

Fresh Transport

新鮮輸送

HYOKAN SO-KO

JR FREIGHT CONTAINER VERSION



HYOKAN SO-KO

Utility model registration number: 3206373

Keep the foods and other goods fresh without freezing.
Manage & transport the goods in fresh condition.

This container forms static electric field with high and low current in the chilled container, which enable long storage of the products inside the container keeping fresh without freezing even the temperature is below the freezing point. Test results show that freshness maintaining effect on general foods is fully demonstrated and rice and meat improves umami (taste) due to ripening effect.

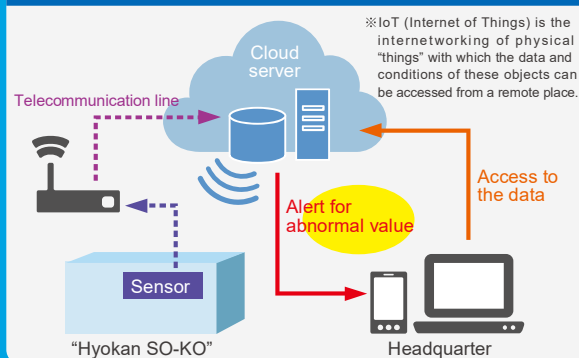
Features

- ▶ Enabling **long term storage maintaining freshness** without freezing
- ▶ Enabling **thawing of the frozen / ripened goods** during storage and transport
- ▶ Since freshness is maintained, there is **no need to hurry** and carry
- ▶ **Significant reduction in food loss** by producers
- ▶ **Keeping freshness** with power supply by storage battery **even during transport trouble**

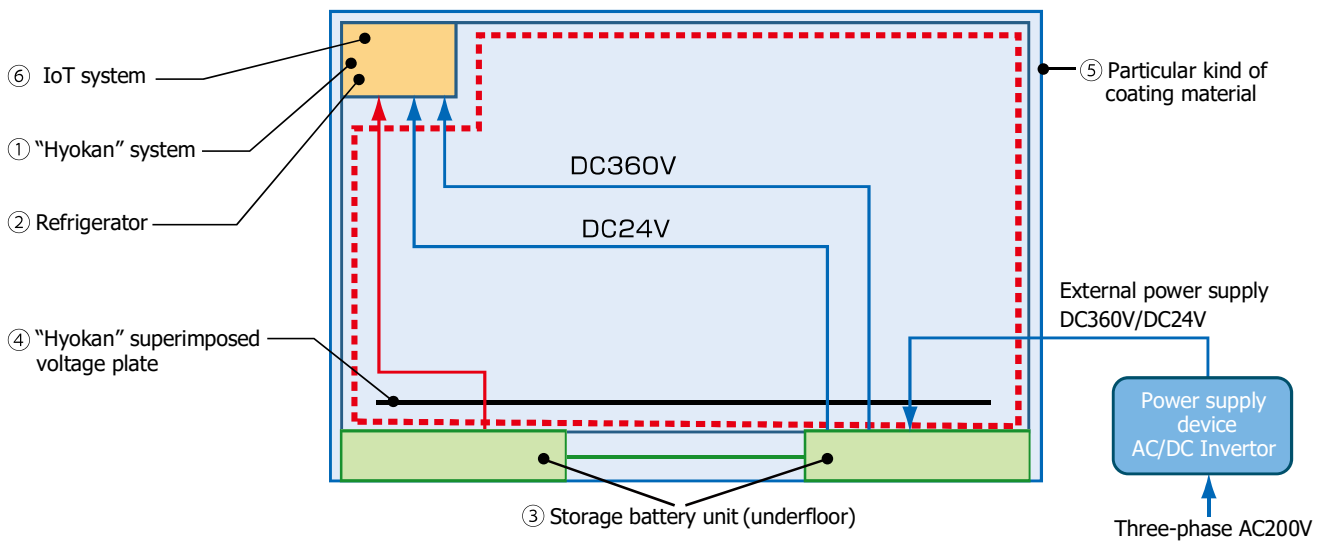
Effects

- 1 The scope of food transport that could not be transported by rail will expand < Increase in railway transport demand >
- 2 Cutting-edge food distribution system can be created with “Ripening” and “thawing” .
- 3 Since there is no need to hurry and carry, adjustment of harvest, production and shipment becomes possible
- 4 Food loss will reduced due to freshness maintaining effect
- 5 Since the power is supplied by a storage battery, fossil fuel is not required < Environmental conscious design >
- 6 Even if a transport trouble occurs (train etc.), food loss can be prevented because required power is supplied by a storage battery

“Hyokan SO-KO” manages malfunction of operating status, battery level, vibration, internal temperature/humidity, refrigeration system, refrigerator and other mechanical equipment.



Structure of "Hyokan SO-KO"



Refrigerator, etc. side



Side View



Door side



Inside View

Inner volume	16 m ³
load	Approximately 3.9 Tone
Storage temperature range	-5 ~ +15 °C
Container power supply	For transport : lithium battery (approximately 30 hours operation) For storage : External power supply (A separate power supply device is required, three-phase AC200V)
Refrigerator	Temperature: -5 ~ +25°C
Hyokan system	2,000 ~ 5,000V service voltage 5mA×2 current Frequency: 50~60Hz
IoT monitor	Internal temperature, refrigeration system, hyokan system, remaining battery, etc.
Painting	Particular kind of coating material



Examples of effects of "Hyokan" technology

Storing foodstuffs with "Hyokan SO-KO" can achieve a very high freshness maintenance effect compared to conventional containers. It is also obvious in comparison photographs. In addition to the effect of maintaining freshness, depending on the ingredients such as rice and meat, the inspection result shows that "ripening" progresses and the umami is improved when stored in Hyokan SO-KO.

Item	Number of days to keep	Item	Number of days to keep
Strawberry	10 ~ 20 days	Japanese yam	12 months
Grape	30 ~ 50 days	Japanese Radish	30 days
Apple	12 months	Beef	20 ~ 90 days
Peach	3 months	Pork	25 days
Ripe pineapple	10 ~ 30 days	Chicken	10 ~ 20 days
Spinach	14 ~ 30 days	Sardine	15 days
Asparagus	20 ~ 30 days	Saury	20 days
Lattice	One month	Chrysanthemum	1 ~ 2 months
Onion, Potato	6 months	Rose	One month
Flammulina velutipes	40 days	White rice, brown rice	More than one month

※The number of storage days is a reference value, and it does not guarantee the number of storage days.

Conventional storage

"Hyokan" Preservation

Pork loin
Comparison
after 5 days



Lily
Comparison
after 10 days



Strawberry
Comparison
after 10 days



Conventional storage

"Hyokan" Preservation

Tuna
Comparison after 7 days



Sea urchin
Comparison after 14 days



Beef
Comparison after 5 days



Japanese radish
Comparison after 30 days



Lettuce
Comparison after 30 days



Asparagus
Comparison after 30 days



Examples of effects of "Hyokan" technology

Conventional storage

"Hyokan" Preservation

Nameko mushroom
Comparison after 20 days



Onion
Comparison after 42 days



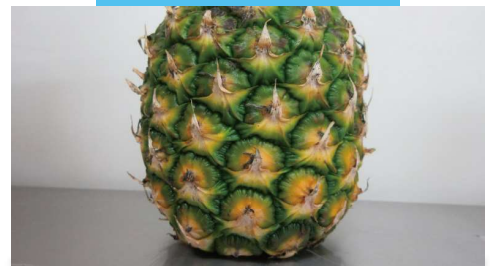
Mozzarella
Comparison after 10 days



Peach
Comparison after 67 days



Pineapple
Comparison after 30 days



Prawn cream
Comparison after 30 days



Test result of "Hyokan" technology

鮮度

Freshness

Even in foods such as meat which is easy to decay, it suppresses the generation of bacteria and keeps vivid fleshy quality for a long time.

▶ HyokanKo 90-day preserved beef

(temperature -3°C voltage 3,500V)

Test for fungus after transfer to cold storage

	At start	After 3 days	After 7 days
Coliform bacteria count	Negativity	Negativity	Negativity
Standard plate count	3 million or less/g	3 million or less/g	3 million or less/g

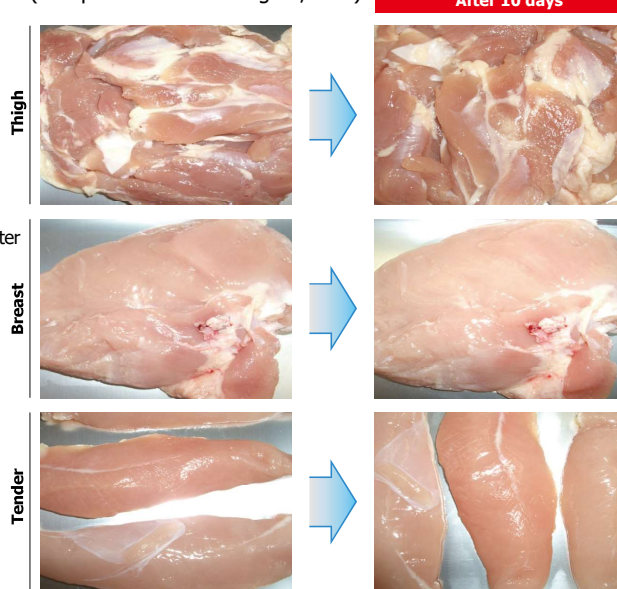
Inspection agency: Hokkaido Tokachi area Regional Food Processing Technology Center (note) The standard plate count in meat is not defined on the standards by Food Sanitation Law. A general reference fiducial point is below 5 million/g. (Japanese consumer' s co-operation union)



Beef 50 days after "Hyokan" storage

▶ Chicken preservation test

(temperature -1°C voltage 3,500V)



Even decayable chicken can be stored in good condition.

熟成

Aging

For foods such as rice, it is confirmed that ripening and Umani is promoted by preserving HyokanKo.

▶ Analysis of Hyokan aged rice test

Result of grain property analysis

Sample Name	Normal	0°C 2 months	-4°C 2 months	
Sample No.	1	2	3	
Sample type	Brown rice	Brown rice	Brown rice	
Taste analysis	Taste value(point)	82	85	84
	Amylose(%)	18.4	18.0	18.1
	Protien(%)	7.2	7.0	7.1
	Water(%)	12.8	15.2	14.9
	Fatty acid (mg/100g)	17.6	13.9	15.3
Fresh Degree	100	100	100	

note) Amylose and fatty acid degree of rice grain taste meter are reference values.

Sample Name	Normal	0°C 2 months	-4°C 2 months	
Sample No.	4	5	6	
Sample type	Milled rice	Milled rice	Milled rice	
taste analysis	Taste value	87	90	89
	Appearance	9.0	9.3	9.2
	Hardness	5.3	5.0	5.1
	Glutinosity	9.3	9.8	9.7
	Balance	9.1	9.5	9.4
estimating equipment	Hardness	3.41	3.04	3.36
	Glutinosity	0.10	0.24	0.50
	Balance	0.03	0.08	0.15
	Elasticity	0.66	0.66	0.66

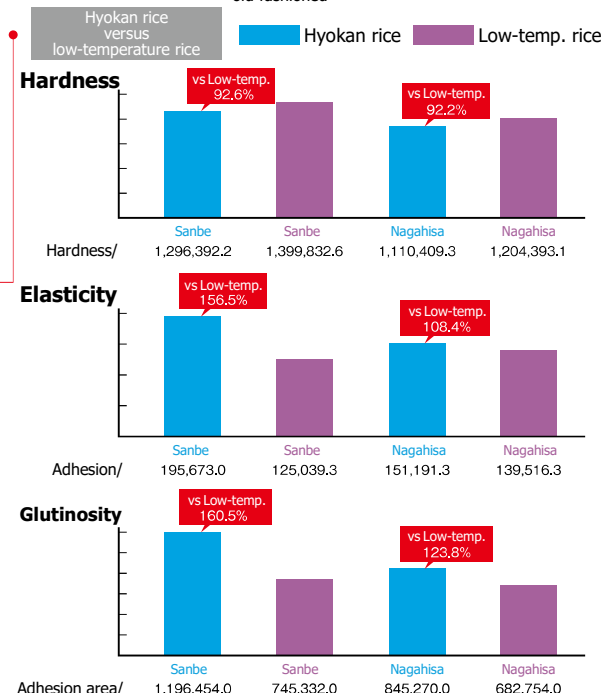
• Taste appraisal value : The higher the score the better the delicious rice

Amylose : The lower the percentage is "stickiness"

Protien : The lower the proportion, the better the water absorption, which makes it rich rice

Water : If the amount of moisture is small, it will be greasy rice during cooking

Fatty acid : Degree of oxidation. Indicates the progress of old-fashioned



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