



proton

We make future fresh.



proton  
+HOLDINGS



proton  
MAGNETIC FREEZER

We make future fresh.



proton  
DEFROSTING

We make future fresh.

proton  
+DINING

**PROTON**

CONGELACION MAGNETICA SECTOR PRODUCTOS DEL MAR



proton  
EUROPE

[www.proton-europe.com](http://www.proton-europe.com)

### 1. Damage to muscle structure

- Cell separation: the water that is outside the fibers freezes before the inside, generating an osmotic force that causes liquid to flow from the inside to the outside.
- Damage to membranes and proteins, by the ice crystals formed.
- Protein denaturation due to changes in the non-frozen aqueous matrix: in osmotic pressure, pH, ionic strength, etc.

### 3. Microbial development

- Much of the flora is sub-lethally damaged.
  - Thawed meat is more susceptible to microbial growth and alteration, so it usually has more contamination than fresh meat (at the same storage time).
- Microbial development stops at  $-12^{\circ}\text{C}$  (for certain more resistant fungi)

### 4. Changes in texture

- Less juiciness and
  - More hardness.
- Associated with changes in muscle protein:
- Shortening by rigor
  - Protein Denaturation
  - Increase in cross-links between proteins (due to denaturation phenomena and the presence of oxidation products that serve as a bridge between functional groups of amino acids).

### 5. Changes in taste and color

- Decreased flavor intensity due to loss of flavor precursors and aromas in exudates.
  - Possible collection of aromas from outside during freezing, storage and defrosting.
  - Oxidative thickening of fats and discoloration of pigment during storage. Its degree depends on all those factors (intrinsic and extrinsic) that affect it.
- At temperatures between  $-30$  and  $-40^{\circ}\text{C}$ , oxidation reactions practically stop.

### 2. Moisture losses

- Decrease juiciness and make meat harder.
- Altered appearance, taste and texture when freezing burns occur
- Economic losses due to weight loss.

## FREEZER EFFECTS

1. Damage to muscle structure
2. Moisture loss
3. Microbial development
4. Changes in texture
5. Changes in taste and color
6. Changes in nutritional value

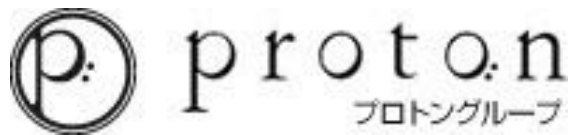


### 6. Changes in nutritional value

- Losses of water-soluble nutrients due to exudate (without a significant impact on the nutritional value).
- If there is oxidation there is also loss of nutrients susceptible to oxidation reactions.

# PROTON

MAGNETIC FREEZER



## THE NEW GENERATION OF FREEZERS: PROTON ®

In today's extremely changing food industry, customers demand quality, seasonal, "newer" products every day, at reasonable prices, with high availability and that comply with all sanitary standards. In order to satisfy all these demands we must use the best technology to process them, keep them fresh, tasty and healthy, even if they have been frozen.

Keeping all the organoleptic properties intact in a thawed product was up to this moment something unthinkable to achieve, because even with the best current freezing (cryogenic) methods, color changes occur and exudates and liquids appear when thawing, causing obvious alterations of the original product due to the damages caused by the size of the crystals formed and by the cell destruction during freezing.



**PROTON ® FREEZER** belongs to a new generation of freezers, which unlike other systems that also use magnetic fields (CAS), its use is widespread in Japan for its proven effectiveness for the realization of a perfect freezing, when the differences between products disappear defrosted and fresh product and giving rise to a new category:

**“the fresh product in frozen”.**

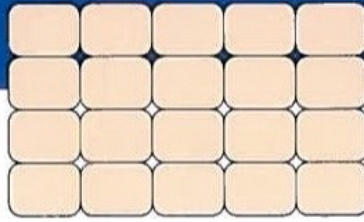
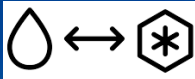
**PROTON ® FREEZER** technology is used in many different types of industries and sectors, not only in Japan, but in many Asian countries.

It is, in short, the most perfect form of freezing that exists today.

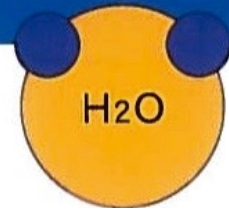


# FREEZING PROCESS

(PASS from FRESH ESTATE TO FROZEN)



FOOD CELLS



CONTENT  
IN WATER

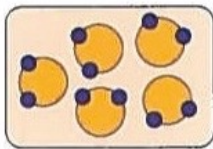
## FREEZING TRADITIONAL

-FREEZER  
-BATTER  
-CAMARA

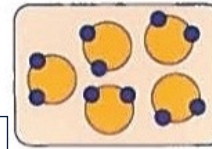
## PROTON MAGNETIC FREEZER



Free water  
freezes producing ice  
crystals that grow  
inversely at the speed of  
the freezing technology  
used, i.e. when the  
passage time for ice  
crystal formation is long

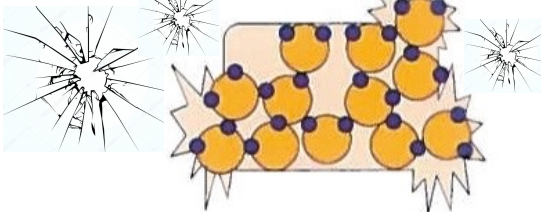
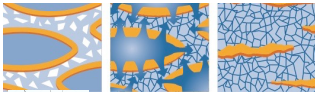


## FREEZING PROCESS



The product freezes while a  
static magnetic field and an  
electromagnetic wave  
radiate in a predetermined  
direction

### CREATION OF BIG CRYSTALS

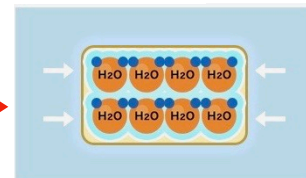
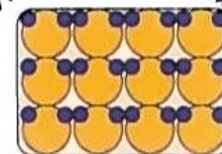
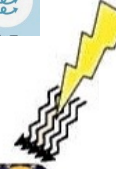


THE CRYSTALS EXPAND  
WHEN THE WATER (liquid)  
BECOMES ICE (solid), CAUSING  
CELL RUPTURE

MAGNETIC  
FIELD



ELECTROMAGNETIC  
WAVES



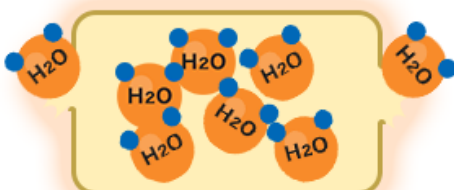
ORDINATION OF WATER MOLECULES  
AVOIDING THE EXPANSION OF THE VOLUME OF THE CRYSTALS  
OF ICE WHEN FREEZING (NANOCRISTALES)



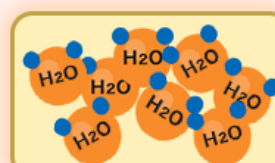
CELL  
RUPTURE

## DEFROSTING

When freezing, the water  
molecules align,  
maintaining their linear  
structure and preventing  
the growth of the crystals  
that cause cell breakage



It is MANIFESTED in the form of EXUDATES  
(DRIPPING) and CAUSES CHANGES in the CELL  
STRUCTURE (CHANGES in the TEXTURE, COLOR,  
FLAVOR, ...) and LOSS OF NUTRIENTS and OTHER  
COMPONENTS



ORIGINAL  
CELLULAR  
STRUCTURE

KEEPS the ORIGINAL CELL STRUCTURE  
(can be re-frozen) and PRESERVES ALL  
ORIGINAL FOOD ORGANOLEPTIC QUALITIES  
(COLOR, TEXTURE, TASTE, ..)

# PROTON MAGNETIC FREEZING

DEALER IN  
EXCLUSIVE  
OUTSIDE ASIA



**FREEZE  
ALL CLASS  
FOOD**

FISH, MEAT, VEGETABLES, BREAD,  
PASTRY, DAIRY, COOKED DISHES

**KEEP THE  
CELL STRUCTURE  
NO DAMAGE  
NO BREAK CELL**

**CONTROL  
THE CREATION  
& SIZE OF  
WATER CRYSTALS  
THANKS TO THE  
ELECTRO  
MAGNETICS  
FIELDS**

**NO DRIP (LIQUIDS)  
& WITHOUT CHANGES  
TO DEFROST  
COLOR, TEXTURE, FLAVOR**

Keep all the original  
**ORGANOLEPTIC  
QUALITIES**  
TASTE, COLOR, TEXTURE

**LOW DEHYDRATION  
HIGHER PERFORMANCE**

**GREATER SPEED AND  
BEST QUALITY  
THAT THE BLAST CHILLER**

PF-15



**UNIFORM FREEZING  
INTERIOR AND EXTERIOR**

**DELICATE FREEZING &  
NOT AGGRESSIVE  
AS THE NITROGEN**

**IT ALLOWS  
DEFROST  
& FREEZE AGAIN**

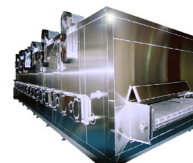
**KEEP INTACT  
NUTRITIONAL VALUES**



**ELIMINATES BACTERIA,  
MICROORGANISMS,  
PATHOGENS &  
ANISAKIS**

**15**

KG/HOUR



**500**

KG/HOUR

**CIB®** Culinary Institute  
of Barcelona  
Cooking Tomorrow

ARRANGE A VISIT  
to know PROTON TECH  
[proton@innovafish.com](mailto:proton@innovafish.com)  
Tel. +34 627 925 103

**RESTAURANTS WITHOUT KITCHEN**  
**proton**  
+ DINING

**LAST  
GENERATION  
OF FREEZERS  
IN JAPAN**



**ONLY  
TECHNOLOGY  
VALID FOR  
FREEZE  
SUSHI**

Become a  
**MEMBER**  
**proton**

RECOMMENDED BY THE MINISTRY OF INDUSTRY OF JAPAN



**We make future fresh**

**PROTON CAR**  
全国巡回!! プロトン号



[www.proton-europe.com](http://www.proton-europe.com)

## GAMA DE CONGELADORES PROTON & REBORN



### PF-15

CAPACITY CYCLE 15 kg.  
SIZE 1200Wx870Dx1700H  
WEIGHT 450 Kg  
TEMPERATURE air blast -35/-38°C  
CAPACITY 5 trays x 1 room  
TRAYS NUMBER 5  
TRAYS DIM. 600 x 400 x 20

### PF-30

CAPACITY CYCLE 30 kg.  
SIZE 1660Wx1205Dx1830H  
WEIGHT 750 Kg.  
TEMPERATURE air blast -35/-38°C  
CAPACITY 8 trays x 1 room  
TRAYS NUMBER 8  
TRAYS DIM. 600 x 400 x 20H  
EXTERNAL CONDENSING UNIT

### PF-60

CAPACITY CYCLE 60 kg.  
SIZE 2440Wx1250Dx2050H  
WEIGHT 1.200 Kg.  
TEMPERATURE air blast -35/-38°C  
CAPACITY 8 trays x 2 room  
TRAYS NUMBER 16  
TRAYS DIM. 600 x 400 x 20H  
EXTERNAL CONDENSING UNIT

### PF-150

CAPACITY CYCLE 150 kg.  
SIZE 3400Wx1904Dx2320H  
WEIGHT 3.900 Kg.  
TEMPERATURE air blast -35/-38°C  
CAPACITY 8 trays x 4 room  
TRAYS NUMBER 32  
TRAYS DIM. 600 x 600 x 20H  
EXTERNAL CONDENSING UNIT

### PF-3 (HOIHOI)

CAPACITY CYCLE 3 kg.  
SIZE 900Wx750Dx1850H  
WEIGHT 250 Kg.  
TEMPERATURE air blast -25°C  
CAPACITY 300L  
TRAYS NUMBER 4  
TRAYS DIM. 542W x 330D x 250H



### TU-300

CAPACITY CYCLE 300 Kg.  
SIZE Made-to-order. (Speed of the conveyor belt can be customized)  
BELT CONVEYOR SIZE 1400x9400  
MAIN BODY WEIGHT 12.000 kg  
INSIDE TEMPERATURE SETTING  
air blast system -35/-38°C  
EXTERNAL CONDENSING UNIT

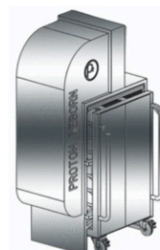


### TU-500

CAPACITY CYCLE 500 Kg.  
SIZE Made-to-order. (Speed of the conveyor belt can be customized)  
BELT CONVEYOR SIZE 1400x13900  
MAIN BODY WEIGHT  
INSIDE TEMPERATURE SETTING  
air blast system -35/-38°C  
EXTERNAL CONDENSING UNIT

### TU-150

CAPACITY CYCLE 150 Kg.  
SIZE Made-to-order. (Speed of the conveyor belt can be customized)  
BELT CONVEYOR SIZE 1.200Wx3.000L  
MAIN BODY WEIGHT 4.000 kg  
INSIDE TEMPERATURE SETTING  
air blast system -35/-38°C  
EXTERNAL CONDENSING UNIT



### REBORN

SIZE Made-to-order  
CAPACITY Expandable until 300 Kg.  
TEMPERATURE air blast -30/-35°C  
CONFIGURATION 3 stages  
CONFIGURATION  
Nominal 77 KG./1 loading cart  
40 Kg. (10 trays)  
60 Kg. (15 trays)  
TRAYS DIMENSION 600Wx600Dx350H  
EXTERNAL CONDENSING UNIT

# PROTON

SEA PRODUCTS SECTOR

# **EXPERIENCIA PROTON**

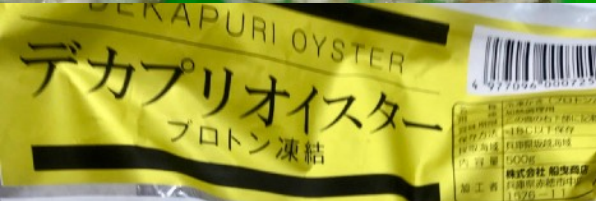
# CLIENTES JAPON sector PRODUCTOS DEL MAR

|   |                                  |   |        |                                      |     |
|---|----------------------------------|---|--------|--------------------------------------|-----|
|     | YORIKISUISAN INC.                | <a href="http://yorikisuisan.co.jp/company_A_En.html">http://yorikisuisan.co.jp/company_A_En.html</a>   | JAPAN  | SEA PRODUCTS                         | EJE |
|     | WANDO ABALONE CO., LTD.,         | <a href="http://www.wakoreaglobal.com/frozen-abalone/?ckattempt=1">http://www.wakoreaglobal.com/frozen-abalone/?ckattempt=1</a>   | JAPAN  | SEA PRODUCTS ABALONE                 | EJE |
|    | NINBEN1                          | <a href="http://www.ninben1.com/CCP023.html">http://www.ninben1.com/CCP023.html</a>   | JAPAN  | SEA PRODUCTS small fish shirasu      | OK  |
|    | HANKYUDELICA-I                   | <a href="http://hankyudelica-i.co.jp/safety">http://hankyudelica-i.co.jp/safety</a>   | JAPAN  | SEA PRODUCTS Big Fish Company        | OK  |
|     | KOBE.COOP.OR.JP                  | <a href="https://www.kobe.coop.or.jp/">https://www.kobe.coop.or.jp/</a>   | JAPAN  | SEA PRODUCTS Big Fish Company        | OK  |
|     | KYOKUYO                          | <a href="https://www.kyokuyo.co.jp/home/search/index.html">https://www.kyokuyo.co.jp/home/search/index.html</a>   | JAPAN  | SEA PRODUCTS Big Fish Company        | EJE |
|     | KYOKUYO MARCHE KYOKUYO           | <a href="https://www.marche.kyokuyo.co.jp/shop/default.aspx">https://www.marche.kyokuyo.co.jp/shop/default.aspx</a>   | JAPAN  | SEA PRODUCTS Big Fish Company        |     |
|    | KYOKUYO SEA MARCHE               | <a href="https://www.seamarche.jp/totable.html">https://www.seamarche.jp/totable.html</a>   | JAPAN  | SEA PRODUCTS Big Fish Company        |     |
|     | KYOKUYO shokuhin                 | <a href="https://kyokuyo-shokuhin.co.jp/shiogama.html">https://kyokuyo-shokuhin.co.jp/shiogama.html</a>   | JAPAN  | SEA PRODUCTS Big Fish Company        |     |
|   | SAMASA SUISAN CO. LTD            | <a href="https://www.samasa.co.jp/product/#freeze">https://www.samasa.co.jp/product/#freeze</a>   | JAPAN  | SEA PRODUCTS Big Fish Company        | OK  |
|   | OKI-KATSUGYO                     | <a href="https://www.oki-katsugyo.jp/%E5%95%86%E5%93%81%E6%A1%88%E5%86%85/%E3%83%97%E3%83%A D%E3%83%88%E3%83%B3%E5%87%8D%E7%B5%90%E5%95%86%E5%93%81/">https://www.oki-katsugyo.jp/%E5%95%86%E5%93%81%E6%A1%88%E5%86%85/%E3%83%97%E3%83%A D%E3%83%88%E3%83%B3%E5%87%8D%E7%B5%90%E5%95%86%E5%93%81/</a>   | JAPAN  | SEA PRODUCTS Big Squid factory       | OK  |
|   | HATAYAMA FISH PROCESSING         | <a href="http://hatayamasuisan.com/factory.html">http://hatayamasuisan.com/factory.html</a>   | JAPAN  | SEA PRODUCTS FISH                    | EJE |
|  | OSAKANALINK                      | <a href="http://www.osakanalink.co.jp/index_proton.html">http://www.osakanalink.co.jp/index_proton.html</a>   | JAPAN  | SEA PRODUCTS Fish                    | OK  |
|  | SUZUTOMI CO. LTD                 | <a href="https://suzutomi.co.jp/">https://suzutomi.co.jp/</a>   | JAPAN  | SEA PRODUCTS FISH                    |     |
|   | TSUKIJI UOICHIBA CO., LTD.       | <a href="http://www.tsukiji-uoichiba.co.jp/en/business_guide/index_03.html">http://www.tsukiji-uoichiba.co.jp/en/business_guide/index_03.html</a>   | JAPAN  | SEA PRODUCTS FISH                    |     |
|  | YAMAKO PACIFIC                   | <a href="http://www.yamakopacific.com/facilities">http://www.yamakopacific.com/facilities</a>   | JAPAN  | SEA PRODUCTS Fish                    | EJE |
|  | HOKUCHIN CO., LTD.               | <a href="http://www.hokuchin.co.jp/">http://www.hokuchin.co.jp/</a>   | JAPAN  | SEA PRODUCTS Fish Product            | OK  |
|  | SHINUOEI                         | <a href="http://www.shinuohei.co.jp/18proton.html">http://www.shinuohei.co.jp/18proton.html</a>   | JAPAN  | SEA PRODUCTS Fish Shop               | OK  |
|   | TAKUSUI-GROUP                    | <a href="http://takusui-group.com/">http://takusui-group.com/</a>   | JAPAN  | SEA PRODUCTS Japanese Shrimp         | OK  |
|  | FUNABIKI.                        | <a href="https://funabiki.info/">https://funabiki.info/</a>   | JAPAN  | SEA PRODUCTS Oyster                  | OK  |
|   | SEALIFE-HAMADA                   | <a href="http://sealife-hamada.net/2017/07/21/%E3%83%97%E3%83%AD%E3%83%88%E3%83%B3%E5%87%8D%E7%B5%90%E6%A9%9F%E7%A8%BC%E5%83%8D%E7%BC%81%E7%BC%81%E7%BD%9F%E6%B5%9C%E7%94%B0%E6%B8%AF%E3%81%AE%E5%89%A3%E5%85%88%E3%82%A4%E3%82%AB%E7%BD%9E/">http://sealife-hamada.net/2017/07/21/%E3%83%97%E3%83%AD%E3%83%88%E3%83%B3%E5%87%8D%E7%B5%90%E6%A9%9F%E7%A8%BC%E5%83%8D%E7%BC%81%E7%BC%81%E7%BD%9F%E6%B5%9C%E7%94%B0%E6%B8%AF%E3%81%AE%E5%89%A3%E5%85%88%E3%82%A4%E3%82%AB%E7%BD%9E/</a> | JAPAN  | SEA PRODUCTS Squid and Fish Factory  | OK  |
|  | AOMORIKAISAN                     | <a href="http://www.aomorikaisan.co.jp/factory.html">http://www.aomorikaisan.co.jp/factory.html</a>   | JAPAN  | SEA PRODUCTS Tuna and Salmon Factory | OK  |
|   | YAMAKO PACIFIC (BRUNEI) SDN BHD. | <a href="https://thescoop.co/2018/04/18/brunei-joint-venture-casts-sights-on-tuna/">https://thescoop.co/2018/04/18/brunei-joint-venture-casts-sights-on-tuna/</a>   | BRUNEI | SEA PRODUCTS Tuna                    |     |











**南三陸町**  
minamisanriku-cho

## 〔三陸天然あわびとめかぶのセット〕

### 株式会社マルヤ五洋水産



#### 内 容

- ・あわび（ブロン凍結 100～110g） 6個
- ・めかぶ（凍通し 90g たれ付き）

天然あわびの品質と漁獲高は三陸が日本一。  
獲れたて新鮮アワビをブロン凍結しました。  
南三陸産めかぶの旨さはやみつき必至。

## 「大洗しらす 食べくらベセット」

### 株式会社 にんべんいち



#### 内容

冷凍生しらす120g、釜揚げしらす160g、しらす干し130g、ちりめん80g



プロトン凍結で産地の旨みを閉じ込めた「冷凍生しらす」は流水解凍で産地の旨みを再現。大きな釜で茹で上げたしっとりやわらかい「釜揚げしらす」。釜揚げしらすを少し干した「しらす干し」。しらす干しを更に干して硬さを出した「ちりめん」の食べくらベセットです。





**浜田市**  
Hamada City

### 【「浜田開府 400 年記念」シーライフ 一番人気のどろろ干物と浜田港自慢の魚をお届け】

## 株式会社シーライフ

**内容**

・のどろろ干物（毎月お届けします）、魚の切り身（金魚、鯛、鰹、秋刀魚、鰯、サバ、アジ、イサナ、カレイ、フナ）のどろろ干物、焼き魚用の切り身、お刺身用イカ、フライ（揚げ物）用のお魚など。

**浜田と言ったらノドログロ！**  
漁獲量が少ない、高価で稀少なノドログロ干物を毎月お届けします。毎月ノドログロと一緒に、浜田港の旬のおススメ魚もセッティングしてお届けします。  
どんちっち 3食アジ・カレイの干物やお刺身のイカ、納豆アジの切り身や、焼き魚用の魚の切り身等種類豊富。



## [日本海陸岐活魚倶楽部・ブロンセット]

### 株式会社日本海陸岐活魚倶楽部

**内容**

ブロンセット(お刺身・1皿)      ブロンセット(お刺身・2皿)      刺身5品4皿



**西ノ島町**  
seinojima town

年末に好評いただいた(株)日本海陸岐活魚倶楽部・ブロンセットの第2弾! 今回は遠でもお送りしている「ヒオウパズ」をブロンセットにした「ブロンパズヒオウパズ」と多くの楽しみをいただく本町でも人気の「ブロン活が刺身A」のセットとなります。旬の時期にブロン活技術により急速冷凍した西ノ島の特産品をお楽しみいただける限定セットです。





**浜松市**  
hamamatsu City

**〔浜名湖産鰻白焼き〕**  
株式会社海老仙

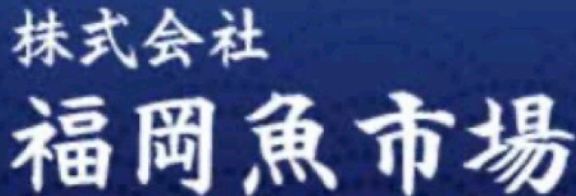
**内容**  
 浜名湖産鰻白焼き約 110g×2本  
 山椒のたれ 115g×1本  
 ・山椒 2パック



鰯(あじ)の比較 [凍結とチルド]

| 凍結時<br>プロトン凍結 | 納品時<br>冷蔵保管(流通) |
|---------------|-----------------|
|               |                 |
| ↓             | ↓               |
| 解凍後           | 冷蔵保管7時間後        |
|               | <br>ドリップ        |

時間交点を境に、良い凍結品は生のモノを上回る。(ドリップ現象・目玉の色・エラの色・魚体の艶 et



#### 原料入荷：解凍

- ・ 外壁からの虫侵入対策：高速シャッター
- ・ 水漏れ：塗床（色）、腰壁（サビ）
- ・ 湿気：換気対策

#### 下処理工程

- ・ 生ゴミ発生撤出ルート、保管について
- ・ 床排水の系統、殺菌工程
- ・ 低温空調、作業者手元の照度確保

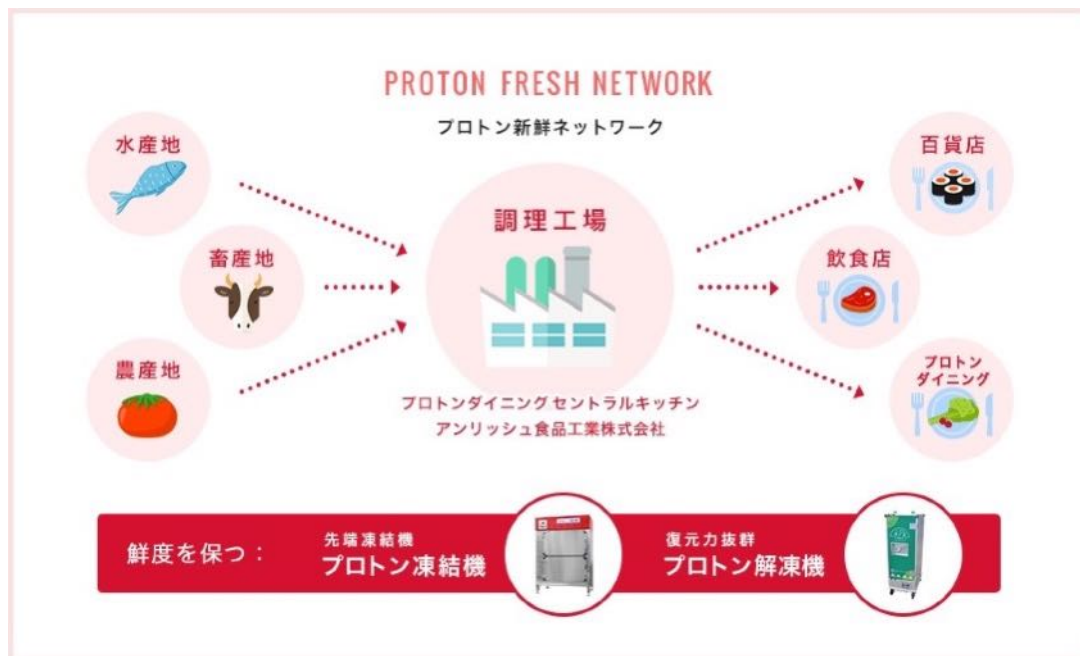
#### 製造室

- ・ 調味、加熱、粉付け作業。
- ・ 床色区分、バイル等の換気結露対策
- ・ 粉集塵対策、作業者手元の照度確保

#### 下処理工程

- ・ 凍結品の温度管理：低温空調
- ・ 塗床仕上げ平滑、換品での照度確保
- ・ ダンボール等の埃対策、出荷前室の検討





JAPAN DOES NOT MISUSE. TAKE ADVANTAGE OF VD. ALSO OF ALL THE ADVANTAGES


Latest Freezing Technology "Proton Freeze"

## 機械ビジネスと食品ビジネスの融合

先進性冷熱機器（プロトン凍結機・解凍機共に特許取得済）を  
基礎に新しく・美味しいプロトン凍結品の提供を行います。

冷熱機器製造・販売  
研究・開発

食品製造・販売  
レストラン経営

 **proton**  
プロトングループ

>

**RFS** RYOHO  
FREEZE  
SYSTEMS

**innova**  
**fish**



**proton-**  
**EUROPE**

[www.proton-europe.com](http://www.proton-europe.com)  
NARA (JAPAN) - BARCELONA (SPAIN)  
T: +34 627 925 103  
[proton@innovafish.com](mailto:proton@innovafish.com)