

### 鮮度の一滴シリーズ



After opening  
Approx. 30 days

Approx. 120 days

Approx. 180 days

From August 2015

### (Improvement of packaging)

- Change soy sauce bottle to pouch-type holder with special reflux stopper
- Preserve freshness and prevent oxidation after opening
- Cut weight by approx. 39% in comparison with PET bottle



### (Extend freshness)

- Used to recommend consumption within 30 days or so after opening in the case of conventional glass bottles and PET bottles. Realize the maintenance of freshness and prevention of oxidation for about 180 days after opening.

### いつでも新鮮シリーズ



#### (Improvement of packaging)

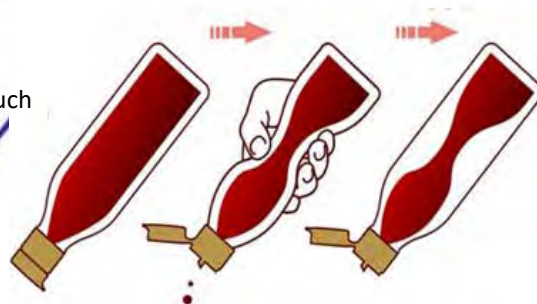
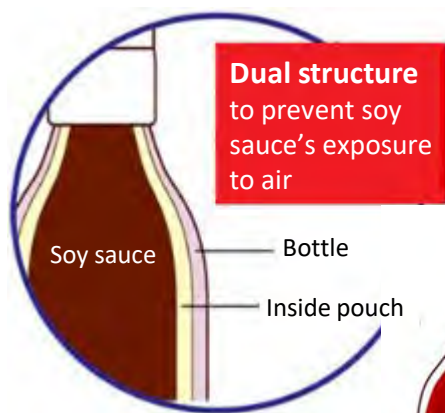
- Dual structure of the bottle prevents soy sauce's exposure to oxygen after opening and so realizes its high preservability.
- Amount of dispensing soy sauce is adjustable from small to large depending on the strength of squeeze.



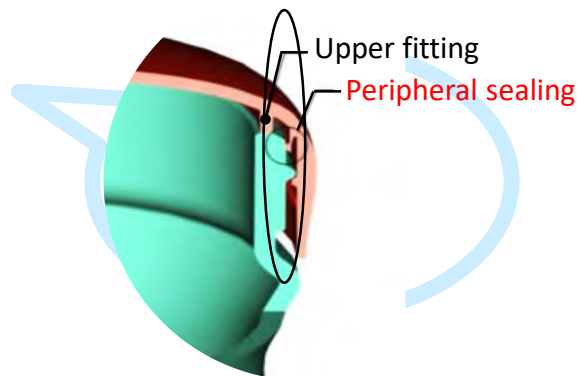
#### (Reduction of food waste)

- Preserve the freshness of soy sauce for 90 days after opening by preventing the degradation of the content through oxidation.
- Residual in the bottle is reduced as soy sauce can be dispensed to the last drop by squeezing it.

From August 2011



### 「ほんだし®」60g瓶



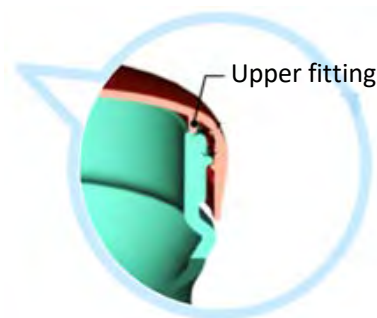
#### (Improvement of packaging)

- Attachment of rib inside the cap to seal the upper and peripheral parts of the holder improves airtightness.



#### (Reduction of foot waste)

- Curb degradation of quality after opening product
- Prevent caking with sealing cap
- Extend flavor

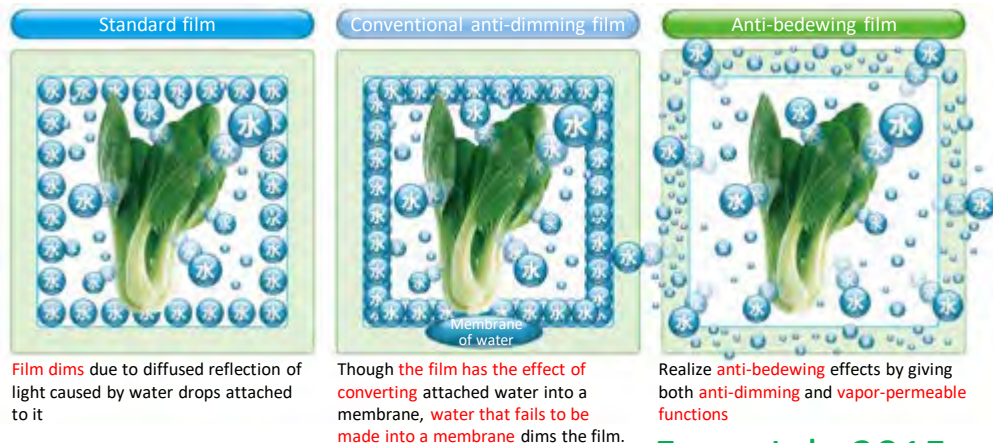


Conventional holder

From 2008

### 鮮度保持フィルム P-プラス®

#### ■ Film-by-film comparison of water content



#### ■ Comparison of bedewing reduction effects



(Storage temperatures: 10 degrees C/assumption of refrigerated showcase)

(Effects)

- (1) Prevent melting and rotting of mushrooms in the case of store sale
- (2) Curb mold and bud flush at time of exporting sweet potatoes to Southeast Asia

#### (Improvement of packaging)

- Develop anti-bedewing film by combining original blending technology and film multi-layering technology
- Maintain proper temperature inside the package with the film absorbing moisture and releasing it through its outer surface
- Curb respiration of vegetables and fruits by creating micron holes on the film and setting an appropriate amount of oxygen passing through the film depending on their kinds, weights, distribution environments, etc.

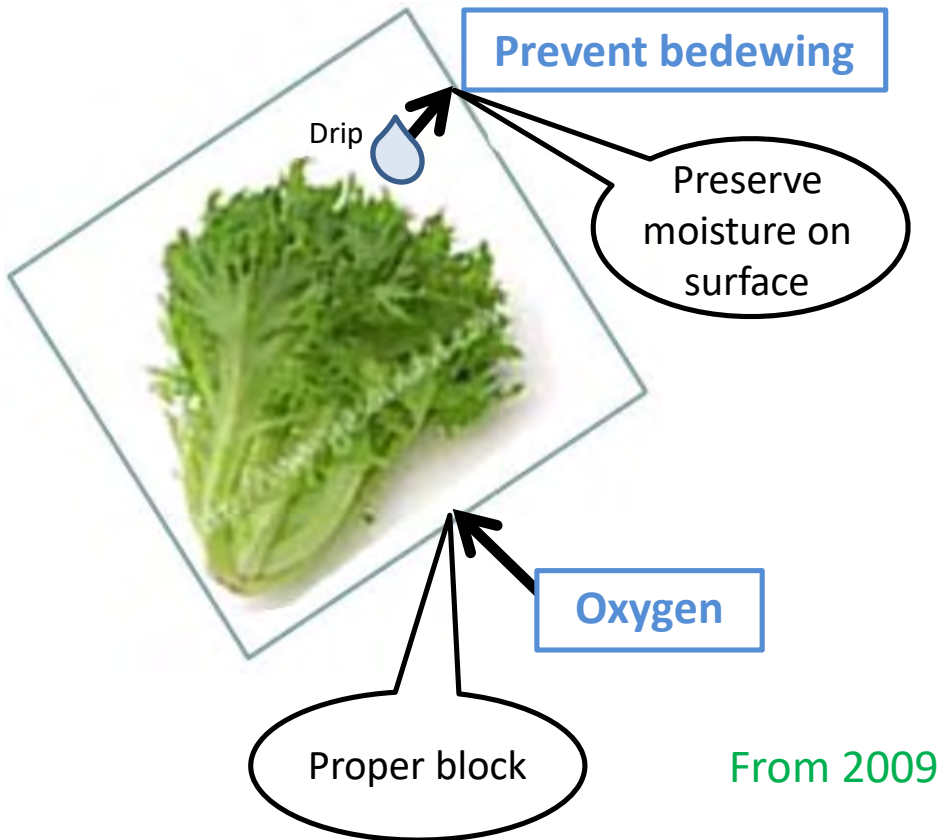


#### (Extend freshness)

- Extend the freshness of vegetables and fruits by curbing their respiration
- Reduction of food waste caused by rotting resulting from bedewing inside the package



### 鮮度保持袋 スパッシュ®

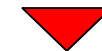


**FY 2015 Grand Prize of Mottainai (regret over waste) for Industrial Waste**  
**Win the Minister of Agriculture, Forestry and Fisheries Award**

### (Improvement of packaging)

- “Spash” (keep-fresh pouch) maintains optimum temperatures for vegetables and fruits through proper barrier effects and prevents their discoloring. It also prevents bedewing and maintains their purity and freshness inside.

|  <b>Store shelf sale (example): Cut lettuce</b><br>(condition: 4th day at storage temperature of 10 degrees C) |                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Standard package                                                                                                                                                                                  |   |
|                                                                                                               |  |
| Noticeable “darkening” and “wilting”                                                                                                                                                              | Limited “darkening” and “wilting”                                                    |



### (Extend freshness)

- Reduce food waste by extending freshness

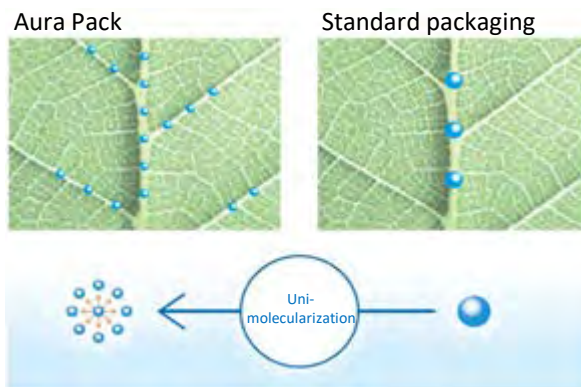
### 鮮度保持袋 オーラパック®

(Number of test days: 3rd day)

Test conditions      Average temperature 22℃      Average humidity 30%RH



↑Curb discoloring and bad smell of broccoli



Aura Pack stimulates water molecules in vegetables and fruits which stagnate after harvesting and preserves their freshness by activating water molecules.

### (Improvement of packaging)

- Special treatment of the film, such as making fine holes, maintains a “low-oxygen and high-carbon dioxide” situation inside the pouch and stimulates the activities of water molecules in vegetables and fruits after harvesting.
- Curb spoiling of vegetables and fruits, caused by water drops inside the pouch, through high anti-dimming nature.

### (Extend freshness)

- Curb discoloring and smell by keeping vegetables and fruits fresh and extend the period of preserving freshness.

Example: Broccoli

Conventional packaging: Extended to 5 days from 3 days

### (Promotion of exports)

- Expected to be used for exports from Japan

From 2008

### フリルレタス、レタスミックス



From February 2016

#### (Improvement of packaging)

- Use of pouch that greatly curbs the evaporation of moisture from vegetables and fruits

#### (Improvements in food production process)

- Production of vegetable (lettuce) inside clean room
- Wrapping in hygiene-controlled, low-temperature cutting room



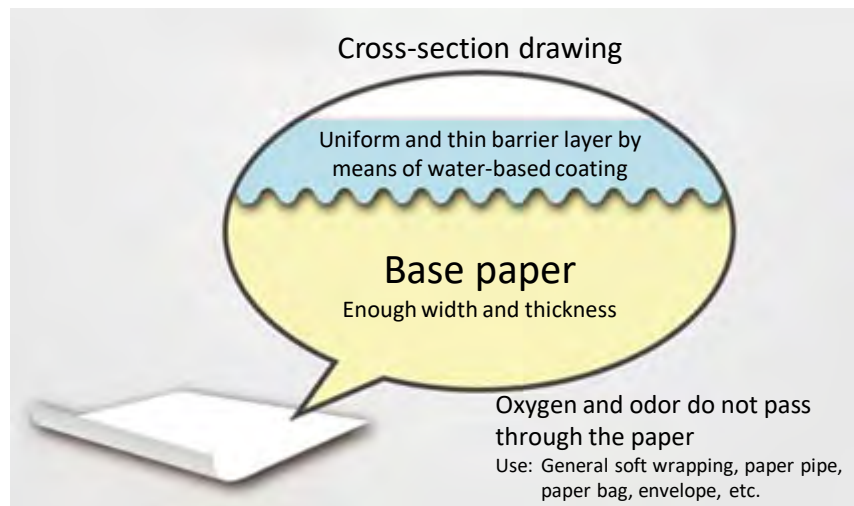
#### (Extend freshness)

- Extend the period of freshness from 2-3 days to 1 week to 10 days through synergy effects of a cut in the number of germs at the manufacturing and wrapping stages and the use of a keep-fresh pouch.

#### (Promotion of exports)

- Exports of vegetables and fruits aboard a ship with refrigerating machinery are possible.

### シールドプラス®



From August 2016

### (Improvement of packaging)

- Develop Shieldplus, which has high barrier properties against oxygen and is capable of maintaining the flavor of contents and preventing the entry of odor, by applying water-based coating to paper
- Applicable as a paper material with various thicknesses, Shieldplus can be processed into wide-ranging applications such as soft wrapping materials, cups, paper dishes, liquid containers, etc.



### (Extend best-before date)

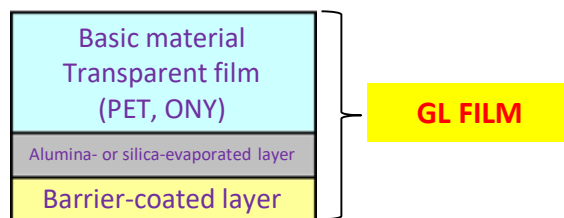
- Barrier properties against oxygen extend best-before date by preventing the oxidation of contents.
- Barrier properties against flavor curb the degradation of flavor



### GL FILM



<Cross-section drawing>



#### (Usage example: Yamaki Co. Katsuo Pack)

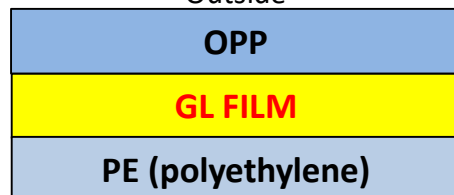


Used as inside package



(Inside package: composition of packaging material)

Outside



Inside (facing food)

#### (Improvement of packaging)

- Exercise stale barrier properties by creating inorganically evaporated and coated layers to prevent the passage of oxygen, moisture, etc. inside the film as base material
- Improve preservability by attaching film matching food in addition to high barrier properties

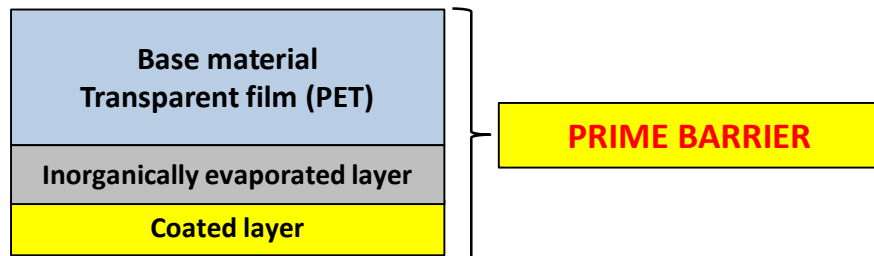


#### (Reduction of food waste)

- Preserve flavor and texture of food at the time of sealing as high flavor-retaining properties, barrier properties against oxygen and moisture-proof properties prevent the dispersal of flavor as well as oxidation and moisture absorption
- Improve user-friendliness by individual wrapping and reduce disposal waste

### PRIME BARRIER <sup>®</sup>

(Cross-section drawing)



(Usage example: Ichimasa Kamaboko Co. Tamago iri Oden 6 Shu 6 Ko)



(Composition of packaging)

Outside

|                      |
|----------------------|
| <b>PRIME BARRIER</b> |
| ONY                  |
| CPP                  |

Inside (facing food)

(Sale) From June 2013

### (Improvement of packaging)

- Develop high-barrier film “Prime Barrier” good for retort food by combining “GL Film” having barrier properties against oxygen and moisture and “Besela” with flex resistance.
- Special treatment has given the film functions to absorb the odor of retort food.



### (Reduction of food waste)

- Long-term preservation at ordinary temperature is possible due to strong resistance to the effects of temperature and humidity.
- High flex resistance curbs disposal waste caused by damage to film.

### お母さん食堂



\* FamilyMart UNY Holdings Co. has renewed its original “sozai” (prepared food) “FamiDelica” as “Mother’s Kitchen,” effective in September 2017.



### (Improvement of packaging)

- Use plastic food containers and upper lid film blocking oxygen
- Remove air from sealed containers and fill them with gases (nitrogen and carbon dioxide) to curb the oxidation of food and the multiplication of germs.



### (Extend best-before date)

- Extend best-before date of “sozai”

From August 2016

### 「ランチパック」シリーズ



From 1984

#### (Improvement of packaging)

- Use a film thinner than usual to fill package with air to maintain the quality of products.

#### (Improvement at food production stage)

- Automated production process prevents human hands from touching products inside.



#### (Reduction of food waste)

- Curb the generation of food waste because air inside the package serves as a cushion against damage during transportation or in households.

#### (Preserve freshness)

- Maintain the safety and quality of product due to packing under hygienic conditions



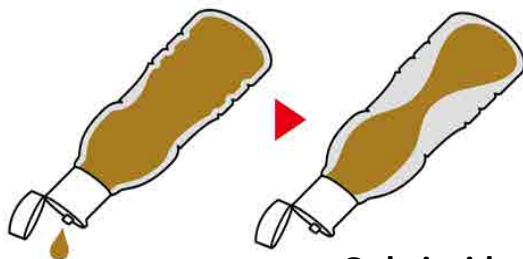
### 香りつづく とろける味噌



**Freshness lasts as long as “miso” (bean paste) is not exposed to air**

**Dual structure bottle**

**Dispenses when squeezed and stops when released**



**Only inside pouch shrinks**

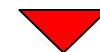
**(Sale) From September 2017**

### (Improvement of packaging)

- Dual structure of the bottle realizes high preservability by preventing the content's exposure to outside air after opening.
- Dispensing amount is adjustable from small to large depending on the strength of squeeze.

### (Ingenuity in production process)

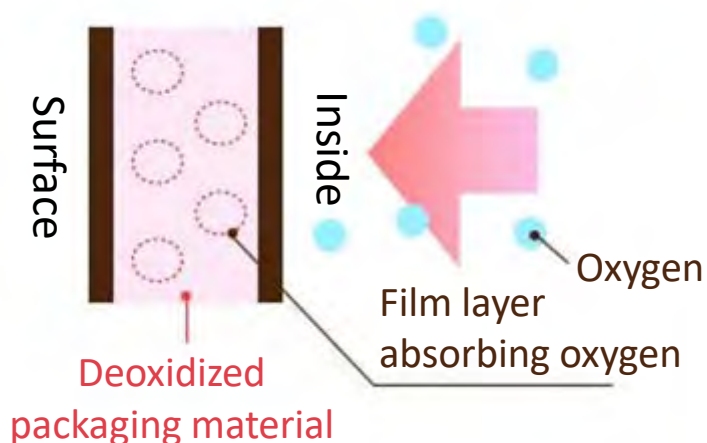
- Improve user-friendliness by liquidizing miso



### (Extend best-before date)

- Preserve freshness for 90 days by curbing the degradation of content by oxidation after opening
- Residual in the bottle is reduced as the content can be dispensed to the last drop by squeezing the bottle.

### 「味の素KKおかゆ®」 白がゆ



(Sale) From 1998

#### (Improvement of packaging)

- Use deoxidized packaging material for the pouch to absorb oxygen from products at the time of production and storage.

#### (Improvement at food production stage)

- Use water from which oxygen was removed at the time of production.



#### (Maintenance of quality)

- Prevent drop in the flavor and quality of products by removing oxygen from them at the time of production and storage.

### 浜焼きシリーズ



(Composition of packaging material)

Hamayaki Hotate

Best-before date:  
Before opening - 180 days  
at ordinary temperature



Outside

**PRIME BARRIER**

ONY

CPP

Inside (facing food)

### (Improvement of packaging)

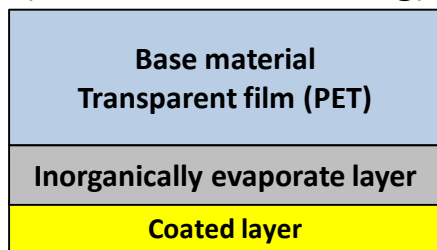
- Adopt packaging material using highly flexible and transparent film Prime Barrier to prevent degradation from crooked part after retort treatment.
- Vacuum packaging of material, as it stands, is possible.



### (Reduction of food waste)

- Long-term preservation at ordinary temperature is possible due to strong resistance to the effects of temperature and humidity (Before opening - 180 days at ordinary temperature)
- High flex resistance curbs disposal waste caused by damage to film.

### (Cross-section drawing)



**PRIME BARRIER** ®

(Production: Toppan Printing Co., Ltd.)

(Sale: From December 2016)

### ぬらすと！抗菌シート

(Comparison photos 6 days later: Circles point to spoiling)

Without sheet



With anti-germ sheet



No discoloring! and slow spoiling! on anti-term sheet

### (Improvement of packaging)

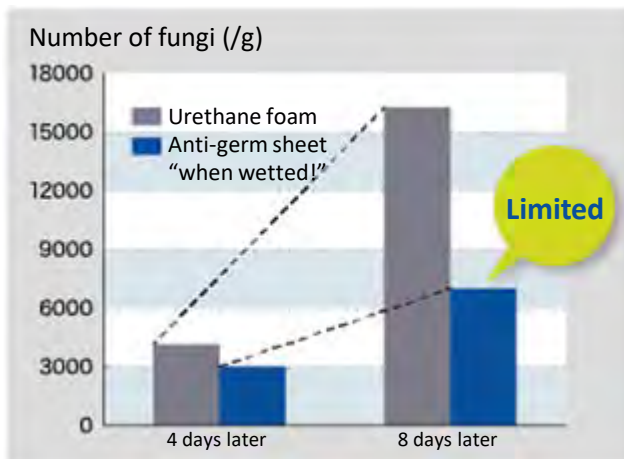
- Develop an anti-germ sheet with addition of powder from burnt scallop shells that alkalifies when exposed to water
- The sheet curbs the growth of germs and absorbs excess moisture and so curbs the discoloring of contents (vegetables, fruits, mushrooms, etc.) and damage to them.



### (Extend freshness)

- Use of the sheet in a package of strawberries slows the start of spoiling for 3 to 6 days
  - Use of the sheet in a package of mushrooms curbs their discoloring and spoiling even 7 days after.
- (\*) Both features are based on test data by the company.

ぬらすと！抗菌シート

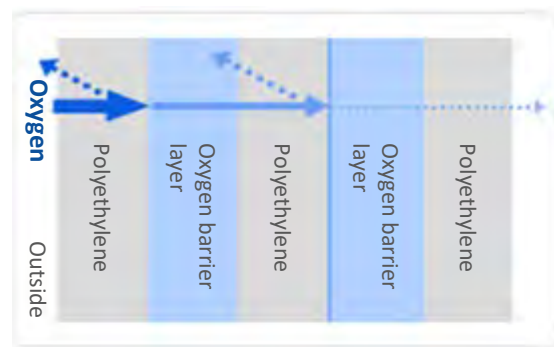


Reproduced from the homepage of Oji Holdings Corp.

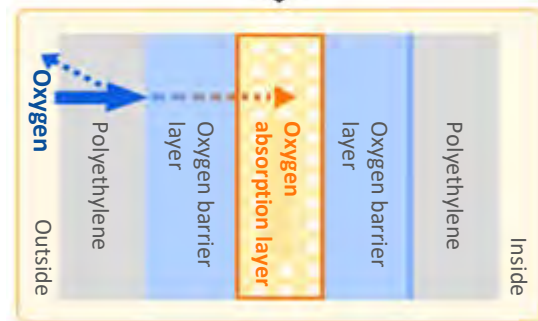
(Sale) From April 2017



### キューピーハーフ



Existing multi-layer bottle



Oxygen absorption bottle

### (Improvement of packaging)

- Adopt an “oxygen absorption bottle” of mayonnaise with a multiple-layer structure having high barrier properties against oxygen capable of absorbing even a tiny amount of entered oxygen. The structure has an oxygen absorption layer between oxygen barrier layers.

### (Improvement at food production stage)

- Remove as much oxygen as possible by reviewing the production process and changing the composition of the bottle.



### (Extend best-before date)

- Best-before date has been extended to 12 months from 7 months through the combination of improvements in packaging and the process of production.

納豆「金のつぶ®梅風味黒酢たれ」  
他 1 商品



From March 2016

■ Hinge

Before change



After change



(Improvement of packaging)

- Improve the hermeticity of the tray by eliminating the space and a hole in the lid at the hinge

(Improvements in food production process)

- Adopt a new production method featuring fermentation at temperature higher than usual



(Extend best-before date)

- Best-before date has been extended to 15 days from around 10 days.

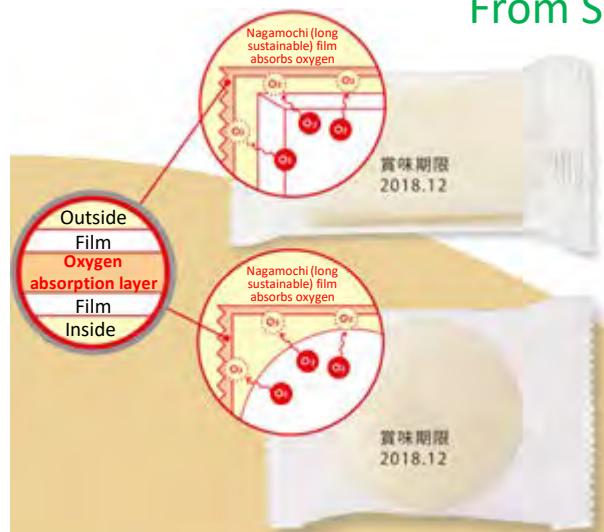
(Reduction of food waste)

- The new packaging is expected to curb the generation of disposal waste at the production stage or caused by the expiry of best-before dates at households.

### サトウの切り餅、サトウのまる餅



From September 2016



### (Improvement of packaging)

- Adopt a high barrier film, which curbs the evaporation of moisture, for individual packaging of rectangular and round “mochi” (rice cake).
- The film maintains the moisture of the rice cake while absorbing oxygen inside each package and preventing the entry of oxygen from without.



### (Extend best-before date)

- Extend best-before date to 24 months from 15 months by maintaining the texture of freshly pounded rice cake through prevention of its oxidation and maintenance of moisture in it.

### (3Rs, etc.)

- The elimination of the conventional agent to preserve freshness has made waste separation easier for disposal.

### 越後生一番切り餅



From April 2015

#### Double-barrier packaging

Adopt **double-barrier** method of individual packaging and enclose deoxygenating agent in outside pouch to preserve the taste of freshly made rice cake.



- **Maintain deoxidation state** in inside pouch after opening outside pouch
- Anaerobic state**  
Oxygen concentration of **0%**

#### (Improvement of packaging)

- Adoption of a high oxygen absorption material for individual packaging and attachment of a deoxygenating agent have made it possible to promptly absorb oxygen and curb the oxidation of products immediately after production.
- Print best-before date on each individual package



#### (Extend best-before date)

- Extend best-before date to 24 months from 12 months, combined with review of production process, etc.

#### (Reduction of food waste)

- Print of best-before date on each package reduces disposal waste caused by forgetting best-before date even in the absence of outer package

\*Related example posted on page 50



### 日本のごはん



Whole wrapping with film

From November 2011

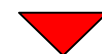
Each  
package  
200g



Each package 120g  
Equivalent to small cup of  
rice soaked with tea  
Equivalent to one rice ball  
("onigiri")

### (Improvement of packaging)

- Review the conventional composition of aseptic packaging material for rice (tray + upper lid film) and adopt single-material, thin-walled film package while improving preservability
- Cut the amount of content from 200g to 120g for easier consumption



### (Extend best-before date)

- Curb oxidation by deoxygenating agent and realize 1-year best-before date for aseptically packaged rice (excluding disaster supply-type, etc.)

### (Reduction of food waste)

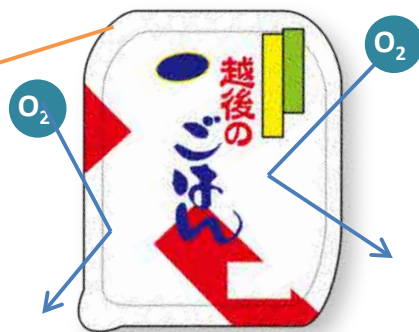
- Reduce leftovers by cutting the amount of each package to 120g for adequate consumption

### 越後のごはん



From September 2015

Use film with high barrier properties against oxygen



### (Improvement of packaging)

- Use film with high barrier properties against oxygen as cover of cooked rice container



### (Extend best-before date)

- Extend best-before date to 300 days from 210 days

### ふんわり名人 甘酒仕立て



From January 2016



### (Improvement of packaging)

- Aluminum-evaporated film, with higher barrier properties against oxygen than before, used for outside and inside packaging blocks oxygen and light.



### (Extend best-before date)

- Extend best-before date for standard products, whose best-before date is 120 days as in the case of ordinary rice-based snacks, to 180 days
- Use of aluminum-evaporated film prevents the oxidation of products and preserves their flavor

### 輸出用 ふんわり名人 きなこ餅、チーズもち



From June 2012



### (Improvement of packaging)

- Use of packaging material with high barrier properties against oxygen in barrier layer of outside film prevents oxidation of products



### (Extend best-before date)

- Greatly extend best-before date to 300 days, compared with 120 days for products for domestic market

### (Promotion of exports)

- Extend best-before date to 300 days for exports, considering time needed for customs clearance procedures, etc.



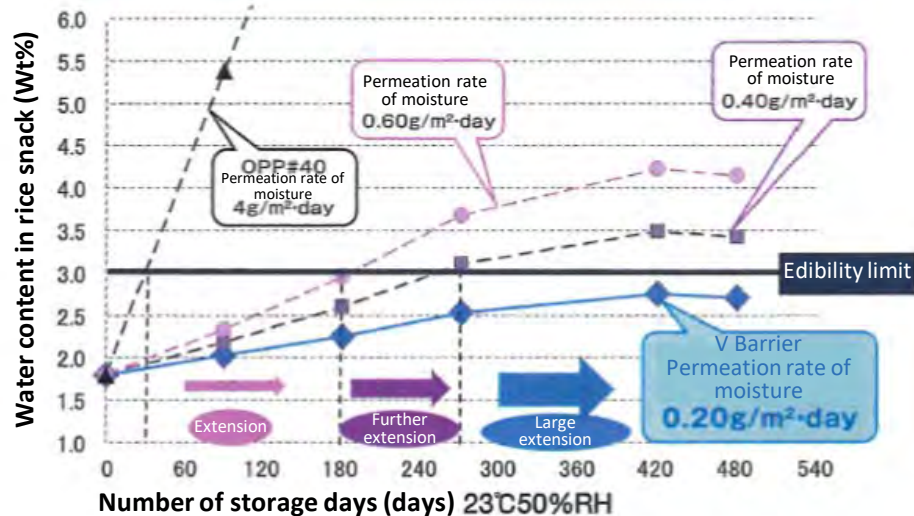
### 品質保持フィルム Vバリア®



Usage examples: Rice-based snack (left) and cookie (right)

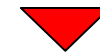
From July 2016

Test on actual packaging and storing of rice snack (prevention of dampening)



### (Improvement of packaging)

- V Barrier is a packaging film with high moisture-proof properties and barrier properties against oxygen. Anti-oxygen barrier properties do not drop even under high temperature.
- High barrier properties preserve the flavor of food products and prevent them from absorbing smells from other food products.



### (Extend best-before date)

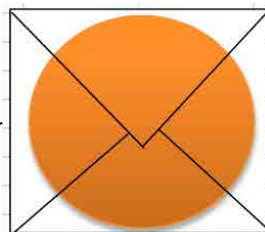
- Prevention of rice snacks, cookies and other dried food products from being dampened, preservation of freshness of unbaked cake and others with relatively high water contents and long-term maintenance of oxidation preventing effects

### 「里見の郷」、「月餅」、「チョコまん」、 「桃山」、「栗まん」

#### Image of conventional product:

Product was wrapped with plastic material, as shown in the image, without deoxygenating agent.

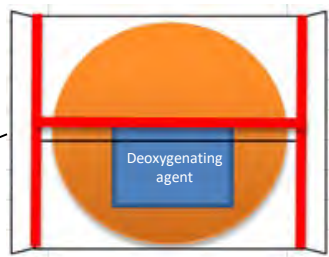
PP (polypropylene)



#### Image of product after improvement:

Inclusion of deoxygenating agent and use of gas-barrier wrapping material with higher hermeticity (sections in red glued with heat)

Barrier PP (polypropylene)  
PE (polyethylene)



#### Usage example:



From June 2011

#### (Improvement of packaging)

- Adoption of high gas-barrier wrapping material and deoxygenating agent



#### (Extend best-before date)

- Shift to a gas-barrier wrapping material with high hermeticity and use of a deoxygenating agent, etc., has achieved the maintenance of product quality and extended the best-before date to 45 days from 10 days.

### 5個入り焼き菓子パック



From June 2011

#### (Improvement of packaging)

- While an alcohol-evaporated agent used to be included in the outside wrapping material for the maintenance of quality, the new method enhances the hermeticity of each package and encloses a deoxygenating agent.



#### (Extend best-before date)

- Extend best-before date to 45 days from 30 days

#### (Reduction of food waste)

- Enclosure of a deoxygenating agent in each package makes it possible to maintain quality after opening and reduce food waste at households.