into intermediate bulk holding tanks, from which the product is transferred to filling machines.  Pallecon with plastic liner bag  Bulk holding tank
EXPECTED BENEFITS	**Reduced packaging waste:** The number of pallecon lining bags the processing plant required per year was reduced by over 3,000. **Reduced product waste:** Eliminated 40 tonnes of product waste from being sent to landfill. **Other benefits:** Utility efficiencies through longer production runs. The use of less pallecons increased plant safety by increasing storage space and reducing vehicle movements around the site.
CASE LINK	http://www.igd.com/our-expertise/Supply-chain/WastePrevention/15854/Heinz-Single-Service-Limited-Telford/
CONTACT INFORMATION	Heinz Single Service Ltd. Hortonwood 2, Telford, TF1 7XW, United Kingdom Phone: 01952 678 414

Case Study 3: DuPont

TITLE	HDPE air cargo liners protect temperature-sensitive cargo from solar radiation
COMPANY / ORGANIZATION	Dupont (in development with Cargolux)
FOOD CHAIN AREA	**3. Warehousing / storage** **4. Finished goods transportation**
KEYWORDS	HDPE, air cargo, transportation, storage, solar radiation, temperature-sensitive, liner, cold chain
ISSUE ADDRESSED	Maintaining proper temperature during air transport is most difficult during temporary breaks in the cold chain – where cargo is subject to extreme conditions such as prolonged exposure to solar radiation and/or ambient temperature extremes on the tarmac. Temperature-sensitive cargo is especially prone to spoilage during air transport.
SOLUTION	DuPont™ Tyvek® Air Cargo covers provide thermal protection to sensitive cargo from the damaging effects of solar radiation heat. Made from HDPE, they are lightweight, tear resistant, and easy to use. The reflective property of Tyvek helps keep shipments naturally cooler and allows for rapid cooling of the load when placed in chilled storage or cooling chambers, shortening cooling times. Tyvek is also permeable, enabling gases and vapors to escape, helping reduce spoilage and condensation. In addition, Tyvek Air Cargo Covers provide protection from heavy rains and a variety of airborne contaminants. 
EXPECTED BENEFITS	**Reduced wastage:** One client, Newrest First Catering, reduced wastage by ⅔ by using Tyvek covers. **Improved cold chain management:** Generates an average of 15.4°C lower temperature when compared to an uncovered load and 9.2°C lower than ambient temperature. Tyvek covers provide better temperature control during breaks in the cold chain and significantly lower relative humidity to comparable cargo covers. **Increased savings:** Reduced costs associated with losses, excursion management, secondary packaging and shipping.
CASE LINK	http://www2.dupont.com/Air_Cargo_Covers/en_US/index.html http://www2.dupont.com/Air_Cargo_Covers/en_US/assets/downloads/DPT13_19091_Brochure_me02.pdf
CONTACT INFORMATION	**DuPont Canada** Product Inquiry Centre Tel: 1-800-387-2122 **Dupont U.S.A.** Corporate Information Center Tel: 1-800-441-7515

Case Study 4: TimeStrip®

TITLE	Smart, heat-sensitive labels assist with simple temperature management for cold chains
COMPANY / ORGANIZATION	timestrip® the smart way to measure time & temperature
FOOD CHAIN AREA	**4. Finished goods transportation**
KEYWORDS	temperature indicator labels, smart labels, heat sensitive labels, single-use
ISSUE ADDRESSED	The lack of accurate product level data due to a poorly designed temperature tracking system leads to an unpredictable cold chain; this leads to the disposal of unadulterated perishables and creates additional shrinkage and loss.
SOLUTION	Timestrips are low-cost, single-use, heat-sensitive smart labels that assist with temperature control management. Timestrips measure the elapsed time since activation, are triggered by specified temperature ranges, and can also show the duration of that temperature breach. Timestrip labels are simple visual indicators, which require no expertise to read. Its simplicity allows all users to easily read and understand information. Timestrip labels are completely inert prior to use and can be shipped and stored at ambient temperatures. Simply squeezing a bubble located on the label, which can be done at any time, activates the Timestrip indicator. Each indicator contains a porous membrane, through which a colored liquid travels at a pre-calibrated rate. A red line appears almost immediately to confirm that the indicator is active. The indicator window will completely fill with colour as time goes on.  Timestrip Plus
EXPECTED BENEFITS	**Reduced wastage:** Timestrips quickly indicate whether there has been a temperature breach, which allows employees to respond accordingly in order to avoid a shipment being wasted. **Increased sales:** Increased sales can be achieved by building consumer confidence. Timestrips act as a quality seal and assures customers that your cold chain has remained intact all along the way.
CASE LINK	http://www.timestrip.com/temperaturemonitoring.php
CONTACT INFORMATION	**Timestrip® Worldwide Headquarters** Timestrip UK Limited Trinity House, Cambridge Business Park Cambridge CB4 0WZ United Kingdom UK Tel: +44 (0) 8450 944 123 US Tel: 1-516-441-0133

Case Study 5: Fyffes & Midlands Co-operative

TITLE	Introducing smaller boxes reduces banana waste in convenience stores
COMPANY / ORGANIZATION	Fyffes (in partnership with Midlands Co-operative)
FOOD CHAIN AREA	**4. Finished goods transportation**
KEYWORDS	bananas, cartons, packaging, convenience stores
ISSUE ADDRESSED	A high level of banana waste occurs in convenience stores, often as a result of overstocking product.
SOLUTION	Through the guidance of WRAP and IGD, Fyffes and Midland Co-operative identified that current 18kg boxes were too large for convenience stores. Smaller 12kg banana boxes were introduced to better match store demand with supply.  The original 18kg boxes alongside the new 12kg boxes.
EXPECTED BENEFITS	**Reduced waste in-store:** Smaller boxes minimized stock carry over at the end of the day's trading. In the study, smaller boxes introduced into 8 convenience stores would reduce waste by 90% and CO_2 emissions by 56 tonnes each year. **Higher product quality and improved sales:** More frequent replenishment meant the fruit was fresher and less marked or bruised, which resulted in high customer satisfaction and additional sales.
CASE LINK	http://www.wrap.org.uk/sites/files/wrap/Waste%20prevention%20case%20studies_0.pdf (Page 10)
CONTACT INFORMATION	Fyffes Plc 29 North Anne Street, Dublin 7, Ireland Tel: + 353 1 887 2700

Case Study 6: RAP

TITLE	Extended cold sandwich shelf life using modified atmosphere wedges
COMPANY / ORGANIZATION	RAP PACKAGING THE FUTURE
FOOD CHAIN AREA	**5. Point of purchase – Retail or Food Service**
KEYWORDS	modified atmosphere, hermetically sealed, oxygen scavenging, barrier film, carton board, laminate, sandwiches, cartons, retail packaging
ISSUE ADDRESSED	Due to their limited shelf life, a high proportion of prepared cold sandwiches goes to waste. DayFresh™ and standard cartonboard sandwich packs for chilled sandwiches are suitable for display for only 1 to 3 days.
SOLUTION	An extended shelf life of chilled sandwiches can be achieved using RAP's Modified Atmosphere (MA) Carton Sandwich Wedge. As the world's first hermetically sealed carton sandwich pack, freshness is sealed in and products are protected from contamination. Its barrier film flushes out gasses, achieving less than 1% residual oxygen inside the wedge. The MA Wedge is made from sustainable carton board and film laminate, reducing the need for oil-based plastics. It also features easy perforated openings, anti-mist windows, and high quality print surfaces for branding. 
EXPECTED BENEFITS	**Extended shelf life/reduced food waste**: Depending on the ingredients, a shelf life of up to 28 days can be achieved; this can significantly reduce the amount of wasted product. **Reduced costs:** MA Wedges are 20% lighter than equivalent packaging, resulting in decreased production and shipping costs. **Improved resource efficiency:** Reduces the need for oil-based plastic by 80% compared to plastic skillets. Carton board is also widely recyclable.
CASE LINK	http://www.rapuk.com/wp-content/uploads/2013/10/17740_RAP_white-paper-doc-LR2.pdf (Pages 5-8) http://www.rapuk.com/product/carton-wedge-long-life-freshpack-2/
CONTACT INFORMATION	**Mail:** 107 Mortlake High Street, London, SW14 8HQ **Telephone:** +44 (0)20 8392 8320 **Email:** info@rapuk.com

Case Study 7: It'sFresh!

TITLE	Extending strawberry shelf life using ethylene-absorbing packaging strips
COMPANY / ORGANIZATION	IT'S Fresh!®
FOOD CHAIN AREA	**5. Point of purchase – Retail or Food Service** **6. Consumer**
KEYWORDS	strawberries, modified atmospheric packaging, ethylene-absorbing, ethylene removal, retail packaging
ISSUE ADDRESSED	Fresh strawberries have a limited shelf life partly due to the release of ethylene, a hormone that causes fruits to ripen and then turn moldy.
SOLUTION	A small plaster-style strip, measuring 8 cm x 4.5 cm, is added to the bottom of each strawberry punnet. Each strip contains a patented mixture of clay and other materials that filters the air and absorbs ethylene. By absorbing ethylene, the strips increase shelf life by reducing premature degradation and waste, and increasing natural disease resistance. The strips work in all temperatures and atmospheres and do not affect the recyclability of the packaging. Test retailers claim there is no extra cost to the consumer of the packaging. 
EXPECTED BENEFITS	**Increased shelf life:** Research finds that It'sFresh! extends the life of strawberries (and other fruit) by a minimum of 2 days. **Wastage savings:** Trials carried out in Marks & Spencers stores showed a minimum wastage saving of 4% – during the peak strawberry season this would equate to 40,000 packs, or about 800,000 strawberries.
CASE LINK	http://www.writtle.ac.uk/pge_PressRelease.cfm?ID=1050 http://www.theguardian.com/environment/2012/jan/06/marks-and-spencer-packaging-fruit
CONTACT INFORMATION	**It'sFresh! Ltd (UK)** **Simon Lee** Director Tel: + 44 (0) 1675 431 001 E-mail: simon.lee@itsfresh.com **It'sFresh! Incorporated (USA)** **Greg Pavett** President Tel: +1 (952) 361 0002 E-mail: gpavett@itsfreshinc.com

Case Study 8: Innovia Films

TITLE	Extending fresh produce shelf life using MAP
COMPANY / ORGANIZATION	innovia FILMS
FOOD CHAIN AREA	**5. Point of purchase – Retail or Food Service** **6. Consumer**
KEYWORDS	modified atmospheric packaging, MAP, flexible film, moisture absorbing
ISSUE ADDRESSED	A high amount of food waste occurs along the supply chain due to the limited shelf life of fresh produce.
SOLUTION	Viridiflex® is a transparent film made from compostable, renewable raw materials that extends the shelf-lie of fresh produce by modifying the atmosphere in pack. Viridiflex keeps products drier than conventional films, while NatureFlex™ film provides a degree of permeability to moisture. Together, controlled moisture release prevents dehydration on one side and mould growth on the other. Specific oxygen barrier properties can be manipulated using Adapt MAP laser technology to maintain optimum gas levels. Viridiflex can be used for vertical form fill seal and flow wrap applications, or as lidding film.  ASDA's Extra Special Cornish Crystal Potato packs using Viridiflex film.
EXPECTED BENEFITS	**Extended shelf life:** Tests have shown that potatoes or parsnips wrapped in Viridiflex are as fresh on day five as on the day they were packed. **Improved customer satisfaction:** ASDA customers have benefited from a significant increase in product life and end of life product quality. This was highlighted by a report of a 92% year on year reduction in complaints in the first five weeks of the Extra Special Cornish Crystal Potato season using Viridiflex film.
CASE LINK	http://www.innoviafilms.com/NatureFlex/Case-Study.aspx?id=14
CONTACT INFORMATION	Regional Head Office (United States and Canada) 290 Interstate North Cir SE, Suite 100 Atlanta, Georgia, USA 303339-2401 Tel: 1-877-822-3456 Email: NatureFlex@innoviafilms.com

NEXT STEPS

The next phase of this project is to develop web portal access via PACit! that would be accessible for member companies to submit their own case studies in addition to peer-reviewed or third-party studies populated by PAC. This access would provide visibility to the highlighted one-page case summaries. The PAC Food Waste team will then determine how and when to make the information available more broadly.

We welcome and appreciate your feedback. Please send your questions and comments or submit your own case study (template provided in the Appendix) to Rachel Morier, Program Manager at rmorier@pac.ca.

APPENDIX – CASE STUDY TEMPLATE

TITLE	*A title for the case study.*
COMPANY / ORGANIZATION	*The company or organization submitting the case study. There can be multiple entries here.*
FOOD CHAIN AREA	*The possible supply chain areas are:* *1. Raw material transportation* *2. Manufacturing / processing* *3. Warehousing / storage* *4. Finished goods transportation* *5. Point of purchase – Retail or Food Service* *6. Consumer* *It is possible to select more than one.*
KEYWORDS	*This is a free format area that would be completed by the case authors. Potential keywords could refer to the product (e.g. grapes, bananas) or the area of the work (e.g. waste measurement).*
ISSUE ADDRESSED	*This area is for a 2 -3 sentence description of the problem being solved.*
SOLUTION	*This area provides a brief description of how the problem was solved. Approx. 4 – 5 sentence paragraph with photograph.*
EXPECTED BENEFITS	*The Expected Benefits section briefly outlines two things;* *1. the area of benefit (e.g. increased shelf life, reduced product damage* *2. the amount of improvement which could be a percentage, a time unit, a weight, etc.*
CASE LINK	*This section would provide an internet link to the case.*
CONTACT INFORMATION	*This area includes one or more of the following:* *1. A person's name / email address or phone number* *2. Alternatively it would be company or organizational contact information.* *3. There can be more than one contact.*
NOTES:	*1. Before a case is posted to the web site the company or organization submitting the work, must send a letter or email to PAC giving their permission for posting. The permission document can be submitted with the case.* *2. There needs to be a disclaimer on the web site entry page stating that PAC is only responsible for posting the work and is not guaranteeing that the content or results are correct.* *3. There should be a similar disclaimer for the companies and organizations posting the work.* *4. Every case must have at least one contact person or organization.* *5. The assumption is that the each case is stored on a secure PAC server, accessible (initially) only to members.*