



Reduction of food waste and advanced packaging which contributes to promotion of exports of agricultural, forestry and fishery products and foods

<Additional version of December 2018>

農林水産省

Food Industrial Policy Office
Biomass Policy Division
Food Industry Affairs Bureau



■ Preservation of freshness

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Packaging that contributes to reduction of food waste

- Various programs are underway for packaging that contributes to reduction of food waste.
- Programs differ depending on kinds of food. Programs become more effective if they are combined with each other or if improvements are made in the food production process.



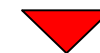
脱酸素剤 エージレス



Usage example: by courtesy of Hokuren Federation of Agricultural Cooperatives

(Improvement of packaging)

- Maintain freshness of rice by combining gas-barrier packaging and deoxygenating agent
- The deoxygenating agent is effective in pre-shipment metal detector screening because it is organic and does not include iron, adopted by conventional agents.

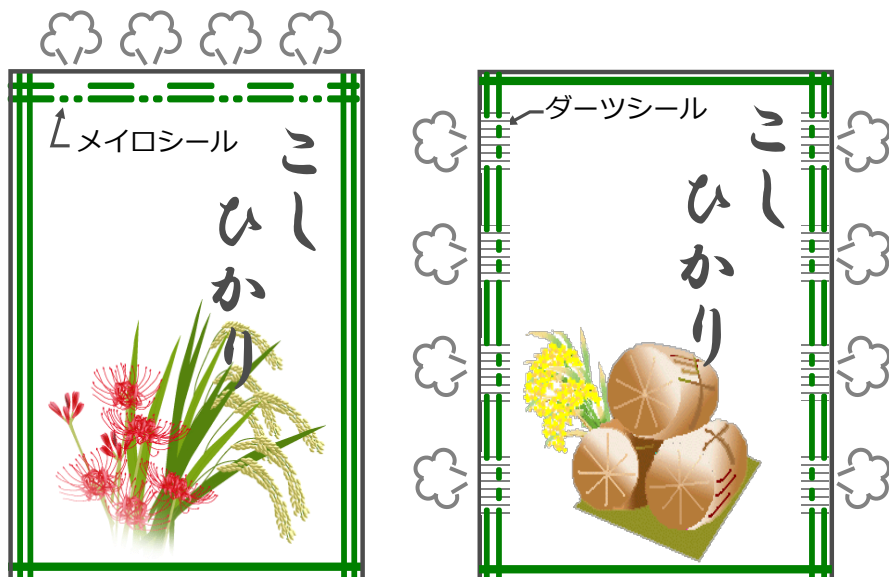


(Extension of best-before date)

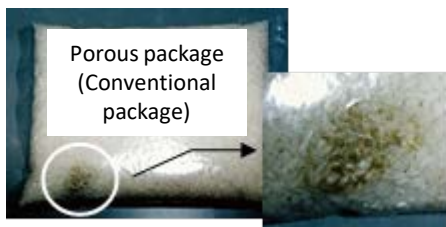
- Maintain freshness as the use of a deoxygenating agent prevents oxidation. Contribute to the reduction of food waste by extending the period of storage during sale at retailers and production plants.

(Sale) From November 2002

無孔袋「メイロシール袋」「ダーツシール袋」



- Test on water intrusion into non-porous package
*Results of a test pouring water over rice packages and storing them for 7 days at 30 degrees C.



- Porous package: Occurrence of molds
- Non-porous package: No occurrence of molds

(Sale) From 1994

(Improvement of packaging)

- Conventional rice package was porous for the release of air in compliance with distribution and sales forms (foreign matters occasionally enter)
- Shift to non-porous rice package having a labyrinthian seal to release air from inside



(Reduction of returns and disposal)

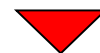
- Prevent the entry of bugs and other foreign matters through air-release holes and the occurrence of molds caused by the entry of water through them.
- Reduction of returns and disposal by distributors and sales outlets

Healthy Kitchen ZERO 糖質0 ロースハム ハーフベーコン



(Improvement of packaging)

- Adopt “Biomatech IB-PET” given gas barrier properties by transparent evaporation technology
 [“Biomatech” is a packaging material developed by Dai Nippon Printing Co., partially using a plant-derived material.]
- Designed for easy opening without big changes to packaging form



(Reduction of food waste)

- Biomatech, though designed for environmental load reduction, maintains gas barrier properties and freshness equivalent to that ensured by conventional packaging.
 * Compared with oil-derived plastic films, Biomatech reduces life-cycle greenhouse gas emissions by approximately 10%.

(Improved user-friendliness)

- As shown in the left photo, Biomatech uses a film with advanced straight tearing properties for easy opening and access to contents.

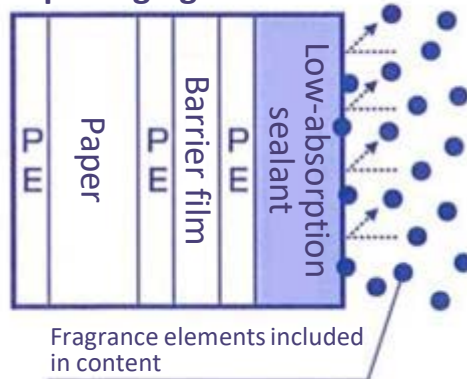


(Sale) From February 2017

DNP低吸着包材（液体紙容器）



● Work of low-absorption packaging material



(Improvement of packaging)

- Place a resin (low-absorption sealant) to curb the absorption of specific elements (fragrance, flavor, etc. of content) in the deepest part of a multi-layer paper package.



(Maintenance of freshness and quality)

- Maintain flavor longer than usual by curbing the package's absorption of fragrance elements (30% increase in D-Limonene, the major component in citrus fruit fragrance, in comparison with conventional paper packages)

うなる美味しさ うな次郎 長持ちパック

<Problems before improvement>

- Concern about possible food waste due to short best-before date
- Low sales in seasons other than summer

<Improvement of packaging>

- Package: Adopt foamed package having heat-insulating, heat-resistance and oxygen-barrier properties
- Upper lid: Adopt film having high oxygen-barrier properties

<Extension of best-before date>

- Remove oxygen from airtight package and fill it with gas to curb the oxidation of food and breeding of germs
⇒ Extend best-before date to 17 days from 10 days
(Cooling at 1-10 degrees C is needed)

<Improvement of user-friendliness>

- Heating food in package in microwave oven is possible
- Package does not become too hot after heating and holding it with hands is possible
- Extended display at stores increases sales in seasons in addition to summer

Would it really also sell outside of eel season?

It remains on the store shelf unsold...



(Structure of upper lid) 外部(包装材料)



上面



【容器構成】 内部(容器内側)



外部(容器外側)

(Sale) From February 2018

チキンラーメン保存缶・カップヌードル保存缶



(Improvement of packaging)

- Prevent oxidation by enclosing a deoxygenating agent in a metal can to create an oxygen-free condition inside



(Extension of best-before date)

- Both canned noodle products can be preserved for three years as disaster food stocks, compared with 8- and 6-month best-before dates for Chicken Ramen and Cup Noodles, respectively.



Storage can for Chicken Ramen



Storage Can for Cup Noodles

(Sale) From September 2012

なごやん



(Sale) From March 2018

(Improvement of packaging)

- In the conventional package made of a film given oxygen barrier properties, a deoxygenating agent was enclosed to curb oxidation for the maintenance of quality.
- Addition of a film with moisture barrier properties further extends the maintenance of quality.



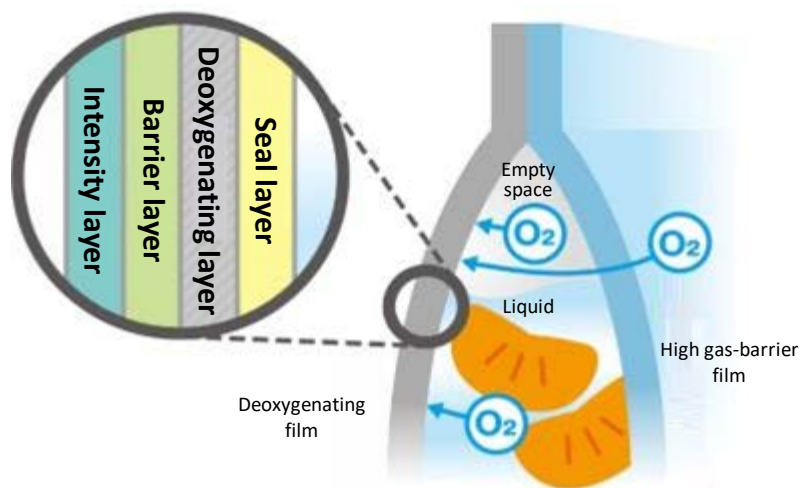
(Maintenance of quality and extension of best-before date)

- Extend best-before date to 60 days from 45 days by maintaining moist texture of product in addition to curbing oxidation

脱酸素フィルム エージレス・オーマック



Structure of deoxygenating film Ageless-Omac



(Improvement of packaging)

- Adopt oxygen-absorbing layer in multi-layer structure
- Freshness is maintained by oxygen-absorbing layer that absorbs oxygen (1) in the upper space (head space), (2) blended in syrup and (3) transmitted from outside.
- Use of a transparent film on one side impresses consumers with the freshness of food products (fruits).



(Extension of best-before date)

- With gas barrier pouch alone: 3 months
 - Use of deoxygenating film: 12 months
- Conditions: Storage at normal temperature and transportation at normal temperature

(Other effects)

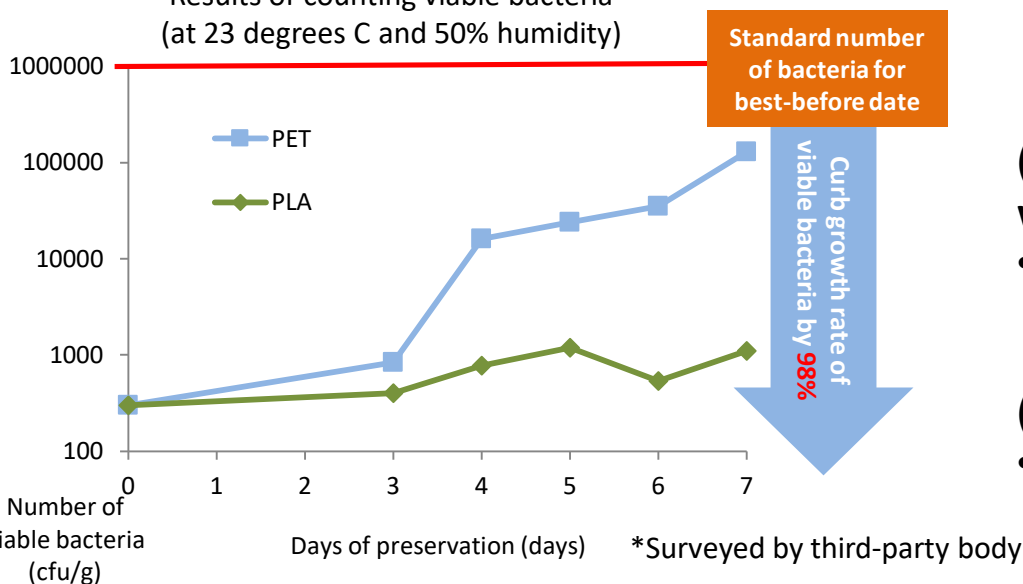
- Easier opening
- Contribution to reduction of food waste

(Sale) From 2002

ニュートカップ° NT 105-300B



Results of counting viable bacteria
(at 23 degrees C and 50% humidity)



(Improvement of packaging)

- Use package (body and lid) based on polylactic acid (PLA), which is highly water-permeable.
- Keep humidity lower than set level inside to curb the growth of bacteria that causes the degradation of freshness and decomposition.

Moisture, oxygen and carbon-dioxide permeability rate of each material

	PLA	PET	PS
Rate of moisture permeability	240ml	20ml	100ml

Moisture, oxygen and carbon-dioxide permeability rate of each material
(unit: g/m2 per day)

(Thickness of measuring sample: 30um, unit: 1cc = 1cm3 = 1ml)

* Quoted from comparison of antibiotic properties between polylactic acid fiber and polyester fiber



(Extension of best-before date and reduction of food waste)

- Reduce food waste by extending best-before date of vegetables and fruits by 1 to 2 days

(Collateral effect)

- Compost and reduce waste, utilizing PLA's feature (*biodegradability)

おいしいプロテインスティックオレンジ 30本・14本



(Improvement of packaging)

- Each stick is filled with 10g
- Selection from 3 kinds of volume is possible in accordance with targeted number of intakes



(Reduction of food waste)

- Small packaging, unlike big bag-type packaging, enables users to consume the product without considering ways of preservation after opening.
- Contribute to the reduction of food waste as the elimination of measuring work helps users continue consumption until the last.

(Sale) From March 2018

小麦胚芽のクラッカー

①



②



③



(Improvement of packaging)

- 3 types of product made available in accordance with consumers' family makeups and needs for consumption volume

- ① 64 pieces (individually packaged): Use by family
- ② 32 pieces (individually packaged): Use by couple
- ③ 26g (pouch with zipper and smaller piece for full consumption): Use by people living alone and for personal consumption)



(Reduction of food waste)

- Contribute to the reduction of food waste as the selection of suitable consumption amount is possible

(Sale) From April 2018

オールレーズン



Change to individually
packaged pouches
each holding 2 pieces

(Improvement of packaging)

- Change the package of “All Raisins” to individual packaging (1 package consisting of 6 pouches each holding 2 pieces) in 2016.



(Reduction of food waste)

- Individually packaged pouches enable the preservation of products while maintaining their freshness even after opening the bigger package.
- Reduce food waste in households as individual packaging enables the preservation of leftovers.

(Sale) From 2016

デコレーションケーキ等の別添苺



Before improvement



After improvement



(Sale) From 2014

(Improvement of packaging)

- In the case of decorated cakes, etc., strawberries, separated from a cake on a plastic tray placed in a paper box, may be damaged as they hit each other during transportation.
- The changed tray does not use a buffer, used in the conventional tray, but has dents that separately hold strawberries to prevent each of them from moving.



(Reduction of food waste)

- Reduce food waste as the partition prevents strawberries from bumping against each other and so preserves the quality of products.

(Other effects)

- Cut in the amount of plastic used due to the elimination of buffers and weight reduction of trays (Approximately 40% cut in the weight of package and 3 ton cut in the use of plastic used per year)

「スマートカット」[®]ジッパー袋

Horizontal opening

Reseal with zipper

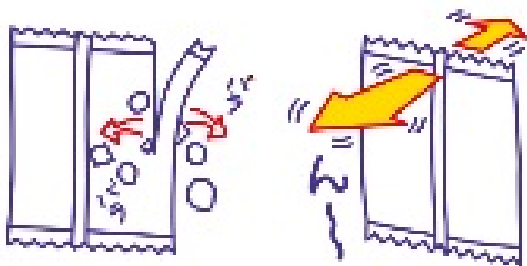


No damage to food labeling



(Sale) From April 2013

(Conventional package)



Content falls out Power needed to open Damage food labeling



(Improvement of packaging)

- Improve a pouch, widely used for candies, etc., so that anyone can easily open it horizontally without using any tool
- Adopt a zipper for preservation after opening



(Reduction of food waste)

- Improved resealing after opening enables the preservation of leftovers
- No damage to food labeling such as best-before date and allergy warning after opening
- Contribution to the reduction of food waste through full consumption

3本入り串団子シリーズ



Before change



After change: Addition of concave-convex surface

(Sale) From 2010

(Improvement of packaging)

- Gradual weight reduction (thinning) of the package for the “3 Stick Dango (rice dumpling) Series” begun in 2008.
- Formation of rib structure (concave-convex) on the sides of the package to prevent the crushing of packages when they are laid on top of each other.



(Reduction of food waste caused by damage to packaging)

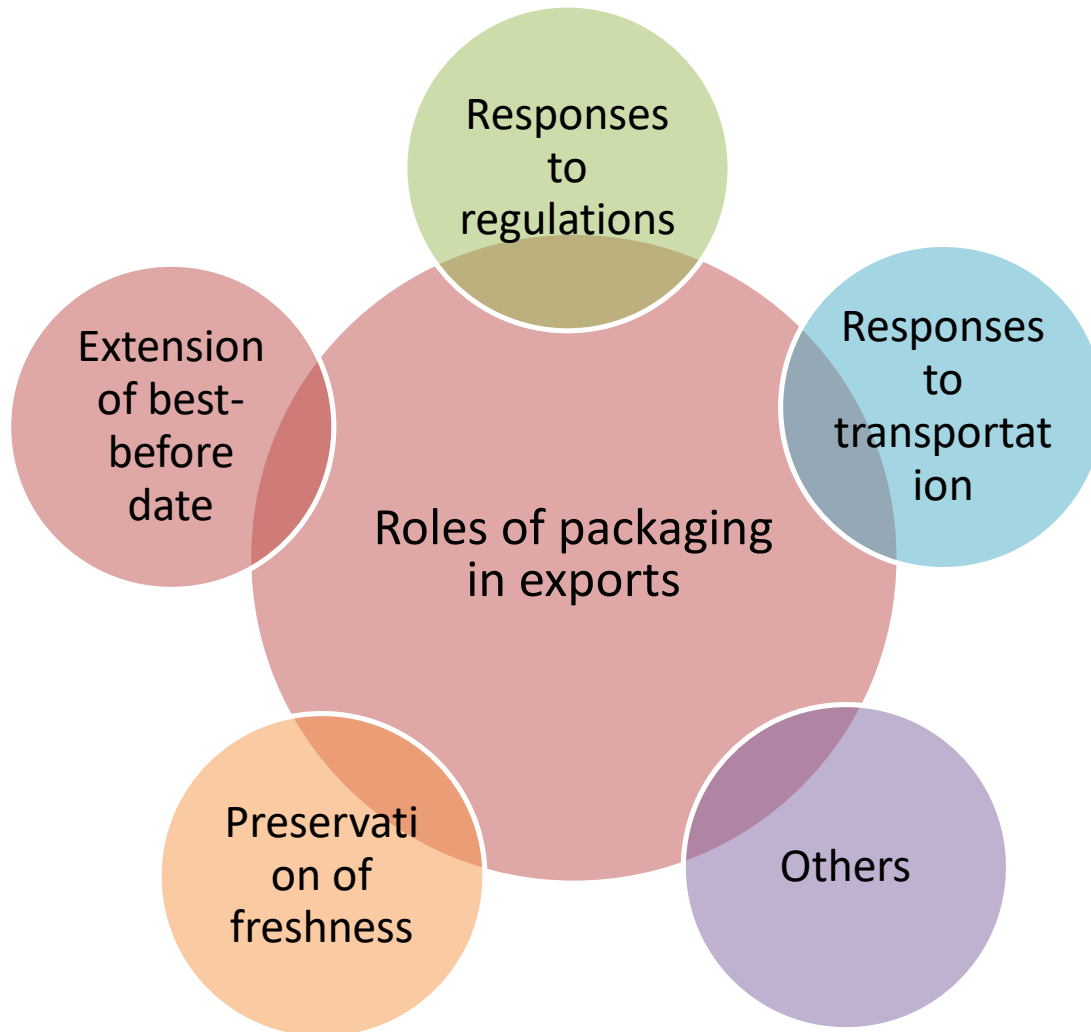
- As products of the “3 Stick Dango Series” are often laid on top of each other for display at retailers, thinning of the package and addition of a concave-convex surface to the side of the package reduce food waste, caused by damage to the packages, on store shelves.

(Other effects)

- Weight cut of 16% in the package and 144-ton cut in the amount of plastic used per year.

Roles of packaging in exports

- Functions of packaging contribute to exports of agricultural, forestry and fishery products and foods from Japan
- Flexible measures are needed to respond to regulations in export destinations and deal with transport conditions different from those in Japan



Roles of packaging in exports

- Responses to regulations
Adopt materials, etc. responsive to regulations in export destinations
- Responses to transportation
Protect products and reduce damage to them at distribution stage
- Extension of best-before date
Ensure time period from transportation to sale (ensure period for quarantine inspection, etc.)
- Preservation of freshness
Ensure time period to preserve the freshness of vegetables and fruits
- Others
Improve user-friendliness and designability as well as design environment-friendly properties

ゆりかご



Thin film is formed into strawberry-shaped dents to hold strawberries in a state of suspension.



Test sale in Hong Kong

“Innovative Technology Development and Emergency Deployment Project (Regional Strategic Project in it)

(Improvement of packaging)

- Thin film fits strawberries and curbs their movements during transportation, reducing damage to them by 10% to 30%.

(Marketing advantages for exports)

- Reduction of damage caused by in-transit shaking and shocks
- Demonstration research and development underway via marine transportation to Hong Kong (Cut in distribution cost in comparison with conventional air transportation)

“Innovative Technology Development and Emergency Deployment Project (Regional Strategic Project within this)

Awarded Japan Star JETRO
Chairman Prize at 2015 Japan
Packaging Contest

Awarded Invention Award from
Japan Institute of Invention and
Innovation and Japan Patent Office
Commissioner Prize in 2016



パルプモウルドトレー (リンゴ用他)



New products: 24H and 25H for apple exports



Packaging at JA Tsugaru Mirai

(Sale) From October 2017

(Improvement of packaging)

- Paper package, with shock- and moisture-absorption and air-permeability properties, enwraps apples and maintains their freshness.

(Marketing advantages for exports)

- Processing into pallet size for exports improves loading efficiency by 1.5 times and reduces cost.
- Environment-friendly as recycling from paper to paper is possible

(Export destinations)

- Thailand, Hong Kong, Malaysia, Singapore, etc.



Use at volume retailer in Hong Kong in 2018: For display and other vegetables



e-Fresh(エチレングス・V O C 吸着分解剤)

Producers: JA Zen-Noh Ibaraki and JA Joso Hikari

Exporter: Matsugen Co.

Use 5g package (44 x 75 mm) per carton



(Sale) From August 2016

(Improvement of packaging)

- Placement of an absorption and decomposition agent in each existing package

(Preservation of freshness and product quality)

- Preservation of freshness is possible as agricultural products absorb and decompose ethylene gas generated by them.
- Maintain the texture and flavor of agricultural products by curbing the consumption of carbohydrate, etc. caused by in-transit stress (shaking, etc.)
- The freshness of pears was maintained in a 14-day export process from selection, packaging, quarantine to export (by sea). Preservability on store shelves after arrival was also highly praised.

(Export destination)

- Vietnam: 150 tons

*Ethylene gas: A gas, generated by plants, accelerates the maturation (aging) of fruit. Maturation (aging) can be delayed by removing the gas.