

Mineral-Enriched Vegetables grown with Deep Ocean Water  
**Supplement-Vegetables**



# Mineral-Enriched Vegetables grown with Deep Ocean Water is “Edible Supplement-Vegetables “ developed by collaborative research project organized by ESPEC · DHC · Kyoto University

## ○ Supplement-Vegetables to eat

Deep ocean water (Deep sea Water: DSW) is a seawater taken from the sea 200m below, it is sterile and contains a lot of minerals. “Edible Supplement-Vegetables” provide us the mineral to be insufficient in our diet. This is a new feature of egetables.

## ○ No pesticide: safety and security

“Edible Supplement-Vegetables” are produced in plant factory with artificial light where production area is completely isolated from outside environment, and thorough sanitation management is performed in the cultivation process. “Edible Supplement-Vegetables” is safe and secure vegetables that do not use pesticides.

### Production of Mineral-rich Vegetables using Deep Ocean Water

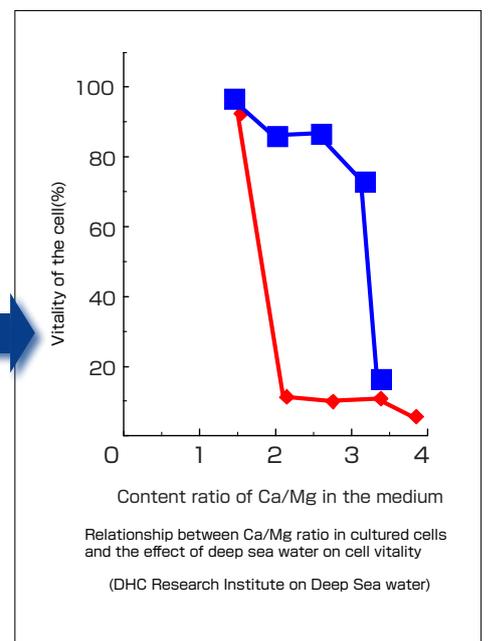
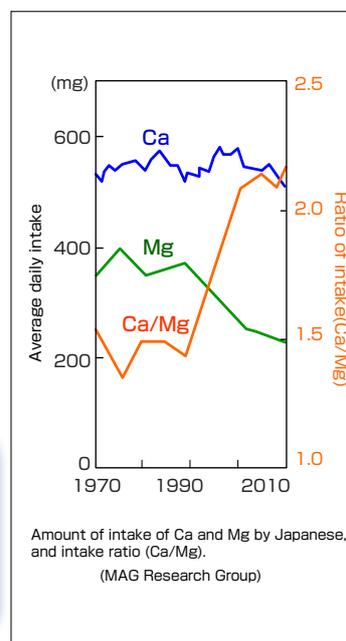
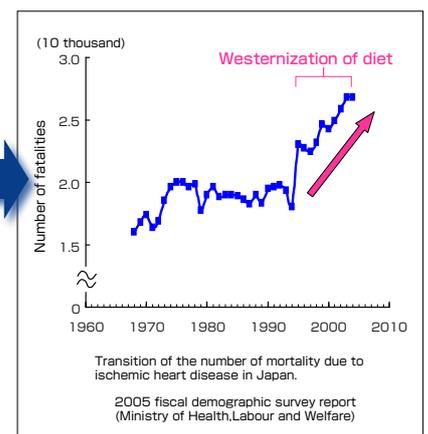
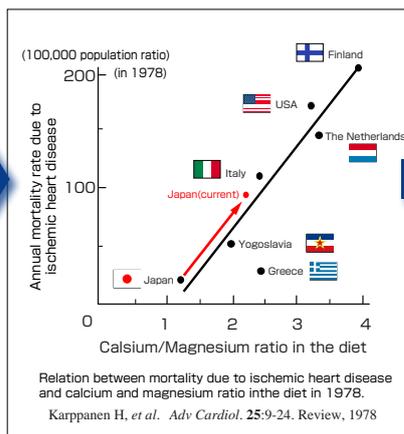
With the westernization of food life in Japan, mortality of ischemic heart disease has been increasing.

A possible reason of heart disease:  
Increase of calcium intake  
Decrease of magnesium intake

The deep ocean water (DSW), contains many minerals as magnesium.

The vegetable grown with deep sea water contains high level of minerals.

New functionality vegetable  
**"eat supplements"**



## Notable features of DSW Vegetable are

### ○ Ca/Mg ratio is well balanced at less than 1.5

The ratio of Ca vs Mg contained in DSW vegetables is kept lower than 1.5 which is ideal for our diet. Vegetables grown in fields have ratios higher than 2.0

### ○ K,Ca,Mg,Na contents in DSW vegetables are higher(by 20%) or more

Major minerals contained have been increased by 20% over other vegetables.

### ○ DSW vegetables are healthiest, with ultra low bacteria and no chemicals.

Cultivated in gardens completely isolated from outside environments, there is no access for bugs and worms, thus producing the cleanest vegetables with low bacteria and no chemicals.

## The cultivation can be vegetables

Mineral-enriched vegetables using deep ocean water can be cultivated in many varieties of vegetables. However, vegetable cultivation with plant factory with artificial light is suitable for leafy vegetables like leafy lettuce and herbs.



Frill lettuce



Green leaf



Red leaf



Semi-head lettuce



Ice Plant



Basil



Roquette



Italian parsley



Mint



Tomato



Cilantro leaf



Watercress



Potherb mustard



Leaf mustard



Strawberry



Spinach



Honeywort



Radish



Shiso (Perilla)



Garland chrysanthemum

# DSW-Farms

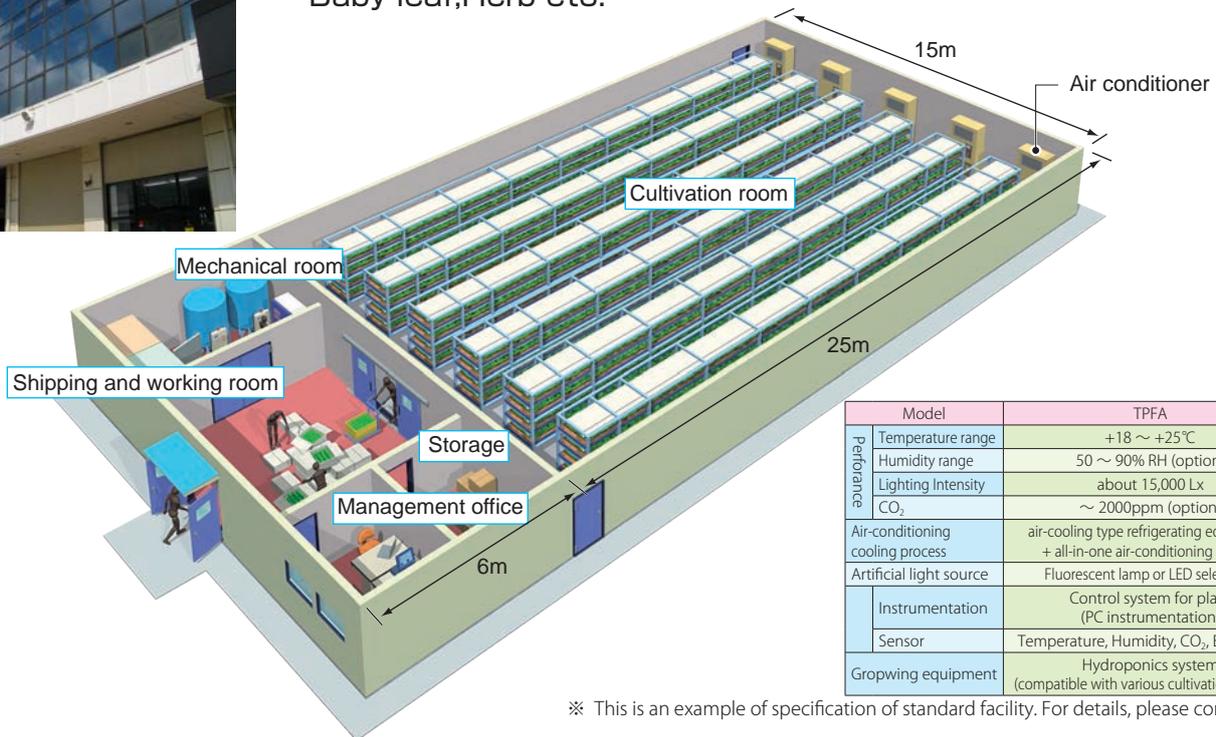
Production facility designed for artificial light farming.  
 Mineral enriched vegetables will be grown in a closed plant, completely isolated from the outside environment. The energy source from artificial light will guarantee a stable growing environment throughout the year, regardless of location and season.

○ We are cultivated in two places .TOKYO (Haneda) and OSAKA (Izumi) .

## TOKYO(Haneda) Lab



- It is a city -type plant factory that was installed in the Haneda Airport of neighboring buildings .
- We are doing the cultivation of leaf vegetables .Frill lettuce, Baby-leaf,Herb etc.



	Model	TPFA
Performance	Temperature range	+18 ~ +25°C
	Humidity range	50 ~ 90% RH (option)
	Lighting Intensity	about 15,000 Lx
	CO <sub>2</sub>	~ 2000ppm (option)
Air-conditioning cooling process	air-cooling type refrigerating equipment + all-in-one air-conditioning system	
Artificial light source	Fluorescent lamp or LED selectable	
Instrumentation	Control system for plant (PC instrumentation)	
	Sensor	Temperature, Humidity, CO <sub>2</sub> , EC, PH, etc
Gropwing equipment	Hydroponics system (compatible with various cultivation systems)	

※ This is an example of specification of standard facility. For details, please contact us.

## OSAKA (Izumi) Lab

- From Kansai International Airport , it is a plant factory that utilizes about 30 minutes of the city suburbs of warehouse by car .
- Frill lettuce , mesclun , it is with ice plant , also strawberry demonstration facility .

