Why not make delicious ingredients by Soft Steam Processing Technology?

【Innovation of food ingredients
—changing the future of food 】

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【Structure of this document】

At the beginning

It is skill of the artisan to bring out the texture, flavor, and fragrance of the material freely. ⇒ Soft steam processing technology has made it possible for anyone to easily realize the craftsmanship of that "preparation"!

❑ What is Soft Steam(SS) processing technology ?

1.【Definition 】It is a proprietary heating technology / control technology and cooking method (DB).

2.【Heating technique】 Generate saturated humid air at normal pressure. It is a highly efficient food material heating technology by using condensation heat and convection heat transfer in combination (new steaming technology).

3.【Control Technology 1】 It is an accurate heating control technology in 1 degree C unit in the temperature zone (20 ~ 98 ℃) below 100 ℃.

4.【Control Technology 2】 It has a control technology to uniformly heat all ingredients in the cooker cabinet.

5.【Recipe DB】 We have accumulated the best cooking method for each ingredient as Data Base.

At the beginning - Continuation

❑ What is made possible by Soft Steam(SS) processing technology?

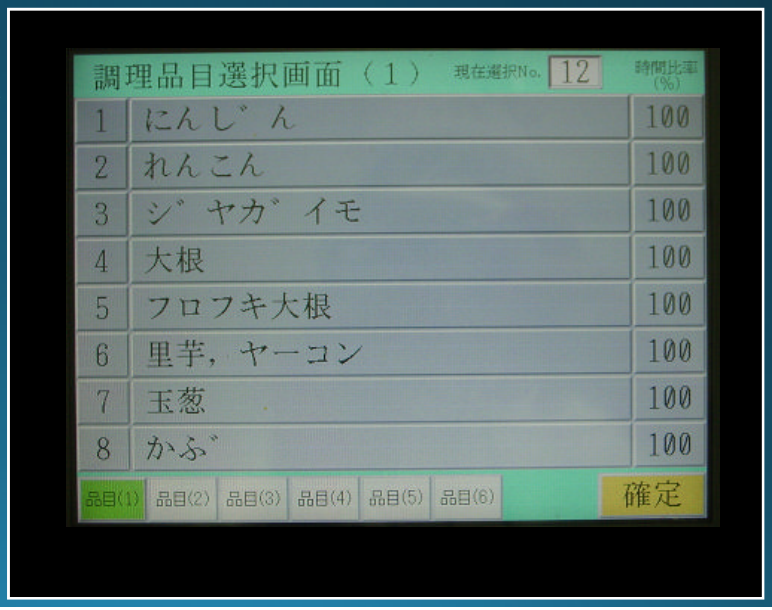
By performing optimum cooking heating based on the scientific characteristics of food ingredients.

1. **【Do not destroy the tissue of foodstuffs】 Suppress destruction of cell membranes.**
2. **【Optimize Nutritional Function of Foodstuff】 Suppresses nutrient loss and prevents deterioration due to oxidation.**
3. **【Texture of food, taste, fragrance】 Pull out freely like a master's skill.**
4. **【Program cooking】 100 kinds or more prepared for various food materials and cooking applications such as vegetables, grain beans and fish meat etc.**

Called cooking program with one button, anyone can do it with simple operation. We ~~realize the best cooking of craftsmanship.~~

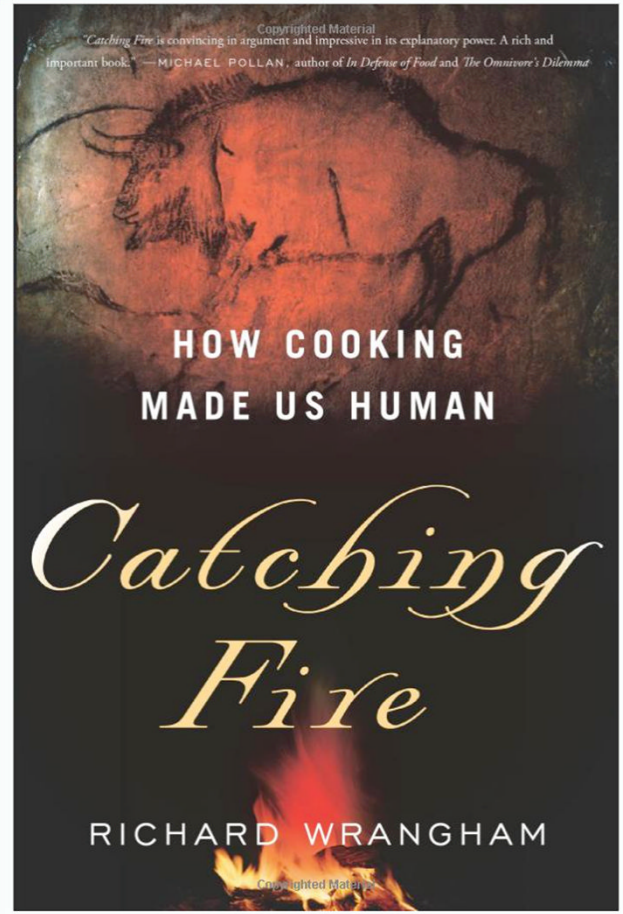
Batch type Soft Steam processing machine

Touch panel type cooking detailed selection screen



【Part 1: Soft Steam (SS) -Introduction of processing technology- 】

1. About Foods and Cooking



【Human Historical Significance of Cooking】

❑ 『Catching Fire』

Dr. Richard Wrangham is a human and primate scholar at Harvard University.

In the book above
"One chance that human beings evolved differently from other animals is cooking." he says.

- By cooking food, nutrients tend to be digested and absorbed,
- By eliminating the need to concentrate body energy on digestion,
- Energy has come to the brain,
- It is said to have promoted the development of the brain.

He also stated that cooking is a necessary process in order to maintain the growing brain's work.

Source：Nikkei Woman Online （2014/7/14）
http://wol.nikkeibp.co.jp/article/column/20140715/186185/?P=1）

1. About Foods and Cooking

【Effect of Cooking on Food Materials】

❑ Of the cooking methods (cutting, stirring, heating, fermentation, cooling, etc.), the method we most use is still cooking. So, in order to better understand Soft Steam Processing Technology, I will list the main influence on the effect of cooking on food in general.

❑ Change in physical properties

Foodstuffs cause state changes such as softening of fibers by applying heat, changes in starch and proteins, fat melting, etc. In addition, when heated in water, tissues composed of animal and plant cells are susceptible to damage, and water-soluble nutrients tend to leak out.

☐ Inactivation of bacteria · Detoxification of toxic components

Naturally derived foodstuffs originally have bacteria adhering to them, inactivating (sterilizing) the bacteria by adding heat, denaturing the toxic ingredients and detoxifying it, and so on, it is edible as it is It is possible to process foods that are not suitable for eating with confidence.

❑ Destruction and damage of vitamins and minerals

By cooking, vitamins and minerals are destroyed and drained. Vitamins are components that are easily denatured by heat, but vitamins (B group, C) called water-soluble vitamins tend to dissolve, especially in hot water as the tissues are damaged. Likewise, water-soluble minerals are easily eluted.

❑ Destruction of cell walls (examples of vegetables and fruits)

By heating and cooking, the cell wall of vegetables softens and becomes easy to chew and crush, so it becomes easier to absorb nutrients than raw vegetables as they are. However, since excessive heating destroys the cell wall, there are problems in terms of "tastiness", "nutrition" and "deterioration" (described later).

1. About Foods and Cooking

【Limit of Conventional Heating Cooking Method】

❑In fact, the conventional heating cooking had the following limit depending on the heat source to be heated.

❑ ~~In case heat source is high temperature one(direct fire · frying pan · fried)~~
The water contained in the ingredients in contact with the high temperature heat source exceeding 100 ° C is warmed to 100 ° C and the proteins and starch contained in the foodstuff are thermally denatured physically and chemically and are edible. However, since heat denaturation of starch and most proteins occurs in the range of 40 ° C or 90 ° C, it does not require high temperature of 100 ° C. Furthermore, unnecessary denaturation such as denaturation / deactivation of vitamins and enzymes, collapse of cellular tissues, etc. occurs when warming to 100 ° C.

❑ ~~When steam is used (conventional steamer, superheated steam oven range, etc.)~~
In the conventional steam heating in which high temperature steam is directly applied to the food material, the steam is 100 ° C. or more (about 300 ° C. in the superheated steam oven), so the foodstuff is heat treated at 100 ° C.
"Superheated Steam" refers to steam heated to 100 ° C or higher.

❑ ~~When high-temperature air with relative humidity less than 100% is used (general oven range = hot air type)~~
In oven heating that applies high temperature air (setting is possible from about 100 ° C or less to 250 ° C) to food materials, as long as moisture remains in the food, from the surface. Since moisture evaporates and keeps vaporizing heat, it is necessary to set the oven temperature to considerably high in order to keep the ingredients at the necessary temperature for cooking, and it is difficult to cook below 100 °C or more lower.

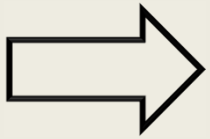
❑ ~~"Dielectric heating" = Heating with frictional heat caused by microwave(causing ultra high-speed vibration of water molecules contained in the food (general microwave oven))~~

Benefits: You can make warm vegetables in a short time. As water is not used, nutrients that are soluble in water remain.

Disadvantage: The heating temperature can not be duly adjusted, and food materials are heated up to 100 ° C to complete certain level of cooking materials. The temperature varies depending on ingredients of ingredients, and delicate heating adjustment is impossible.

Others: It is not suitable for mass continuous cooking at the factory due to the difficulty of electromagnetic wave control and the risk of electromagnetic wave leakage when large-sized.

【Conclusion of the Limitation of Conventional Heating Cooking Method】



【Specific issues to be solved】

❑It is difficult to lower the target food material by heating control at less than 100 ° C to achieve a certain level of cooking process.

In other words

❑Keeping ingredients at target temperature and cooking (Cooking at optimal temperature) is quite difficult.

❑The microwave oven is also difficult to control heating, and it is often said that there is a matter of safety, especially in large scale(factory level).

Specifically, by cooking at 100 ° C In case ;

❑ Excessive metamorphosis of foodstuff properties

❑ Inactivation of vitamins and food enzymes

❑ Due to unnecessary destruction of cell membranes, various inconveniences occur.

2. Soft Steam Processing Technology - to realize preliminary arrangements of the artisan -

【What is Soft Steam Processing Technology?】
＝Moisturizing heating cooking with precisely controlled “Saturated Humid Air”.

In order to overcome the problems due to limitations of conventional heating cooking methods, we developed soft steam processing technology by industry, government and academia.

❑ What is saturated moist air?
It is the air containing the maximum (as far as possible) steam at a certain temperature and having a relative humidity of 100%

❑ Definition of soft steam processing technology
Definition: "Cooking with moisture-heated cooking with accurately temperature controlled saturated humid air".

- Heat can be efficiently heated by using convective heating in contact with the thermal fluid and condensation heat by saturated humid air.
- Since the temperature can be controlled even at normal pressure or below 100 ° C, optimum heat treatment using the target temperature is possible.
- A database of cooking programs corresponding to each ingredient and processing target (in case of meat, rare, well-done etc.), automatic operation is possible.
- By the above technology and know-how, you can realize "skill of a craft that can freely extract the texture, taste, scent”.

【Characteristics of Soft Steam Processing Technology】

【Feature 1】 "Heat homogeneously up to the inside of the foodstuff efficiently" by ~~convection heating~~ + ~~condensation heat~~.

【Feature 2】 Heat with moisture at the optimum temperature of each ingredient / ingredient at 100 ℃ or less, cause only "necessary heat denaturation".

【Feature 3】 "Maintain cellular tissue" by mild temperature and moisture keeping, suppress quality deterioration and denaturation.

【Feature 4】 Quickly homogenize temperature-controlled saturated humid air in a heating cabinet. "Food ingredients are evenly heat-treated".

【Feature 5】 Improvement and optimization of food texture of foodstuff are realized by heating temperature control.

【Feature 6】 Select a program that executes heat treatment at optimal temperature in multiple stages in "Touch panel type menu".

【Feature 1】 "Heat homogeneously up to the inside of the foodstuff efficiently" by convection heating + condensation heat.

- Temperature distribution in the cooker cabinet and food materials -

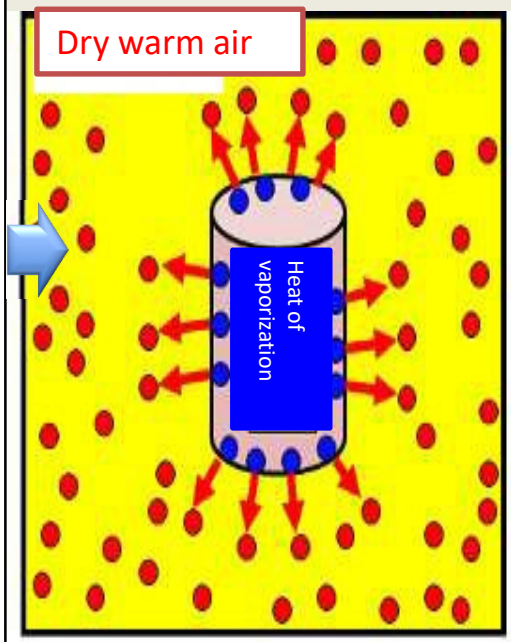
【**Convection heating** – (Minus) **Heat of vaporization**】
Dry warm air (oven etc.), heated by convection heating with high temperature hot air.

However, the heat of vaporization due to the evaporation of moisture in the food material deprives the heat of the foodstuff from the surface of the foodstuff (blue).

The foodstuff is heated by both of these actions.
In order to take the heat of vaporization due to evaporation of moisture in foodstuffs, in order to bring the ingredients to the target temperature, the oven temperature must be increased by 10 to 20 ° C.

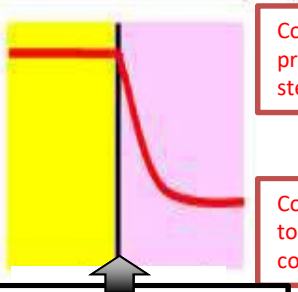
The center temperature of the food does not rise in the middle, it is difficult to become homogeneous.

In case of heating method such as oven



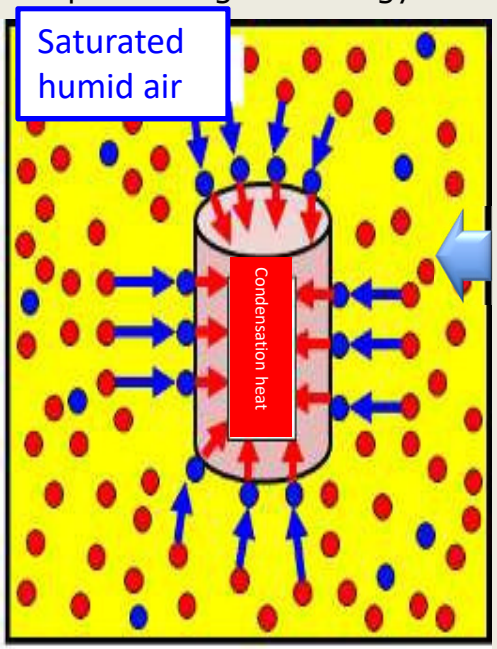
Convection heating by high temperature air

– Heat of vaporization by evaporation of moisture



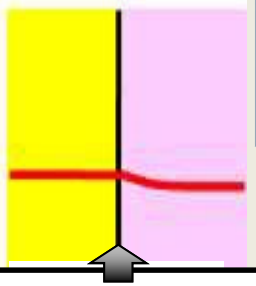
Temperature distribution difference ⇒ Large

In case of heating method of SS processing technology



Convection heating by proper temperature steam

+ Condensation heat due to moisture condensation



Temperature distribution difference ⇒ Small

【Convection heating + (Plus)proper temperature steam】
By using convection heating + condensation heat, heating quickly and homogeneously to the center of the food material with high efficiency heating.

There is no temperature variation in the storage, and the same heating can be done anywhere.

It uses moist saturated air at the target temperature, so it can be heated up to the center of food ingredients just as outside.

【Feature 1】 "Heat homogeneously up to the inside of the foodstuff efficiently" by convection heating + condensation heat.

【What is condensation heat due to saturated humid air?】

- When saturated humid air touches an object of low temperature, condensation of water vapor occurs, at that time, it transmits "heat of condensation" with a large amount of heat to the substance.
- In saturated humid air, water vapor condenses even at 100 ° C or less.
- Saturated humid air is superior to high temperature hot air (influence of vaporization), high temperature steam (excessive denaturation), warm water (tissue destruction and elution).

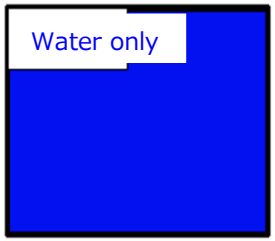
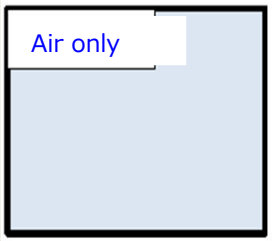
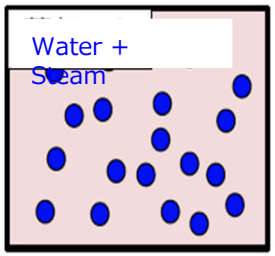
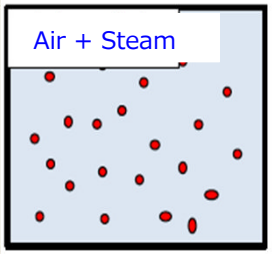
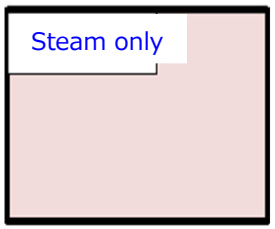
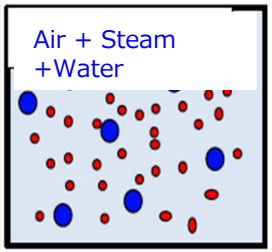
(To be described later, in [Comparative Explanation] page)

2. Soft Steam Processing Technology - to realize preliminary arrangements of the artisan -

Supplementary Explanation

< Difference in Heating Method by "water and air" as heat medium>

【Water-centered heat medium】 【Air-centered heat medium】

Cooking method			Cooking method
Boil, Simmer	 **Water (liquid)** · Liquid moisture only · Below 100 ° C at normal pressure	 **Dry Air** · Does not contain steam · Contain no liquid moisture · 100 ° C or less at normal pressure possible · Drying heating	Oven etc.
Steam	 **Wet Steam** · Not including air · Containing liquid moisture (partly steam condensation) · At normal pressure 100 ° C and above	 **Humid Air** · Including Steam · Does not contain steam · Contain no liquid moisture · 100 ° C or less at normal pressure possible · Drying heating	Heated steam oven etc.
Steam processing	 **Dry Steam** · No air · No liquid moisture · At normal pressure 100 ° C or more · Use for drying heating	 **Saturated Humid Air** · Including Steam · Contain condensation moisture · 100 ° C or less at normal pressure possible · Moisturizing by condensation	Soft Steam processing

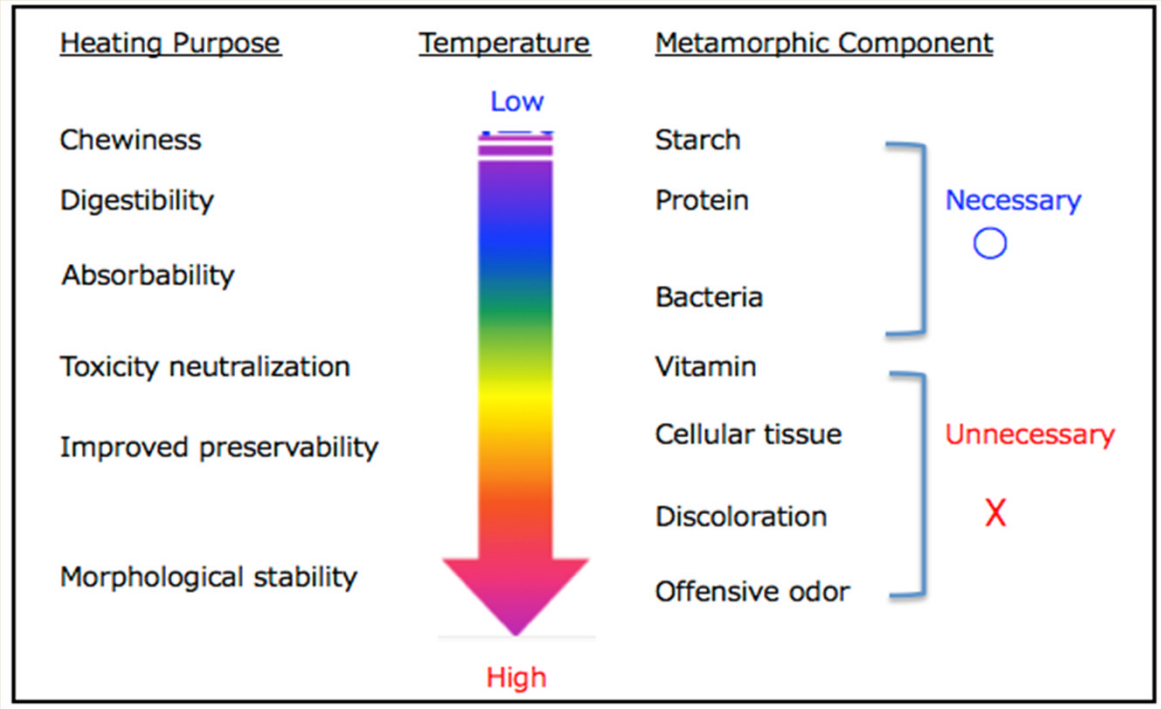
【 Superiority of heating method by "saturated humid air". 】

- Heating with hot water damages the cellular tissue of foodstuff, it has an influence on elution of water-soluble ingredients and texture.
- Heating with high temperature steam gives excessive heat denaturation at 100 ° C.
- Heating with air less than 100% humidity (including humid air) has uneven food temperature due to surface drying and cell tissue damage.
- Soft steam processing using saturated humid air at an appropriate temperature ~~minimizes~~ component elution, excessive heat denaturation, damage to foodstuff tissue.

【Feature 2】 Heat with moisture at the optimum temperature of each ingredient / ingredient at 100 ℃ or less, cause only "necessary heat denaturation".

- By "accurate temperature control" of "saturated humid air ", even in the "temperature range of 100 ° C or less", "Heating moisturizing (leaving moisture and nutrients in food)" can be done at "optimum temperature" according to the thermal characteristics of each food ingredient.
- In addition to improving the quality (physical, scientific, physiological characteristics), it makes it possible to strongly draw out the original characteristics of food materials which was difficult in the past, and to give high value. (Described later)

<Relationship diagram of heating purpose, temperature, modifying component>



At a temperature of 100 ° C or lower, cook ingredients which require metamorphosis at the optimum temperature and add only "necessary heat denaturation"

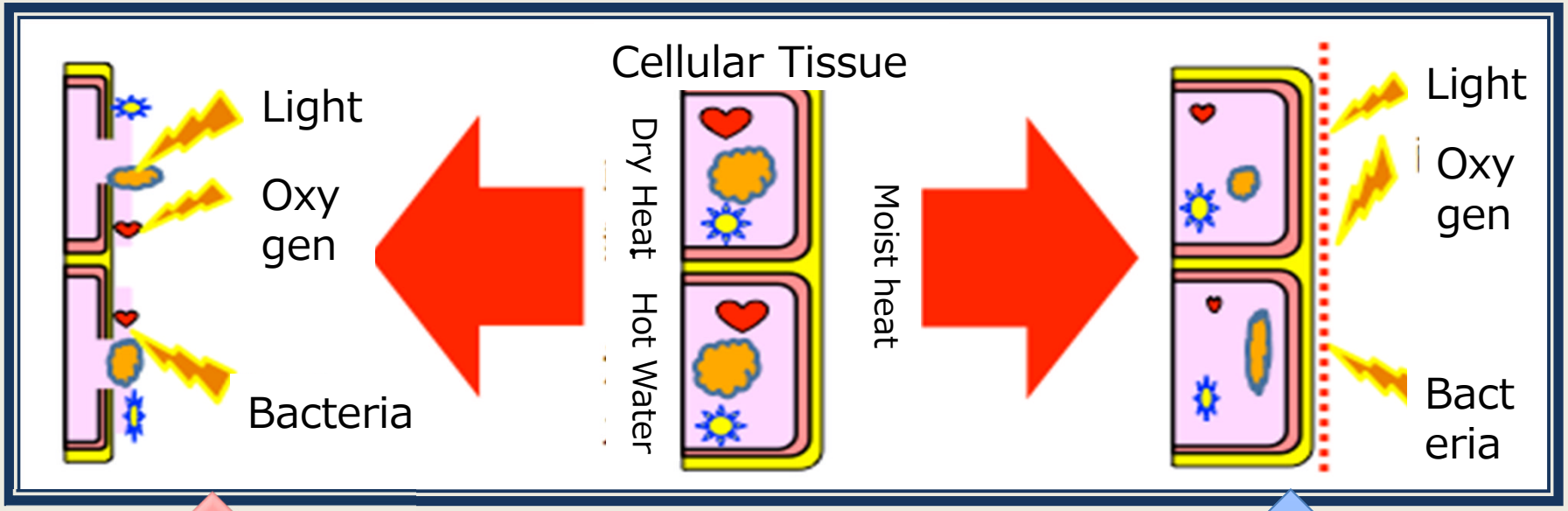
【Feature 3】 "Maintain cellular tissue" by mild temperature and moisture keeping, suppress quality deterioration and denaturation.

【Heating of hot air, hot water and dry air】

- It damages cell membranes and walls.

【Soft Steam (SS) processing】

- Maintains cellular tissue by mild, moderate temperature moisturizing heating, and suppresses deterioration and denaturation.



Useful enzyme ・
Nutrition leakage
Odor, discoloration, corruption due to oxygen and light

Suppresses alteration and deterioration due to oxygen and light without destroying cellular tissues

【Feature 3】 "Maintain cellular tissue" by mild temperature and moisture keeping, suppress quality deterioration and denaturation.

【 Impact on “Cellular Tissue”】

- 【Foodstuff】
  It generally has a cell group derived from a plant or animal body and basically has a structure in which the cytoplasm containing various components is enclosed in a cell membrane or a cell wall.

- 【Heating of high temperature steam・Hot Water・Dry Air】
  The cellular tissue which touched high temperature steam and hot water is broken. Even with heating using dry air, the moisture of the surface tissue is deprived, and the cell membrane and the cell wall are damaged. (Similarly for air mixed steam with less than 100% humidity) .

  When the cytoplasm leaks from the broken cell membrane or cell wall and touches the air or light, various colors contained in the cytoplasm act on the substrate, causing color deterioration and it smells. In addition, germs adhered to the surface of the foodstuffs grow due to the moisture and nutrients of the cytoplasm, causing spoilage.

- 【Soft Steam (SS) Processing】
  As described above, since it is heat-treated at an appropriate temperature of 100 °C or less without drying using saturated humid air, damage to the cell tissue is minimized and unnecessary quality deterioration can be suppressed.

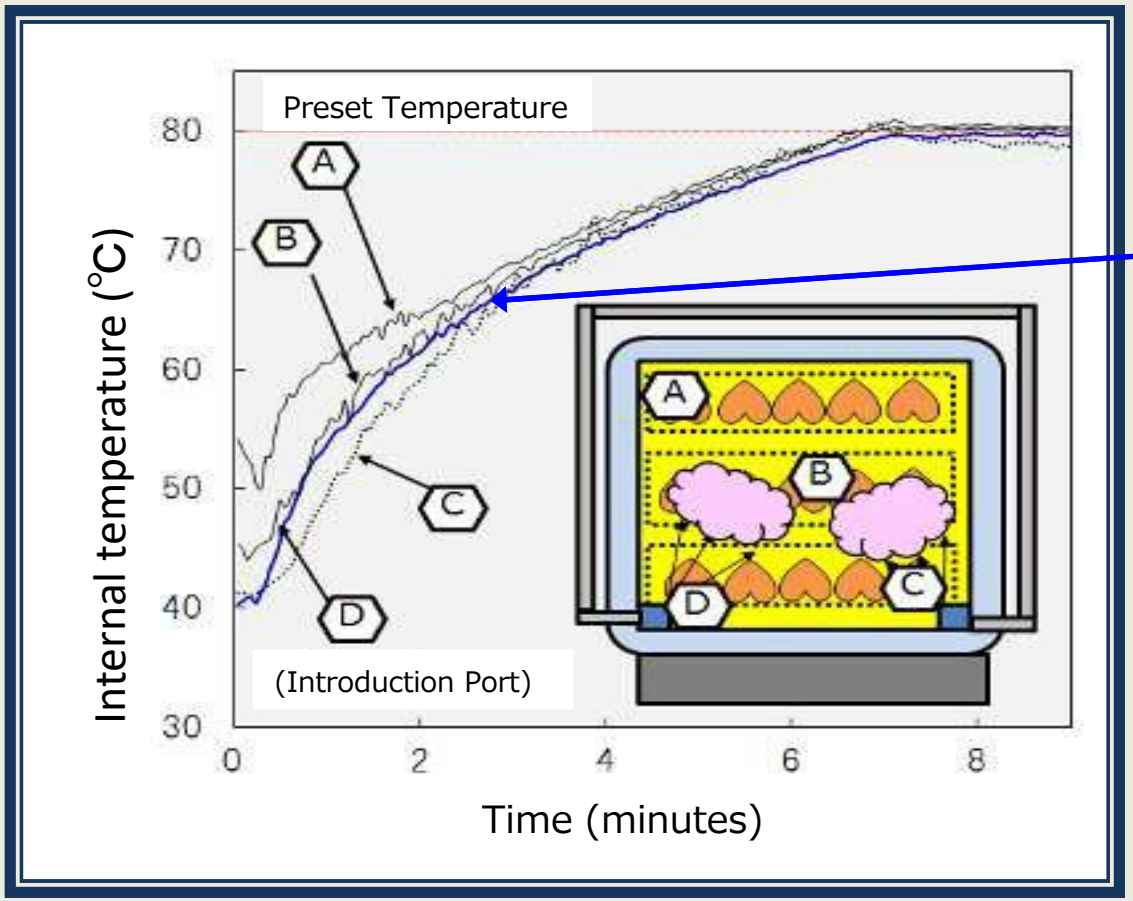
Supplementary Explanation

<Summary Comparison Table of Heating Cooking Methods> Relative Evaluation Method

Heating Cooking Method Comparative Table (relative evaluation)	High Temprature Heat Source	Hot Air	Water Vapor	Saturated Humid Air	Microwave
Kitchenware	Direct Flame Frying Pan Frying with Oil	Oven	Steamer Oven using Heated	Soft Steam Heating Processing	Microwave
Heating Method	Conduction Heat	High Temperature Hot Air	Heated Steam	Convection Heating + Proper temperature steam	Dielectric Heating (frictional heat)
High Efficiency Heating	△	△	△	◎	◎
Homogeneous Temperature Heating	×	△	△	◎	×
Heating ingredients to 100 ° C	◎	◎	◎	◎	◎
Heating Control of food materials at 100 ° C or lower	×	△	×	◎	×
Accurate Heating Temperature Control	×	×	×	◎	×
Moisturizing Heating (not drying)	×	△	△	◎	×
Control of Heat Denaturation	×	×	×	◎	×
Minimize Damage to Cell Wall	×	×	×	◎	×
Minimize Loss of Nutrients	×	×	×	◎	×
Optimization of Texture (aimed softness)	△	△	×	◎	×
Inactivation of Bacteria (sterilization)	△ (unevenness)	○	○	◎	△ (unevenness)

【Feature 4】 Quickly homogenize temperature-controlled saturated humid air in a heating cabinet. "Food ingredients are evenly heat-treated".

- Introducing ‘accurately controlled temperature’ “saturated humid air” to quickly homogenize the internal temperature.
- Heat the foodstuffs placed inside the store evenly.
- Heat treatment can be performed in bulk with uniform temperature of large amounts of food materials.



Each place [A][B][C][D] in about 3 minutes converges to the same temperature zone.

It reaches the target temperature in about 7 minutes.

The internal temperature is quickly being equalized and stabilized.

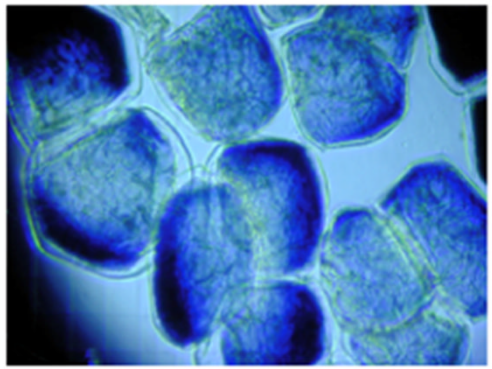
Even if the place is different where the foodstuff in the storage room is placed, it will be cooked uniformly.

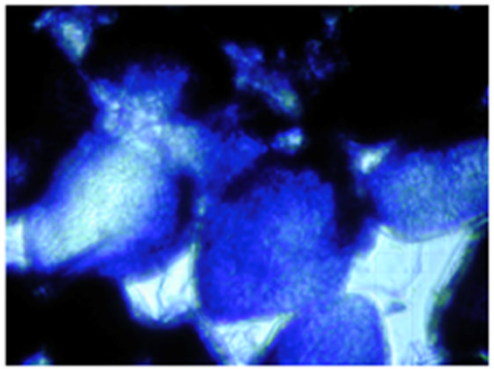
A very important feature in mass processing.

【Feature 5】 Improvement and optimization of food texture of foodstuff are realized by heating temperature control.

- [Change in physical properties] Starch absorbs and swells and becomes viscoelastic, and protein gels due to shrinkage and crosslinking formation. In the case of fibrous substances, physical properties change due to dissolution of cell membrane components and membrane structure change.
- The denaturation temperature is different if the denaturation mechanism is different.
  Even with the same ingredients, there is a big difference depending on the kind of raw materials.
- By controlling the heating temperature by soft steam processing, it is possible to control the texture according to the characteristics of the foodstuff and use by giving appropriate denaturation to these ingredients.

【Starchy Food】

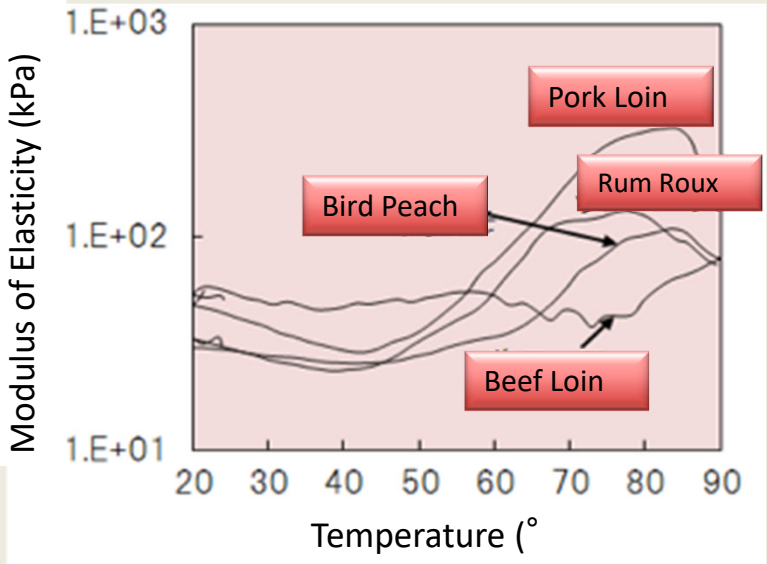




[85 ° C treatment]
- Swelling and completion of gelatinization
- Boundary is clear
- Stable physical properties

[95 ° C treatment]
- Further swelling
- Border is unclear
- Collapse of starch granules

【Fish and Meat】



- Adjustable hardness and softness freely
- Safe rare meat with surely passing the fire
- Delicious semi-processed fish without smell

Supplementary Explanation

<Effect on Food Materials/ quality>

~~The quality of food is determined by physical, chemical, and physiological characteristics,~~ optimal soft steam conditions are determined by scientifically elucidating the effects of food ingredients on each property and changes due to heat treatment, which could produce processed food having new quality characteristics that could not be thought of.

① 【Adjustment Effect on Texture】

The texture usually comes from the physical properties of the major components in the food.

Physical characteristics affect the musical performance and subcutaneous nature. It is also an important characteristic in terms of edible and palatability. It also affects quality changes during storage and transportation.

Protein in farm meat, heat starch in cereals, and fibrous matter in vegetables and fruits heat denature, will form the physical characteristics of heated food.

The denaturation mechanism of each component is different. The starch absorbs and swells and becomes larger, the protein gels due to shrinkage and crosslinking formation, and in fibrous materials, membrane structure change due to elution of cell membrane components and reconstruction.

Even though the same denaturation mechanism is the same, the denaturation temperature varies depending on the type of foodstuff and it also varies with interaction with other ingredients.

In soft steam processing, heat denaturation of each component is grasped beforehand and heat treatment is performed at an appropriate temperature according to the purpose, and the target texture is adjusted.

Supplementary Explanation

<Effect on Food Materials/ quality>

② 【Adjustment effect on Taste】

The taste is derived from the chemical properties of food, and the basic taste such as sweetness, umami, acidity, bitterness, salty taste is related to low molecular components contained in food. These ingredients may be originally contained in foodstuffs, but they are also produced in the course of cooking.

Monosaccharides and amino acids that affect palatability are produced when starch or protein, which is a major nutrient component, is degraded by enzymes. Monosaccharides strongly influence sweetness, which is the most important taste, and amino acids also affect sweetness, taste, bittern, sourness, etc. depending on kinds.

The enzymes involved in these productions are a kind of protein, and when it is heated to high temperature, it is thermally denatured and inactivated. Therefore, by adjusting the heat treatment temperature it is possible to generate the necessary taste and to prevent unnecessary taste.

With soft steam processing, it is possible to accurately and uniformly control the temperature of the food material, and it is possible to control these enzymes and adjust the taste.

③ 【Adjustment effect on Functional Ingredients】

Minor ingredients contained in foods include those that function as physiologically active functional ingredients and those that cause quality deterioration due to unpleasant odor or coloring.

Vitamin C is a typical functional ingredient both quantitatively and functionally, but it is easy to denature with heat, and almost no physiological activity is expected in cooked foods.

However, since the denaturation temperature of vitamin C varies depending on the type of ingredients, loss of vitamin C can be minimized by setting optimum conditions according to the raw material and purpose in softs team processing.

【Feature 6】 Select a program that executes heat treatment at optimal temperature in multiple stages in "Touch panel type menu".

- Accumulation of optimum cooking as a program by ingredients and cooking purposes.
- The program can be easily selected from the touch panel, and the system automatically performs the heating process.
- Automate the underlying process of craftsmanship techniques and save artifacts of this process. Staff can be put into other processes.

[Part of advanced setting function]

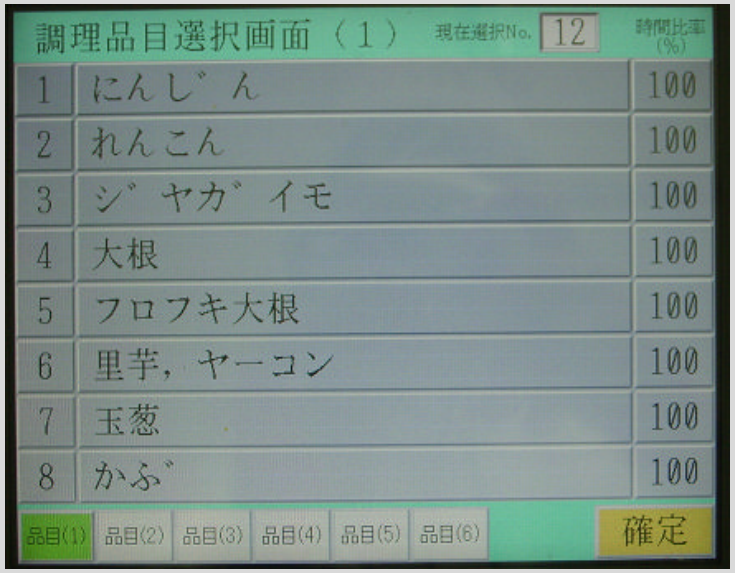
① After testing with your own heating program on the manual screen, after setting the conditions, automatic heating program can be set at your company.

② After completing the operation with the automatic heating program, you can check the state of the ingredients and extend the heating time in increments of minutes.

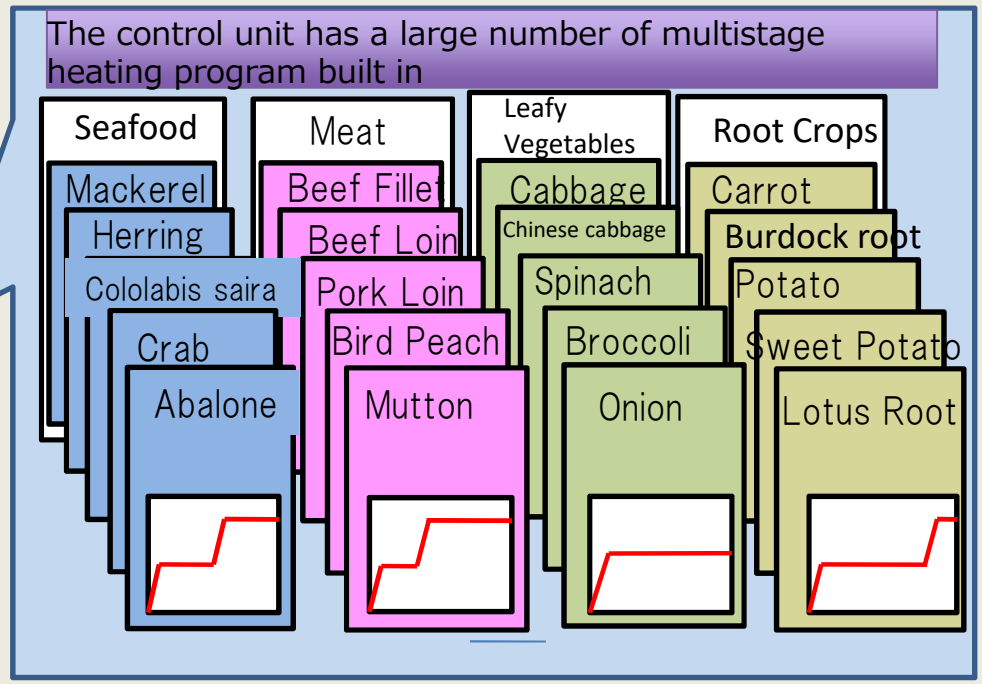
③ It is possible to choose whether to use the core temperature sensor when deciding how to process root vegetables and leaves.

④ It can also be used as a decompressor or a warm warehouse at program temperature setting.

Easy call with selection of touch panel

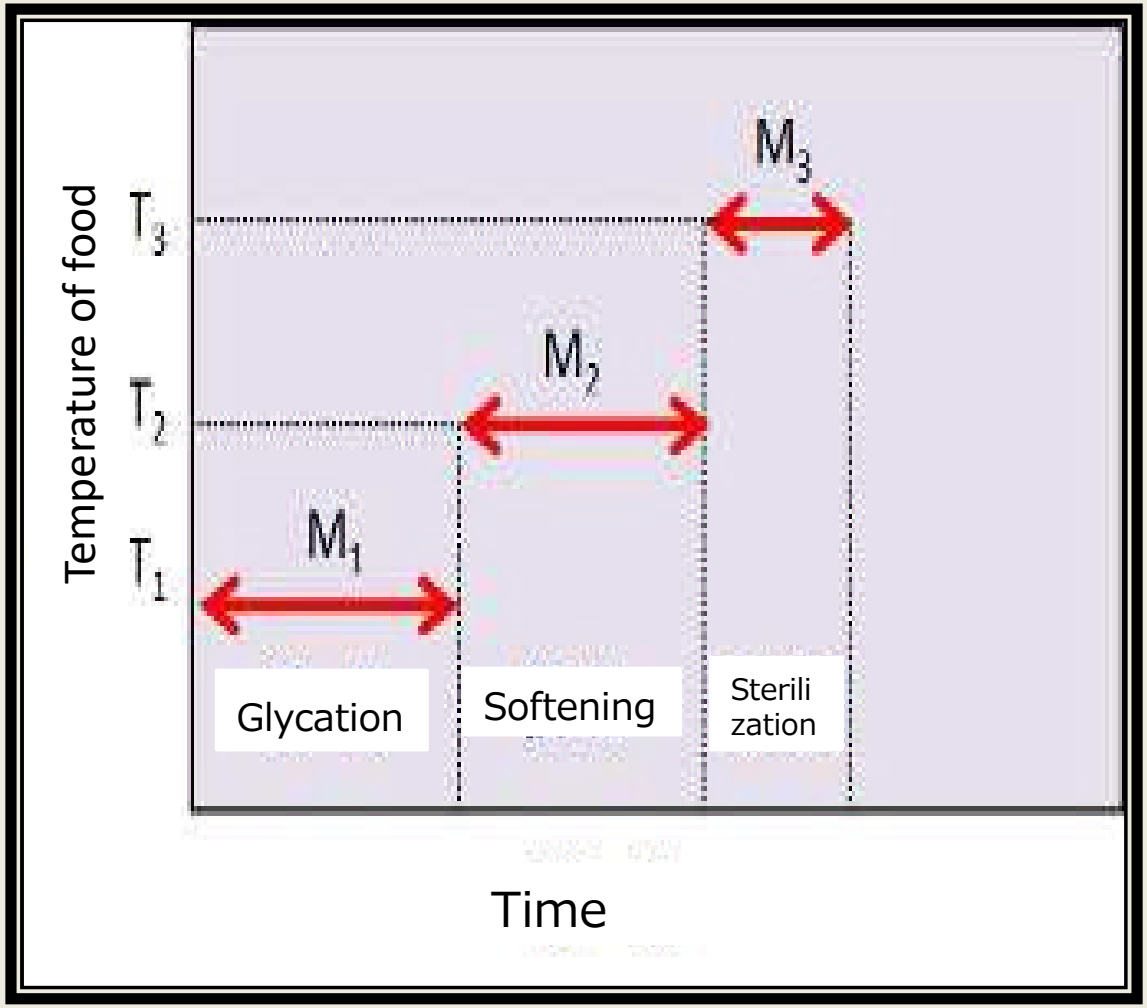


The control unit has a large number of multistage heating program built in



Supplementary Explanation

< Create Necessary Food Quality with Multistage Heating Program >



It is possible to form multiple quality performances by <step type temperature program> which sequentially treats multiple ingredients in foodstuffs under appropriate heating conditions.

It is possible to perform advanced heating cooking by merely selecting a cooking program according to the type and usage of the foodstuff stored in the control part with the touch panel.

❑ Meat processing example
<Precise heating temperature setting according to finishing purpose>

Preset Temperature

90℃ 80℃ 70℃ 60℃

Differences by part of meat

Hanging Tender

Loin

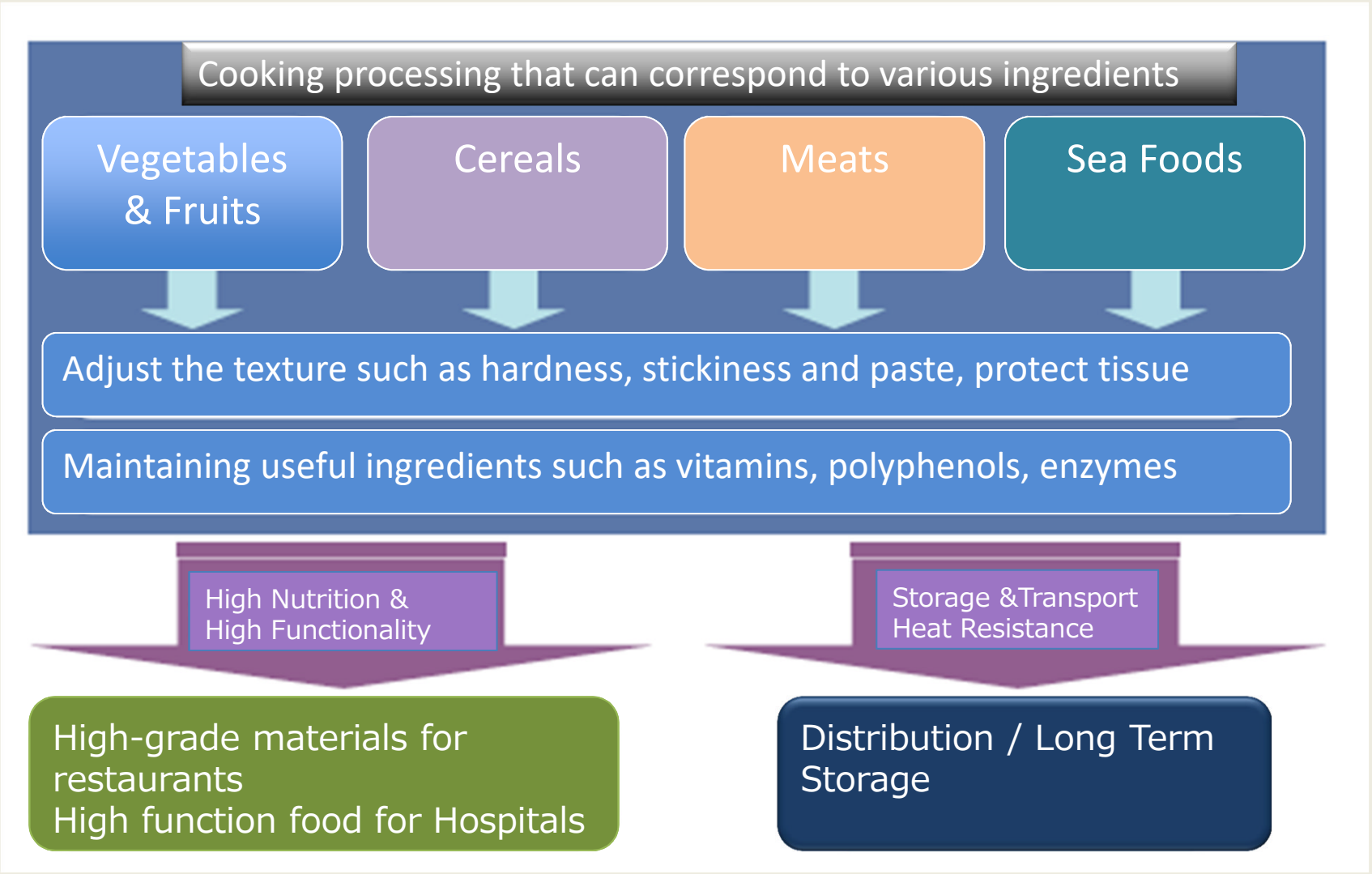
65℃

❑ Processing example of vegetables
<Precise heating temperature setting according to finishing purpose>

Soft Steam Vegetables (commercialization example)

Pretreated Vegetables (Packed in a vacuum pack)	Vegetable prepared dish set (With no seasoning)	Vegetable packing boxed lunch(Seasoned)

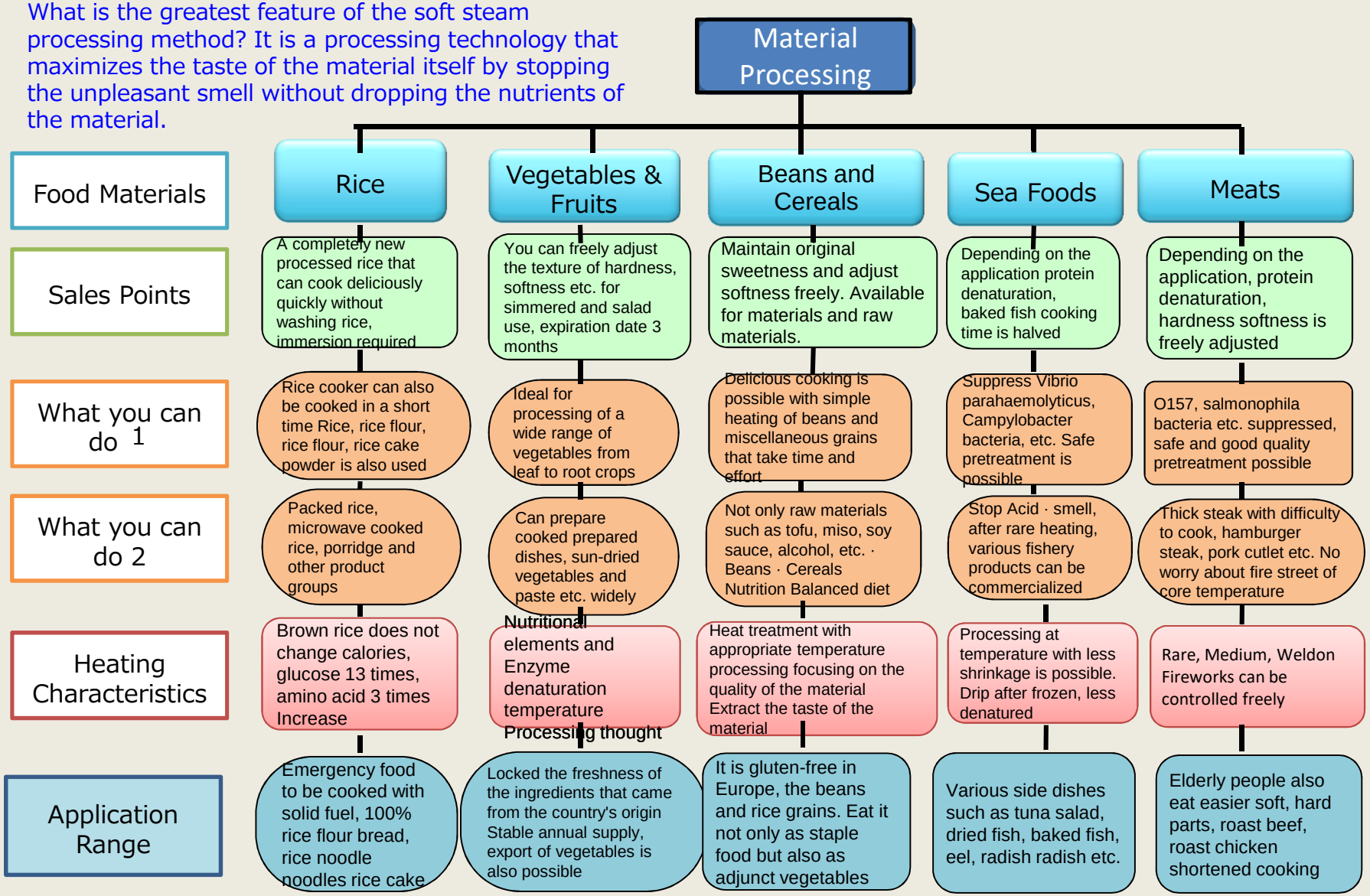
❑ Applicable range list <High-function underlying processing ~ sales>



In addition to providing food for restaurants, we can also provide sterilized heat treatment for use as food for long-term storage.

❑ Application detail by ingredients <What you can do, Heating characteristics, Application range>

What is the greatest feature of the soft steam processing method? It is a processing technology that maximizes the taste of the material itself by stopping the unpleasant smell without dropping the nutrients of the material.



❑ What is ~~SS Processed Rice~~

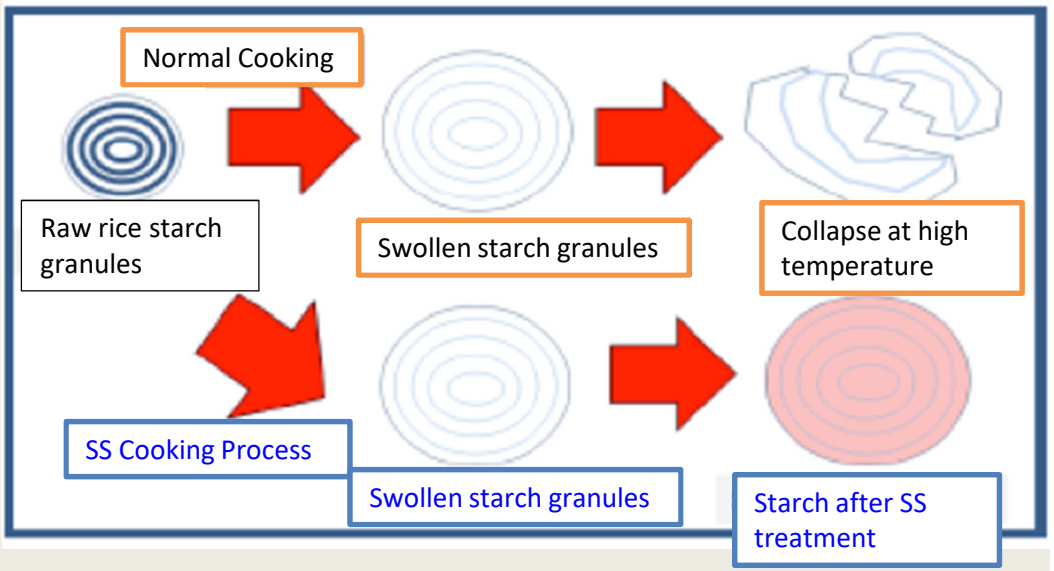
●It is an easy cooked rice which made use of the enzyme contained in rice originally by the latest steam cooking technology "soft steam processing", to the utmost the sweetness and taste of rice to the utmost.

❑ ~~SS Processed Rice~~: type of product

1. ~~Packed Rice~~
If you warm it with a microwave oven or hot water, you can eat it delicious immediately.

2. Dried Rice
①~~Dry Rice~~(White rice) is heated with a specified amount of boiling water for 13 minutes, and if you steam it by 10 minutes, it becomes delicious rice easily.
② ~~Brown Rice~~ can be easily cooked in white rice mode of a rice cooker by putting water in rice without washing rice and immersion.

3. ~~Rice Flour~~ for processing
As raw materials for:
Japanese confectionery, European confectionery, rice crackers, rice noodles, rice flour bread.



Works the enzyme present in the grain in a state where the starch contained in rice is absorbed and gelatinized, and produces sweet component glucose in the starch gel.
Since the starch granules swollen by excessive heating are not destroyed, the rich texture of rice grain lasts long.

❑ Soft Steam Rice product lineup

1. (White rice) With No washing rice nor dipping, you can cook rice in 10 minutes with water.

	Product Name	Weight	Package	Origin
#2101	一膳主義白米 (White Rice)	450g	75gx 6	Domestic
#2102	Soft Steam White Rice	10kg	2	Domestic

Glucose is much more than rice cooked normally, so you can feel sweet taste. Since the starch contained in rice also changed, it is glucose, so the calorie intake does not change.

❑ Soft Steam Rice product lineup

2. (Brown Rice) No washing rice nor dipping, you can cook rice in 37 minutes in water.

#2201

#2202

Product Name	Weight	Package	Origin
一膳主義玄米 (Brown Rice)	450g	75gx 6	Domestic
Soft Steam Brown Rice	10kg	2	Domestic

Soft Steam Brown Rice easily cooks with a normal rice cooker. Since GABA usually increases 3 times as much as brown rice and glucose increases about 13 times, sweetness and umami are remarkably felt. Moreover, because it can cook softly without unpolished brown rice peculiar to brown rice, everyone can eat deliciously.

❑ Soft Steam Rice product lineup

3. Special order item: (Glutinous Brown Rice)
No washing rice nor dipping, you can cook rice in 37 minutes in water.

	Product Name	Weight	Package	Origin
#2301	一膳主義もち玄米 (Glutinous rice brown rice)	450g	75gx 6	Domestic
#2301	Soft Steam Glutinous rice brown rice	10kg	2	Domestic

Soft Steam Glutinous Brown rice easily cooks with a normal rice cooker. Sweetness and umami are felt more than glutinous rice, you can easily make handmade Japanese confectionery such as rice balls, rice balls and brown rice “Ohagi” at home.

❑ Purpose of SS Processing Rice development

1. Make full use of sweetness and taste of rice
2. With the development of soft steam processed rice, it will be easy to cook for small group households and for nuclear families.
3. Returning to the original eating habits of Japanese who staple rice.
4. Expansion of demand for rice, improvement of food self-sufficiency rate, support for domestic agriculture.
5. We aim to strengthen international competitiveness of agricultural products and processed goods as measures against TPP.

❑ Targeted Consumer of SS Processing Rice

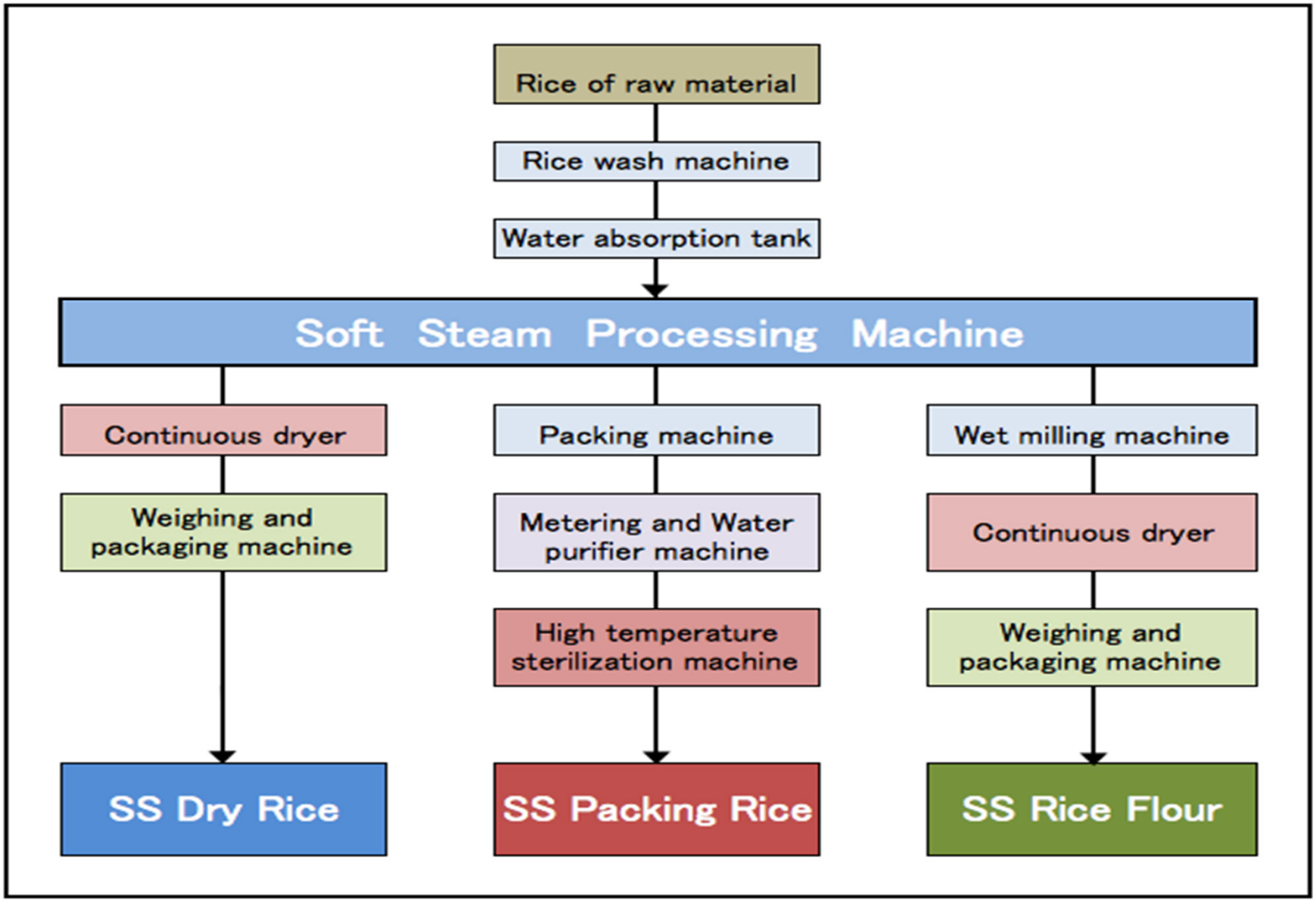
~~For General Household~~
- Single person, Small family
- Working family
- Elderly family
- Emergency food, Caring food

~~For Dining / Manufacturing Industry~~
- Restaurant, Snack, Pub
- Feeding Facilities
- Making Prepared Foods

~~Merits~~
- Deliciousness
- Simple & Easy
- Appropriate amount
- Convenient
- Short time

~~Merits~~
- Deliciousness
- Cost reduction
- Convenient
- Stable quality
- Multipurpose

❑ SS Processing Rice Production Process



❑ Characteristics of SS Processed Rice

<SS packing rice>

・After SS processing, immediately absorb it with hot water, it becomes delicious rice.

<SS dry rice>

・Rice grain moisture is low even after SS processing, there is no tissue destruction, so it can be efficiently dried, it can be given to the same transportability and preservability as raw rice.

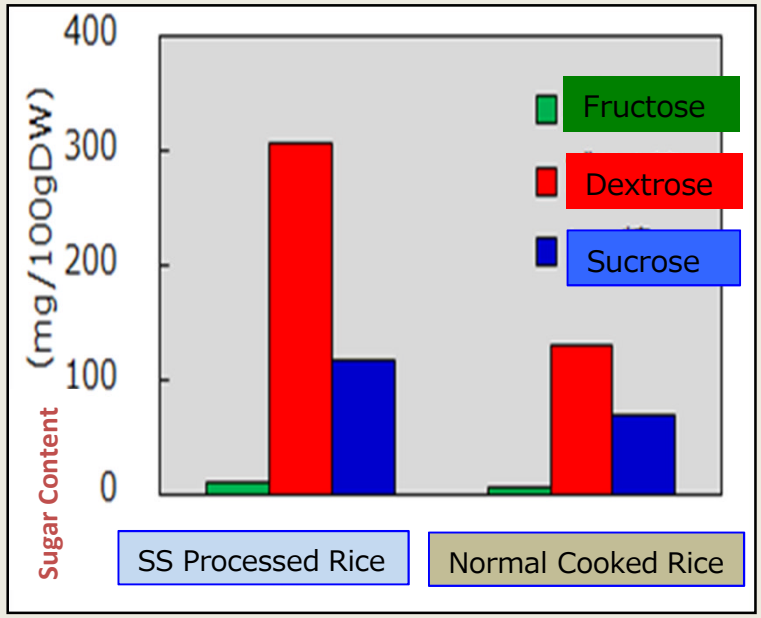
・SS dried rice can be easily rehydrated and recovered with hot water, and it will be delicious to rice in a short time.

<SS rice flour>

・If you milled SS dried rice, delicious sweets with sweetness extracted, rice flour for bread and noodles.

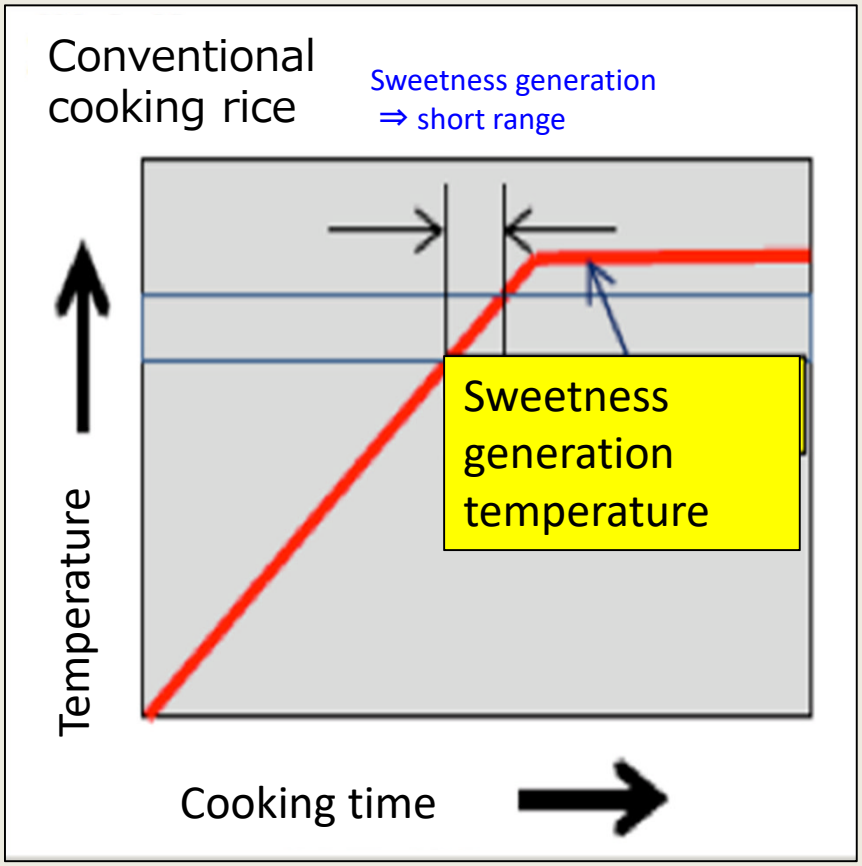
・Even if sweetness comes out, the calorie intake does not increase. (Health / security)

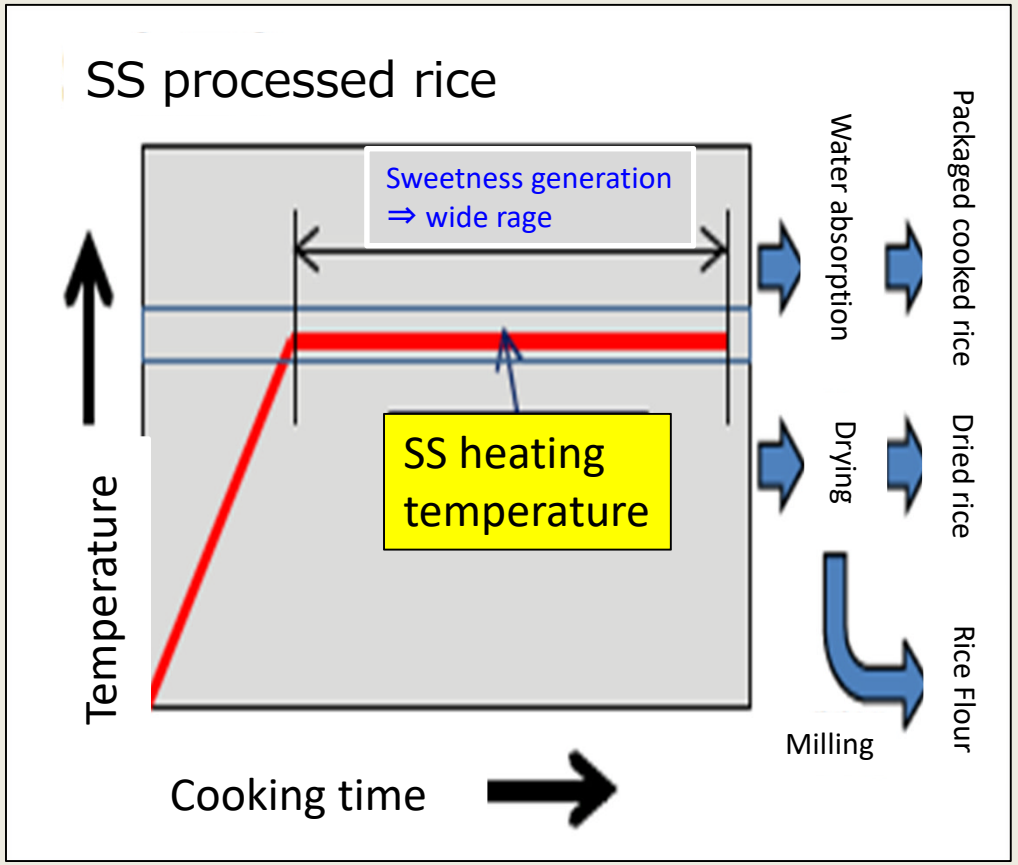
❑ Difference in sugar content after processing



❑ Glycation promotion diagram of starch(temperature x cooking time)

● Difference in time of Sweet spot temperature zone
~~Conventional cooking (short) vs. SS processing (long, variable)~~





❑ SS processed rice production line (photo)

<Automate all processes, allow unattended operation>
- Quality stability ・ Low cost
- International competitiveness as an industrial product

【Part 2 : Introduction of SS Processing Machine】

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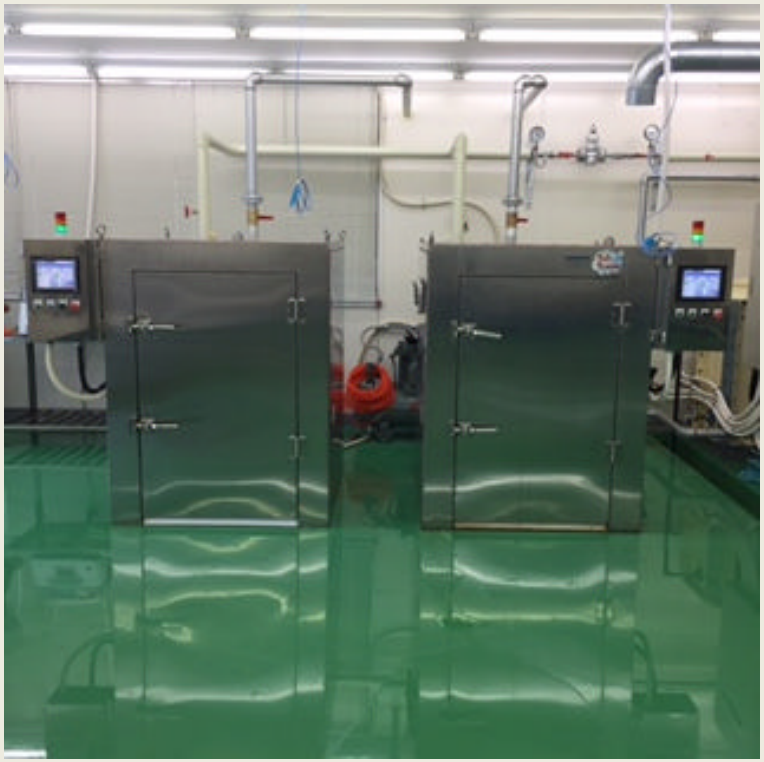
1. Photo of the SS Machine installed

【Soft steam processing machine installed at food factory】

<Double batch type processing machine>



<Continuous conveyor type processing machine>

2. Photo of Processed Food Materials

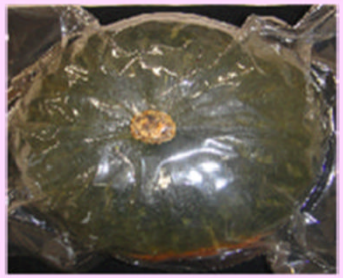
【Before and after processing】


Sweet taste, leave taste


Maximum sweetness, deliciousness


It has no peculiar smell,
makes sweetness


Extracts softness and taste freely




Maximum sweetness, deliciousness


Sweet taste,leave taste

2. Photo of Processed Food Materials

【Prepared side dishes & Rare steaming】

Soft Steam side dishes

Rare steamed shrimp

Rare steamed Yellowtail

3. SS processing machine specifications (Soft Steam Automatic Heating Cooker)

【SSA24 : Spec Sheet】

1. Model	Type Expression	SSA24
	Number of units	1 Unit
2. Conditions of use	Max.Service Temperature	98℃
	Max.Specification Pressure	0.1MPa
3. Materials used and surface finish	Main Part	SUS304
	Surface Finish	Pickling / Degreasing · Hair line (exterior)
	Purchased Item	SS · FC manufacturer standard color
4. Various supply conditions Please supply electricity / steam at your company under the conditions on the right.	Electric Quantity	Three Phase :200V−0.05KW
	Steam Amount	75Kg／h
	Vapor Pressure	0.1MPa
		When using steam of 0.1 MPa or more, please install a pressure reducing valve at your company.
5. Chassis specifications	Machine Weight	440kg
	Machine Size	W 1,115mm ×D 1,250mm×H 1,400mm
	Truck Weight	230kg (24 sheets basket - 12 pieces saucer)
6. Equipment Capability	【Usage Examples】 ① Potato 15 g randomly (for simmered) 6 kg / net × 24 mesh = 144 kg heating time 80 min ② potato circle 6 kg / net × 24 mesh = 144 kg heating time 80 minutes ③ Ginseng 15 g randomly (for simmered) 6 kg / net × 12 mesh = 144 kg heating time 95 min	

3. SS processing machine specifications (Soft Steam Automatic Heating Cooker)

【SSA24 : Spec Sheet】

<Dolly / Basket>

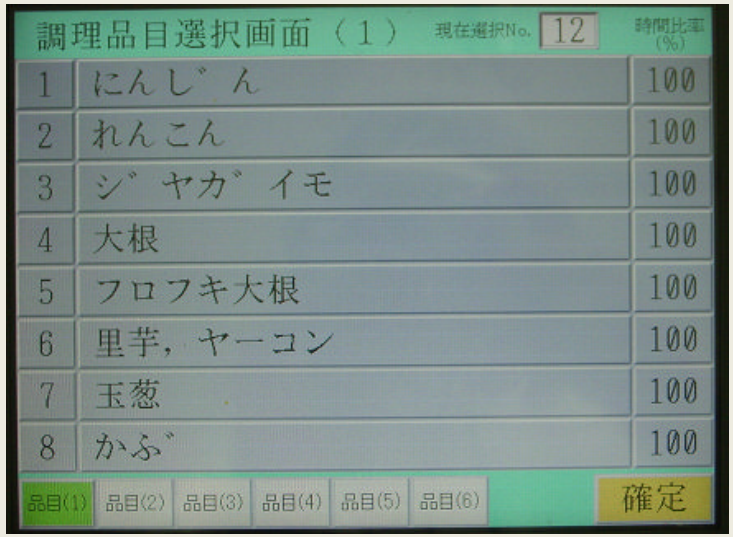
7. Construction	1) Body frame	Floor Dimensions	1,115mm(W) x 1,250mm(D)
		Behavior	· Door opening / closing direction will be open in front. · The door opens manually after setting the trolley. · Temperature rise is done by soft steam. · Temperature rise required time varies depending on the product.
	2) Dolly / Basket	Dolly Dimensions	970mm x 660mm x 1,092mm(Hight)
		# of Storage	12 rows x 2 rows (# of baskets)
		Cage Dimentions	550mm x 410mm x 75mm(Hight)
	3) Uniform Heating	Control Valve	It is controlled by a proportional control valve in order to reduce the temperature fluctuation in the cabinet.
	4) Control Device	Control Method	Fully automatic control panel using sequence controller
8. Accessories	The quantity shown on the right is the total quantity.	① Dolly	1 Unit
		②Cage (SUS)	24 Units
		③Tray (SUS)	12 Units
9. Machine Consumables	Estimated useful life	①Solenoid valve & Reducing valve	8 years (no useful life setting for component manufacturers)
		②Caster	10 years (when using 8 hours / day)
		③Cam Follower	10 years (when using 8 hours / day)

[Warranty]
- We will repair free of charge within 1 year after delivery of machinery if breakdown caused by our company is caused. However, consumables are excluded.
- We do not guarantee losses caused by breakdown of equipment parts of machinery.
- However, we will repair and improve equipment parts.
- Corrosion caused by water quality typified by chlorine ions is not guaranteed.

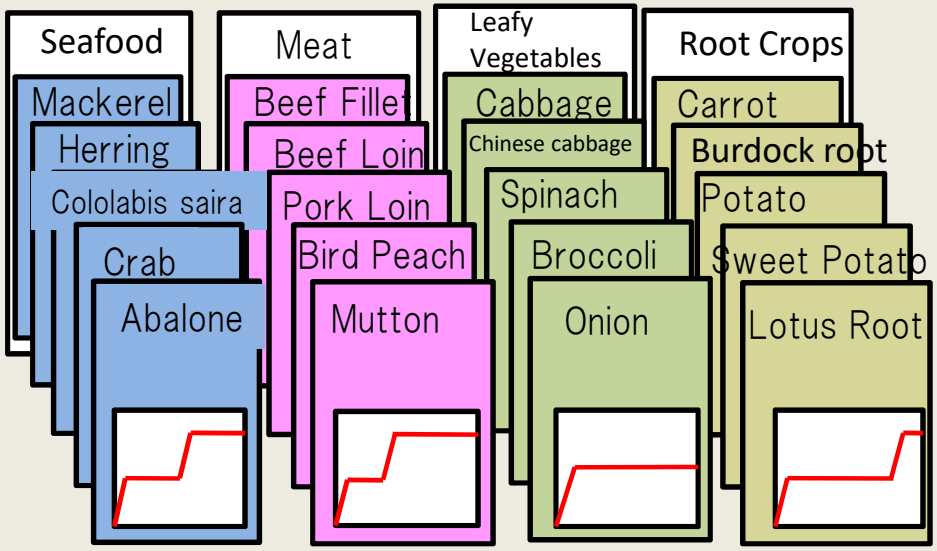
3. SS processing machine specifications (Soft Steam Automatic Heating Cooker)

【SSA24 : Spec Sheet】

<Touch Panel>



<Multi-step heating program by Food Materials>



❑ Specification of Touch Panel

- Number of stored ingredients: up to 48 items.
- Pierce the core temperature sensor into the center of the cooking item foodstuff and select the program. Pressing the drive button performs automatic operation according to the heating program.
- Material processing example: How to modify ingredients. Selection program installed.

Example) Radish: Japanese radish for simmered vegetables, Furofuki Radish, Radish Bagno Cauda
Example) Beef: rare steak, beef stew

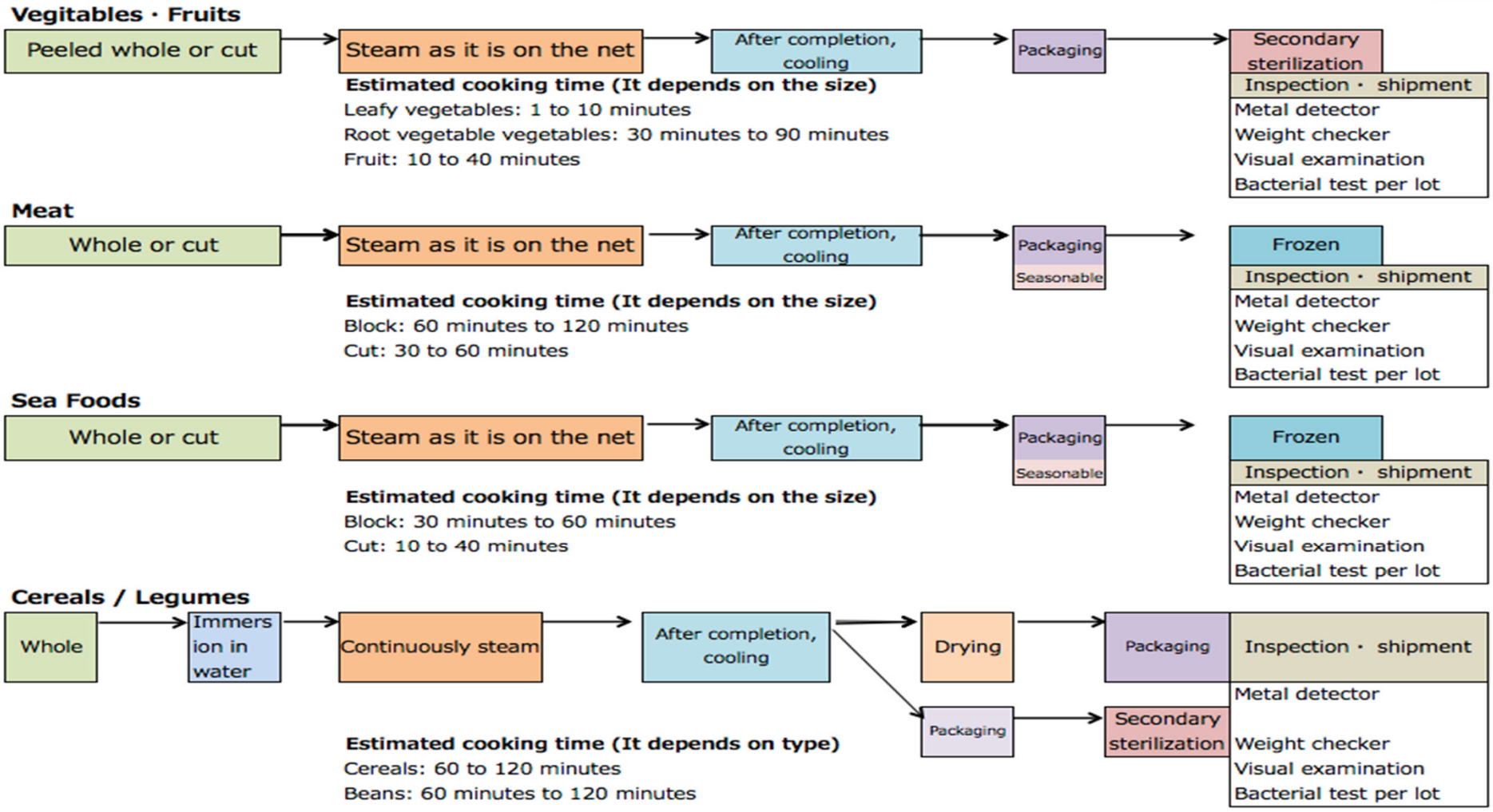
- Separate programs are prepared for each purpose.
- We prepared a heating program for many ingredients in a study over 15 years (database conversion).

4. Manufacturing Process (flow to inspection / shipment)

【Method of processing foodstuff in Soft Steam machine】

❑Select machining program to make full use of the function of each ingredient by function button, all automatic operation from heating preparation to cooking completion.

- From the date of introduction of machinery anyone can process uniform food ingredients.
- It is a state-of-the-art cooking technology that enables production management worldwide to be done from anywhere because it is connected by IOT.



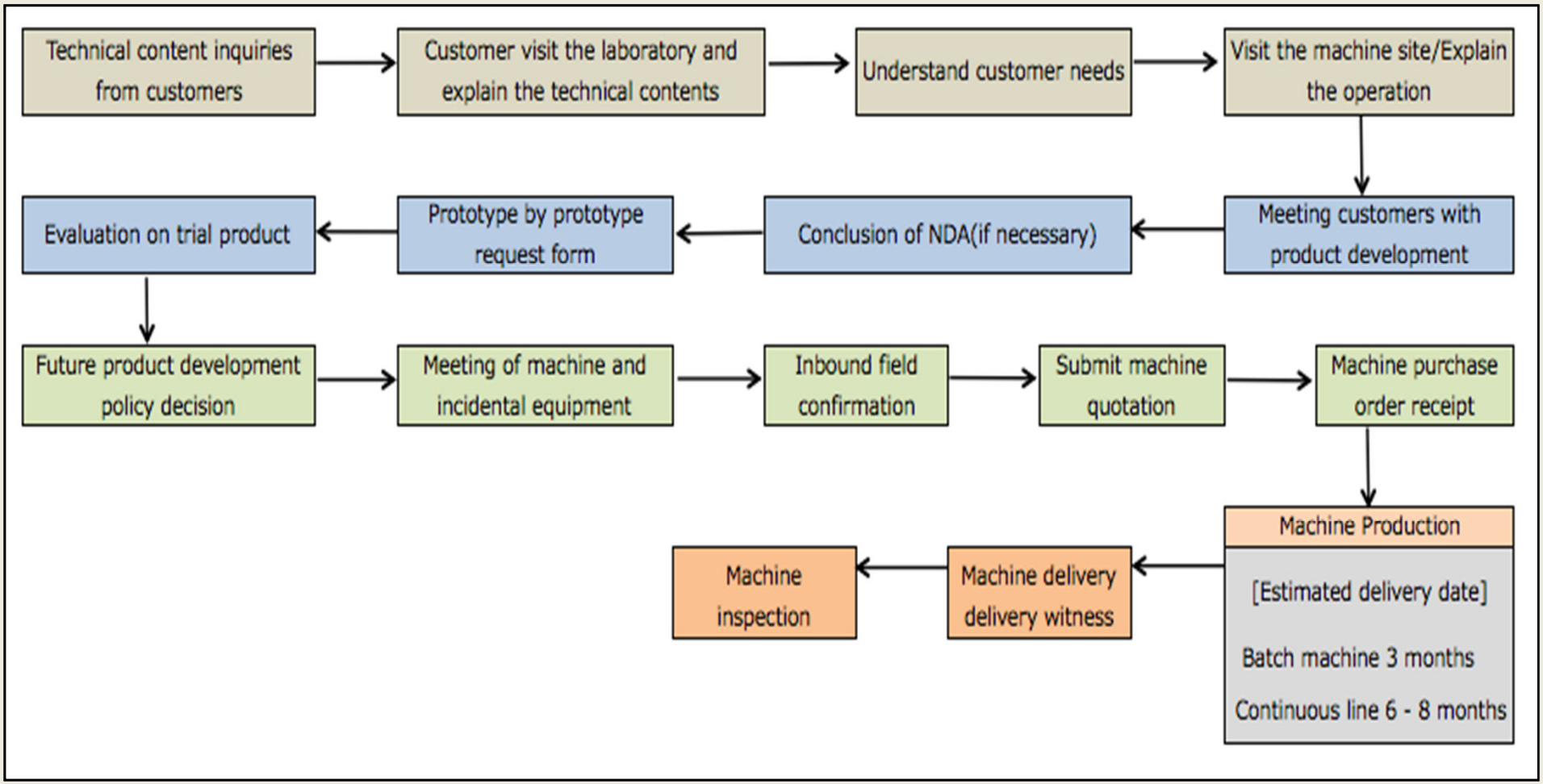
5. Delivery Record

【Soft Steam Mechanical System Delivery List 】

	Model	Location	Usage	Type of Customer & Application
A	Large Batch	Tokyo	Fish processing	For lunch boxes, school lunch, etc., for supermarkets and other retailers
B	Large Batch	Aichi	Vegetable, fruit processing	Foodstuff industry, food for business use such as confectionery industry, processed food to supermarket etc
C	Medium size Batch	Niigata	Vegetables, beans processing	School lunch, business food ingredients such as hospital feeding
D	Large Batch	Saitama	Vegetable processing	Food service industry, school lunch service, retail for supermarket
E	大型連続機	Saitama	Vegetable processing	For business use of restaurant service industry, co-op, retail for supermarket
F	Large Batch	Gifu	Vegetable processing	Food service industry, school lunch service, retail for supermarket
G	Large Batch	Miyagi	Vegetable processing	For business use of restaurant service industry, co-op, retail for supermarket
H	Large Batch	Tottori	Fruit processing	Supplies fruit processed food as OEM of confectionery manufacturer
I	Small batch	Saitama	Laboratory research	Adopted as food material technology development
J	Small batch	Okayama	Confectionery manufacturer lab	Adopted as food material technology development
K	Large Batch	Saitama	Tea	For new product development
L	Large Batch	Nagano	Vegetable, fruit processing	Dry fruits and vegetable development
M	Continuous rice line (planned)	Saitama	Soft Steam rice	Internet direct sales, for hotel and restaurant business

6. From Business Talks to System Delivery

【Flow from opportunity to system delivery】



【Part 3: Business Model and Company Introduction】

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<Our Business Model>

❑Business development based on patents / know-how

1. Manufacture and sale of soft steam processing machine and plant
2. Manufacture and sale of processed foods (partly, experimental)
3. Manufacture and sale of soft steam rice processing machine and plant
4. Manufacture and sale of SS processed rice (partly, experimental)
5. Food development consignment

❑Delivery place of processing machine / plant (inside parenthesis, customer's use)

1. Domestic processors (delivered processed foods to lunches, meals, supermarkets, restaurant industry etc.)
2. Major U.S. distributors (delivered to net sales, hotels, restaurants)
3. Laboratory, manufacturer laboratory (new product development)

❑Future business development

1. Increase publicity in domestic market and increase inquiries.
   - Requests for publication of feature articles, etc. to the media, marketing activities such as appearance at lecture meetings.
2. Sales to major processors to medium to small processors.
   - Consider utilizing external and sales force.
3. Plant sales and technical licensing to overseas food processing major companies.
   - Major enterprises in cultural areas with similar food culture, such as Asia.

2. Company Intellectual Property / Know-How

【Registered Patents】

Patent Number		5130363	5386701	59538588
Registration Date		2012/11/9	2013/10/18	2016/5/27
Title of Invention		Heating and Cooking Device	Heating Cooking Apparatus and Heating Cooking Method	Boiled Rice Production Equipment and Cooked Rice Production Equipment
Patent Holder	1 2 3	TML Saitama Prefecture Waseda University	Saitama Prefecture TML Arai Machinery Works	TML Saitama Prefecture Waseda University

Detailed Description of the Invention (Short Summary/Translation)

【Technical Field】	1	The present invention relates to a heating cooking apparatus, and more particularly, to a heating cooking apparatus capable of generating high nutrition and high quality food by causing mild thermal denaturation at an optimum temperature for food materials.	The present invention relates to a heating cooking apparatus and a heating cooking method.	The present invention relates to a method and apparatus for producing cooked rice utilizing saturated humid air containing minute water droplets having a humidity within a range of 90% to 100% under atmospheric pressure.

【Know How】

- Manufacturing know-how of soft steam (SS) processing machine based on patent, and operation know-how
- Development of new ingredients, optimal heat treatment method to make use of its flavor and nutrition for each ingredient
- Food processing program database (about XX 100) that can be installed in SS processing machine

3. Corporate Philosophy

❑ Based on research projects derived from projects derived from collaborative research between industry, academia and government, we aim to become a research and development company that responds to global food problems.

1. To concretely show the solution of Japanese food problem (fusion of cultivation ・breeding technology + food processing technology)

We will practice the technological nation-oriented agricultural policy that combines the product of excellent cultivation and breeding technology in Japan's agricultural and livestock industry with a completely new "soft steam processing technology".

2. To contribute the realization of revitalization of sustainable community

We demonstrate to increase the value-added of agriculture and livestock industry and contribute to food self-sufficiency rate, contribute to revitalize agriculture by disseminating soft steam technology in each field.

3. Respond to world food problems

Food is important human energy. It is an urgent need to respond to food shortages caused by droughts and water famine cried around the world. We promote processing development of cereals, beans and vegetables which can be easily cooked with a small amount of water.

4. Corporate Profile

- Company Name： 株式会社 T.M.L (TML Inc.)
- Home Page： http://www.softsteam.co.jp
- Board of Directors：Hiroo Yamakawa, Representative Director and President
  Masato Mukai, Director
  Shinji Arai, Director
- (Head Office) 450 Kitajyujyo, Misatomachi, Kodamagun,Saitama 〒367-0107
- (Laboratory) 302-B,IOC Honjyo-Waseda
  1011-3 Ohkuboyama,Nishitomita,Honjyo,Saitama 〒367-0035
- Contact: TEL：0495-27-6751 FAX：0495-27-6752
- Established： 2003/5/8
- Capital： ￥50,000,000-
- No of Staff： 3
- Business Contents：
  - Development, manufacture, sales and operation technology of food processing equipment utilizing soft steam technology.
  - Technical consultant for new food development and technology supplier.

5. Introduction of Founder

■ Founder/Developer

Hiroo Yamakawa

■ Specialized Field

<Regional revitalization>

- Sixth industrialization
- Activation of agricultural and livestock industry
- Food processing technology
- Business planning · Sales planning

❑ Specific skills>

- Problem discovery and resolution
- Product development
- Vision formation
- interpersonal negotiation

5. Introduction of Founder

■ Biography

1971 Waseda University Faculty of Political Science and Economics Graduated from economics
1971 Joined Idemitsu Kosan Co., Ltd. (dispatched to Idemitsu Petrochemical Co., Ltd.)
Through the sale of petrochemical products, I learned about the idea of large-area retailing, which is the Idemitsu philosophy and engaged in planning and practicing next-generation community-based dealer policies.
1982 Idemitsu Kosan Co., Ltd. Retirement
Enter the food industry to further pursue community-based retail practice
1982 Joined Hakko Foods Co., Ltd.
Through manufacturing and sales of flour products, learn the fundamental power of small and medium-sized enterprises to spare time and go towards the goal, know the importance of 'food which is human energy'.
2002 Hakko Food Co., Ltd. leave the company
In order to further pursue regional revitalization through food that has been consistently learned, Participate in and devote to research at Waseda University Social System Engineering Laboratory.
2002 A visiting researcher at the Waseda University Institute for Social System Studies
"Effortless city planning in the 21st century" raised, survey by industry-academia collaboration efforts
We surveyed the whole country throughout the theme of research, what is necessary for regional revitalization
As a result, we concluded that revitalization of agriculture and livestock industry is necessary for regional revitalization, we began developing the processing technology of food materials and developed soft steam technology.
2003 T.M. L established
Venture company derived from the research theme of Waseda University Project Research Institute, Inauguration as Representative Director About Agricultural Commerce and Industry Collaboration, Regional Revitalization Project by Sixth Industrialization
While lecturing activities nationwide, while promoting technology dissemination, present soft steam processing machine. We sold 20 units.
2013 Patents No. 5386701 "Heating cooker" Registered.
2014 "Shibusawa Eiichi Business Award" Technology category grand prize.
“ 9tokenshi Kirarin and Shining Industrial Technology” Award .
2016 Patents No. 5938588 "Method for manufacturing cooked rice and apparatus for producing cooked rice” Registered
We will continue to devote our efforts to solving world food problems through the spread of soft steam processing technology.

6. Company's History

<T.M. L Co., Ltd. is a R & D Venture from Waseda University>

2003/5 Established with a capital of 10 million yen as a venture business derived from the research theme of Waseda University Project Research Institute. While holding up "Easy town planning in the 21st century", we studied with Waseda University social systems engineering laboratory in collaboration with industry, academia and government. Started developing soft steam.

2006/2 Moved laboratory and head office to Honjo Waseda IOC

.

2007/7 Started joint research on "high quality processing technology using soft steam technology" with Saitama Prefecture Industrial Technology Center.

2008/6 Waseda University, Saitama Prefecture, and T.M. L Co., Ltd. jointly conducted research, received Waseda University TLO technology certification, and filed a patent application.

2012/11 Patent "Heating and cooking device" No. 5130363 acquired.

2013/10 Patent "Heating cooking device and heating cooking method" No. 5386701 acquired.

2014/2 Winning Grand Prize in Technology Field of “Shibusawa Eiichi Business Award” .

2014/11 Received the award ”Kyutokenshi lighting and lightning industry technology”.

2016/4 Collaborative research began with Waseda University Center for Environmental Research with "Research on revitalization of Honjo area by food, agriculture, environment”.

2016/5 Patents "Rice cooking method and rice cooking equipment" No. 5938588 acquired.