Create new "resources" through electrolysis
and high-temperature and high-pressure processing.

Non-Combustion Method

Organic waste regeneration treatment

マイスター株式会社

◆Business　concept

With regional environment improvement technology, rich earth to children!

Industrial waste disposal by hydrolysis has a great expectation and transformation in improving the local environment and guides us to deliver green environments to the children.

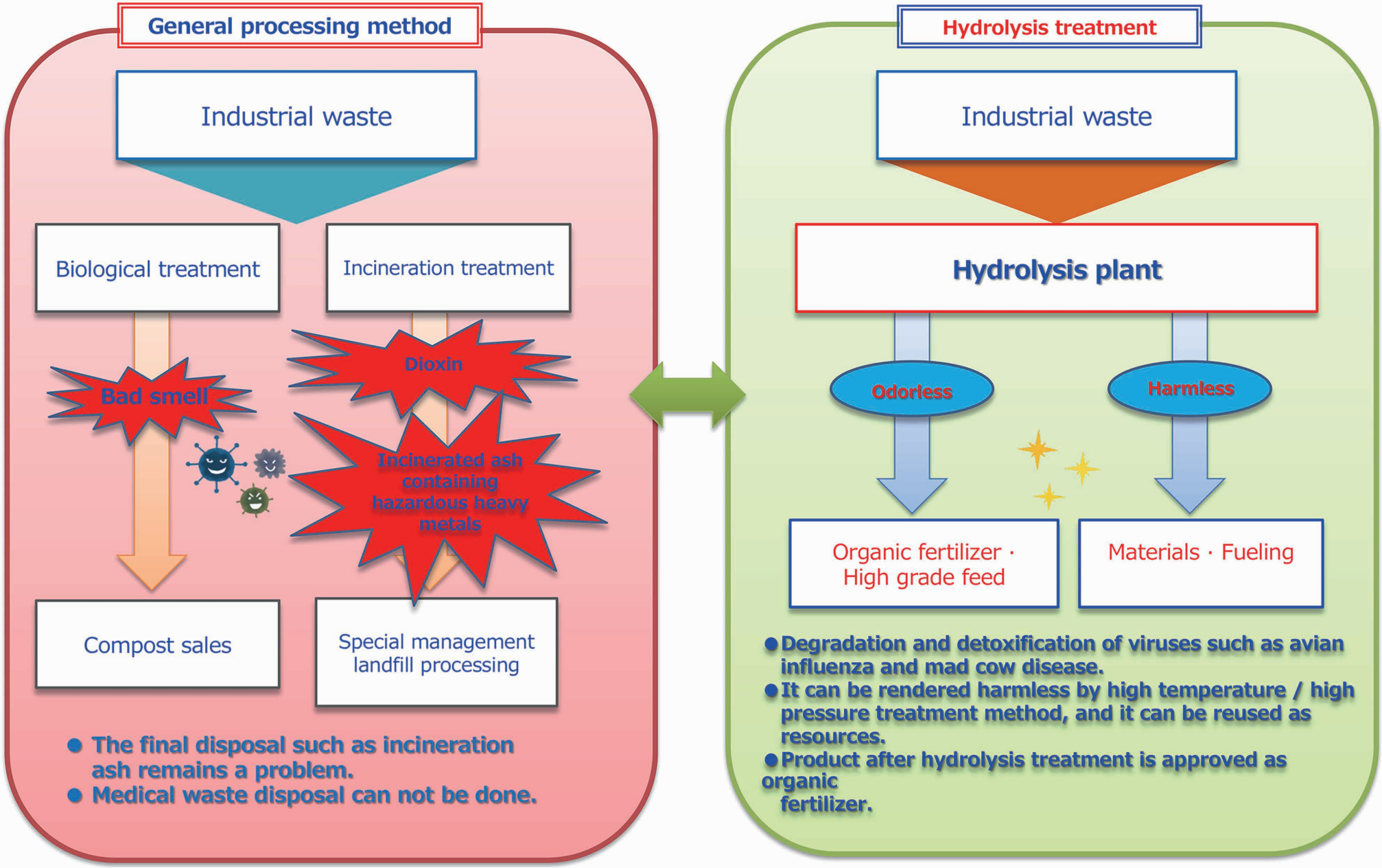
Hydrolysis treatment by high temperature and high pressure is to decompose detoxification of medical waste, pathogenic bacteria problem such as recycling and harmful heavy metals to valuable waste, even bacteria · mold · virus It is an innovative new processing technology that can contribute widely to modern society.

Generation of dioxin · CO 2 which is a big problem in the incineration method. In addition, although there remains a problem in the treatment of harmful heavy metals contained in incinerated ash and fly ash, dioxin and CO2 will not be generated in non-incineration type hydrolysis treatment. Hazardous heavy metals can be molecularly electrolyzed and rendered harmless.

【 The greatest feature 】

① Compared to conventional processing costs, recycling is easy with low-cost processing costs.
② By hydrolyzing food-related waste, high quality value is created as "sterilized feed".
③ The sterilization technology can dispel the worry of "mad cow disease" which shook the world, and it is possible to completely process infectious diseases concerned with avian influenza by sterilization treatment by high pressure and high temperature.
④ Livestock excreta and sewage sludge etc. can be reused as fertilizer and compost, and sales revenues are expected.
⑤ Energy generation such as "ethanol and solid fuel" from organic waste is possible.
⑥ It is "Hybrid fertilizer" which combines both the immediate effect of chemical fertilizer and the delayed effect of conventional organic fertilizer.
⑦ By using this fertilizer, NEXT guides the assistance for next-generation agriculture such as simplification of care and increase of harvest volume.

Difference between General treatment and Hydrolysis treatment



Key to hydrolysis 「What is subcritical water reaction?」

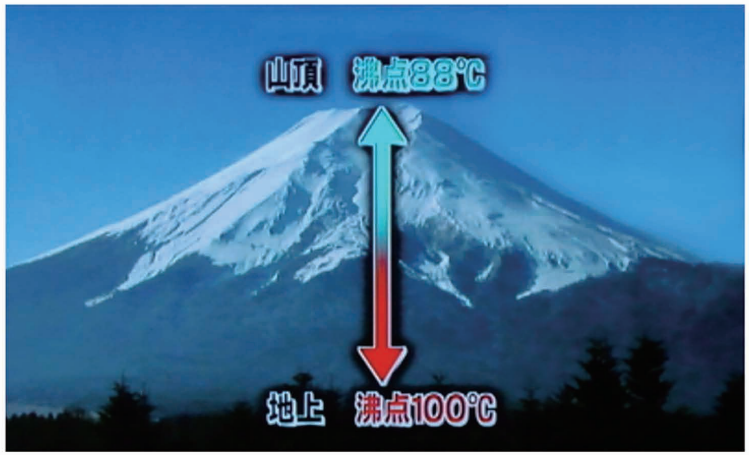
Processing mechanism

Water boils at 100 ° C on the ground and becomes a gas, and at the top of Mt. Fuji where the atmospheric pressure is low, the boiling point reaches at 88 ° C.

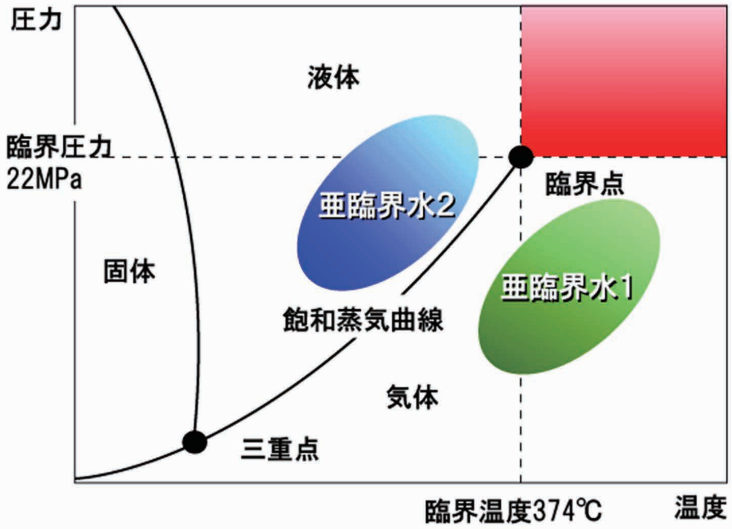
Conversely, the higher the pressure, the higher the boiling point. It is the pressure cooker that you can cook ingredients in a short time by using this principle.

Hydrolysis is like treating waste with a huge pressure cooker. When the water pressure exceeds the critical point of about 22 MPa and the temperature exceeds the critical point of 374 ° C., it is in a state neither a liquid nor a gaseous state, and the state of supercritical water It becomes a state.

The neighboring area before this critical point is called subcritical water.

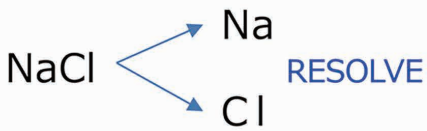


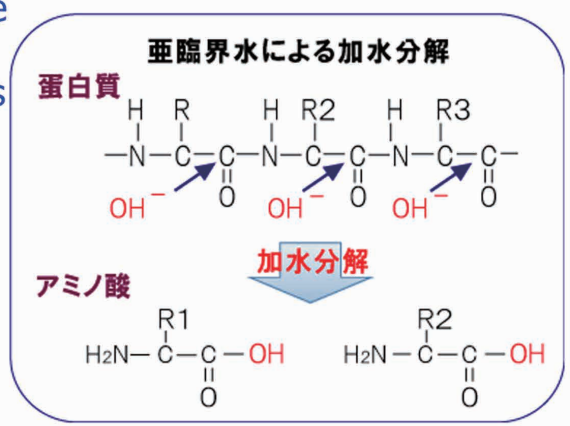
Mechanism of detoxification / molecular mobilization



In subcritical water, by maintaining immediately before boiling, the water molecules to be vaporized violently violently and the collision is repeated so that the molecular bonds of the treated matter are ionized.

This artificially creates a state close to the center mantle of the Earth. In this technology, pressure and living organisms and microorganisms can not survive, ionizing action is exerted due to vigorous vibration and collision of water molecules to reduce the molecular weight.





Kind of Waste can be treated & Mechanism of Treatment

Because it is different from the incineration treatment, it treats safely without generating CO_2 and dioxin, and creates a useful product.

Raw Waste materials

All substances of organic matter are subject to treatment, mixed treatment is also possible

- Life garbage
- Sewage sludge
- Food waste
- Livestock waste
- Crop residues
- Fishery waste
- Wooden remnant
- Medical waste

Hydrolysis
High temperature / high pressure plant

Decompose harmful chemical substances such as organic matter and environmental hormones

Reaction Mechanism
Pyrolysis Reaction by Saturated Steam

- Temp. : 140～220℃
- Pressure : 15～20MPa
- Time : 30分～1時間

Per equipment scale
1t／day～50t／day
Wide correspondence

Reaction and product features

Cellulose and lignin are degraded into glucose and oligosaccharides, while proteins are broken down into various amino acids.
Plastic is also decomposed.
It can be solubilized and liquidized.
Heavy metals can be crystallized.

It is easy to be absorbed by living organisms, and efficiency of methane fermentation etc. can be enhanced.
It can be used as feed or fertilizer.

Drying is fast because organic particles are made into fine particles and micropores are formed.
It can also be used as a carbonization technology.

Plant installation / Processing Site

Organic treated material stockyard

Belt Conveyer Gate

Inlet

Main unit installation status

Discharge

Outlet

Processed materials

◆kind of Plants and Characteristic of the shape

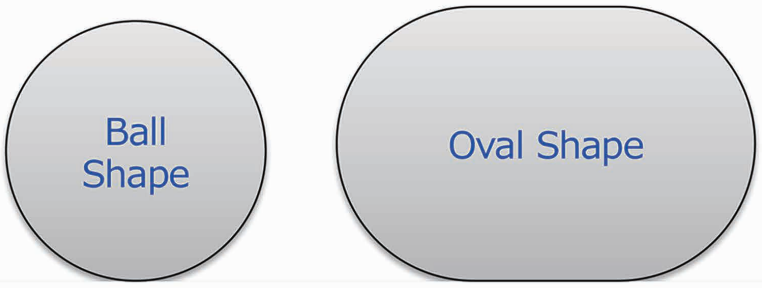
Single type			Twin type		
Model	Tank Capacity	Processing capacity	Model	Tank Capacity	Processing capacity
ESP3-S	3㎥	3㎥	ESP3-W	3㎥×2基	3㎥×2
ESP5-S	5㎥	5㎥	ESP5-W	5㎥×2基	5㎥×2
ESP10-S	10㎥	10㎥	ESP10-W	10㎥×2基	10㎥×2

※ Processing capacity varies depending on the processed material and shape.

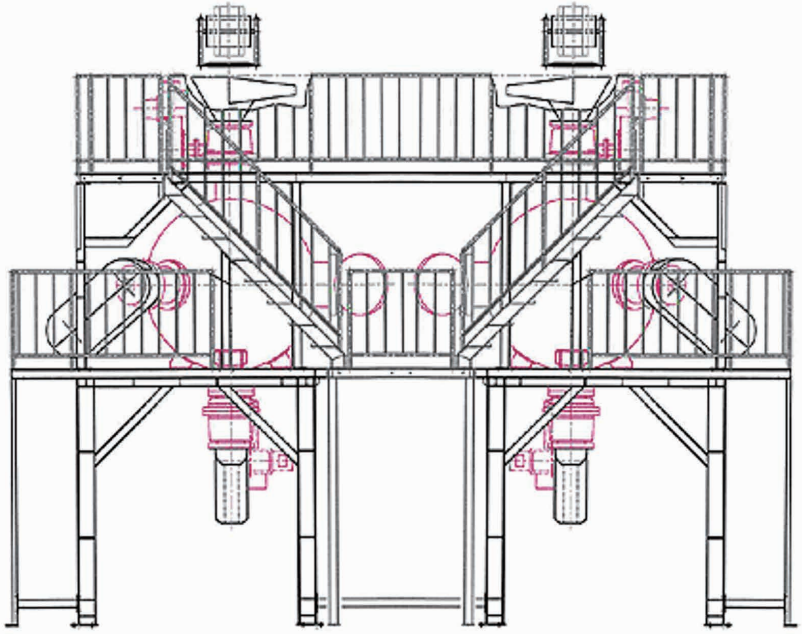
Characteristics of tank shape

- The spherical shape is suitable for special treatment such as treatment of hazardous heavy metals and ethanol production.
  - Because it requires special skills, creation is expensive.
- Oval shape is suitable for general processing such as organic waste disposal.
  - It can be manufactured relatively inexpensively, making cost reduction easy.

Process tank shape



Twin type Plant Image



※Boiler operating time is about 15 to 30 minutes per treatment

◆“Reuse of Optimal Product " by Sorting Process

- Food residue
- Crop residues
- Fishery waste

→ **Livestock Feed**

Nutritional ingredients remain even after sterilization treatment, contributing to the growth of livestock by low molecular weight.

- Life-based garbage
- Sewage sludge
- Livestock excrement
- Fishery waste

→ **Fertilizer/Compost**

We will contribute to the promotion of agriculture that can revive soil by environment friendly "fertilizer / compost".

- Wooden remnant
- Rubber-based waste
- Plastic waste

→ **Ethanol**

Wooden remnants are easy to be liquefied, and solve illegal dumping problems such as waste tires with energy.

- Medical waste
- Incineration ash
- Fly ash

→ **Building Materials**

We can reuse harmful heavy metals of remnant debt discharged by incineration and melting as much as possible and make it as safe as building materials by sterilizing pathogenic bacteria of medical waste.

◆ “Medical waste disposal” in the hydrolysis treatment has been approved.（JAPAN）

3. Cases concerning treatment of infectious waste
【 Case 】There is a high pressure steam sterilization processing technology that puts infectious industrial waste in a pressure vessel and acts steam at a constant temperature and pressure for a certain time to perform decomposition, and the thing after sterilization treatment is disposal as an industrial waste There was a license application for special controlled industrial waste disposal business (infectious waste) purporting to consign disposal to the contractor.
After reviewing the sterilization test results and the like, it was confirmed that sterilization treatment can be performed properly using the treatment facility, so it granted the special controlled industrial waste disposal business permission.

Detoxifying and Alternation of Active Ingredient

表①

Elution Test Report of Trace Amounts of Hazardous Chemical Substances

Item	Pollution Level mg/kg 平均	最大	Subcritical Water 処理法
PCB	0.001	0.001	ND
Trichloroethylene	0.021	0.035	ND
Tetrachloroethylene	0.004	0.009	ND
Dichloromethane	0.011	0.02	ND
Carbo Tetrachloride	0.0011	0.0022	ND
1,2- Dichloroethane	0.0015	0.0037	ND
1,1-Dichloroethylene	0.016	0.025	ND
シスs-1,2-Dichloroethylene	0.037	0.056	ND
1,1,1-Trichlorethylene	0.884	1.259	ND
1,1,2-Trichlorethylene	0.0032	0.008	ND
1,3-Dichloropropene	0.001	0.0022	ND

表②

Elution Test Report of Trace Amounts of Hazardous Chemical Substances

Amino Acid	Temp. Subcritical Water 200℃	250℃	Natural Compost
Phenylalanine	599	436	80
Histidine	272	273	37
Isoleucine	708	272	89
Leucine	1,520	969	169
Valine	987	502	98
Alanine	1,798	2,507	115
Glycine	708	1,144	53
Glutamic Acid Others	2,452	1,471	225
計	9,044	7,574	866

（単位：mg/100 g Dry-W）

表①After application of Polluted Soil treatment, no Hazardous substances Per Table 1 .

表②Increase Active Elements by Subcritical Water Treatment more than Natural Compost. Per Table 2.

By avoiding unnecessary components into soil, create better soil suitable for planting and protect activation of Actinomycetes.

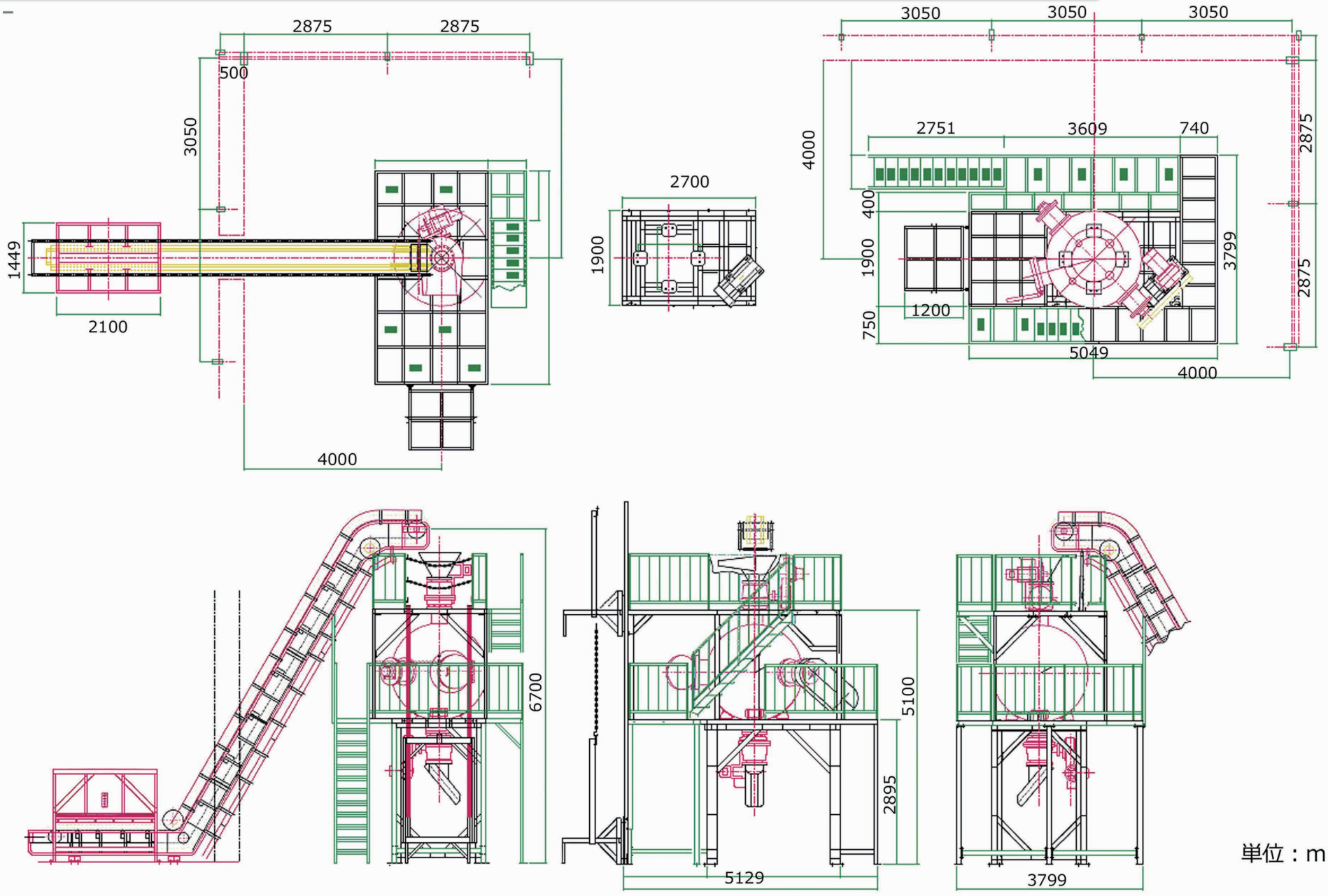
Achieve best cultivation under Natural Farming condition.

After 1 month
Comparison of Decomposition

There will note be any problem to eat Egg Plant cultivated by Natural Farming in comparison with the one sold in the market.

The Fertilizer created by Subcritical Water Processing Plant is surely same cultivation as Natural Farming method.

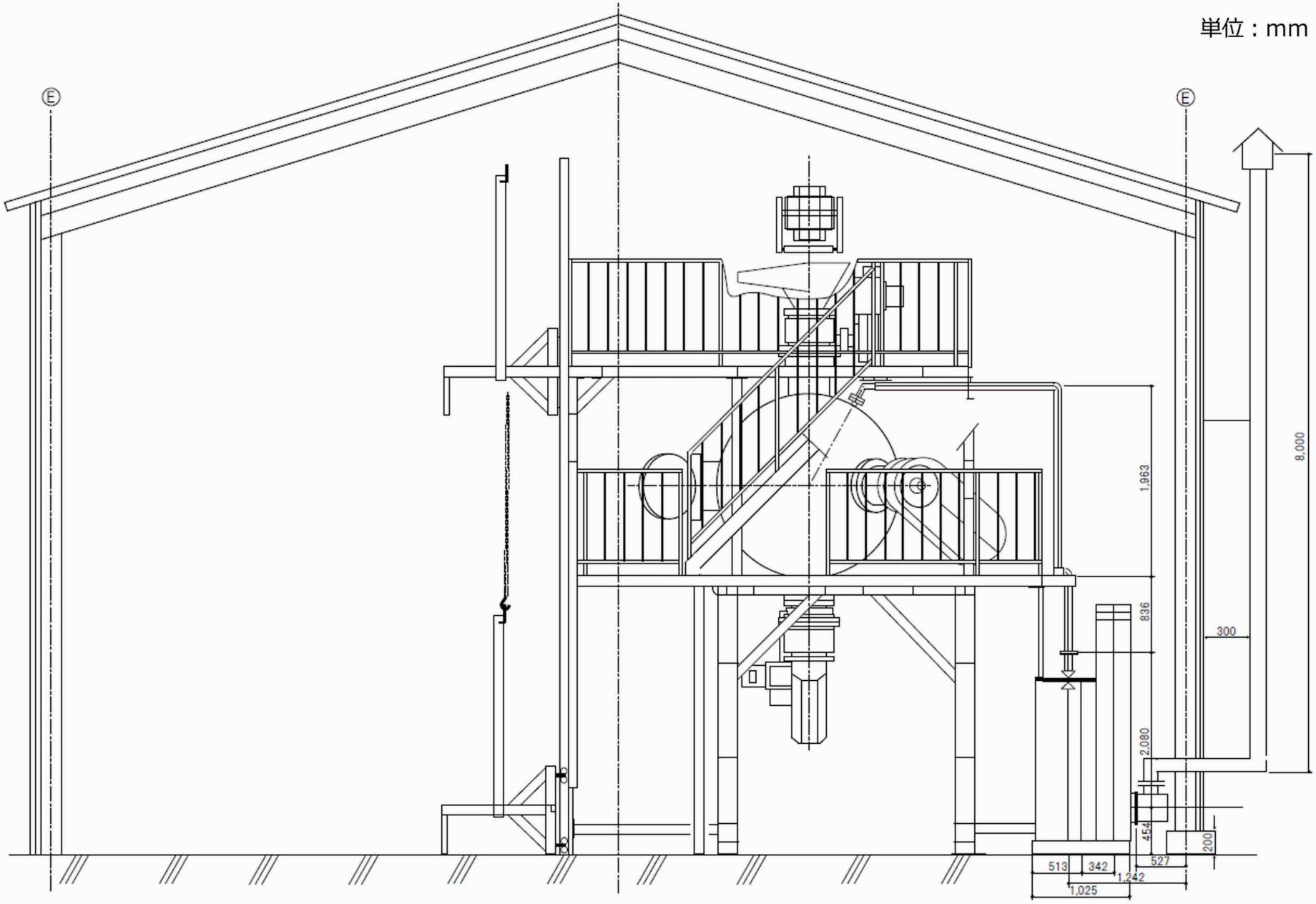
3 m³Type（ESP3-S）Plant Outer Dimensions



単位：mm

◆Image of Elevation Drawing

単位：mm



◆3m3 type running cost

ESP-3S（３㎥） ： Estimated processing

Operating time	tank capacity	Processing amount of 1 time	processing time	Daily throughput	Throughput per month	Throughput per year
8 hours	3㎥	3㎥	6 times	18㎥	450㎥	5400㎥
24 hours	3㎥	3㎥	18times	54㎥	1350㎥	16200㎥

Boiler fuel: Kerosene (Japanese price conversion)

Operating time	Burning 30 minutes	Kerosene (1L)	One time fuel cost	1 day	25th	1 year
8 hours	30L	¥75	¥2,250	¥13,500	¥337,500	¥4,050,000
24 hours	30L	¥75	¥2,250	¥40,500	¥1,012,500	¥12,150,000

Electricity bill: Estimated power consumption due to operation

Operating time	Electric current	power consumption	Power used once
1 hour	60A	30kW	30kW

◆Management and Maintenance for Safe Operation

● Disassembly Inspection/1 yr. in large scale

● Inspection Fee Est.

● Other Expenses

Technical fee(Disassy/Cleaning/Assy)

・Transport/Acom.

Day 1 : Disassy/Clean	Day 2 : Inspection	Day 3:Assy/Ope.

● Period of Maintenance (Simple Maintenance such as expendables and appearance

◆Based on the Products

・Ethanol and Organic Fertilizer : Once for 2 months

・Other products : Once for 3~4 months (Fix at contracting)

◆Maintenance Fees

Engineers conduct inspection

Require Accommodation and transportation fees for Large plant and prod.

● Remote Management by IOT

Control Plant condition by remote system in Japan.

Secure and Safe Operation