

Public Private Partnership on Waste Management in Japan
~Roles and Responsibilities of Private Companies in Japan~

Oil Temperature Decompression Drying method

“Tempura method”

for

Food Waste recycling

~ Japanese and Moroccan Cases ~

27 June 2018



Eco-Stage Engineering Co., Ltd.,

What is the Oil Temperature Decompression Drying method ?



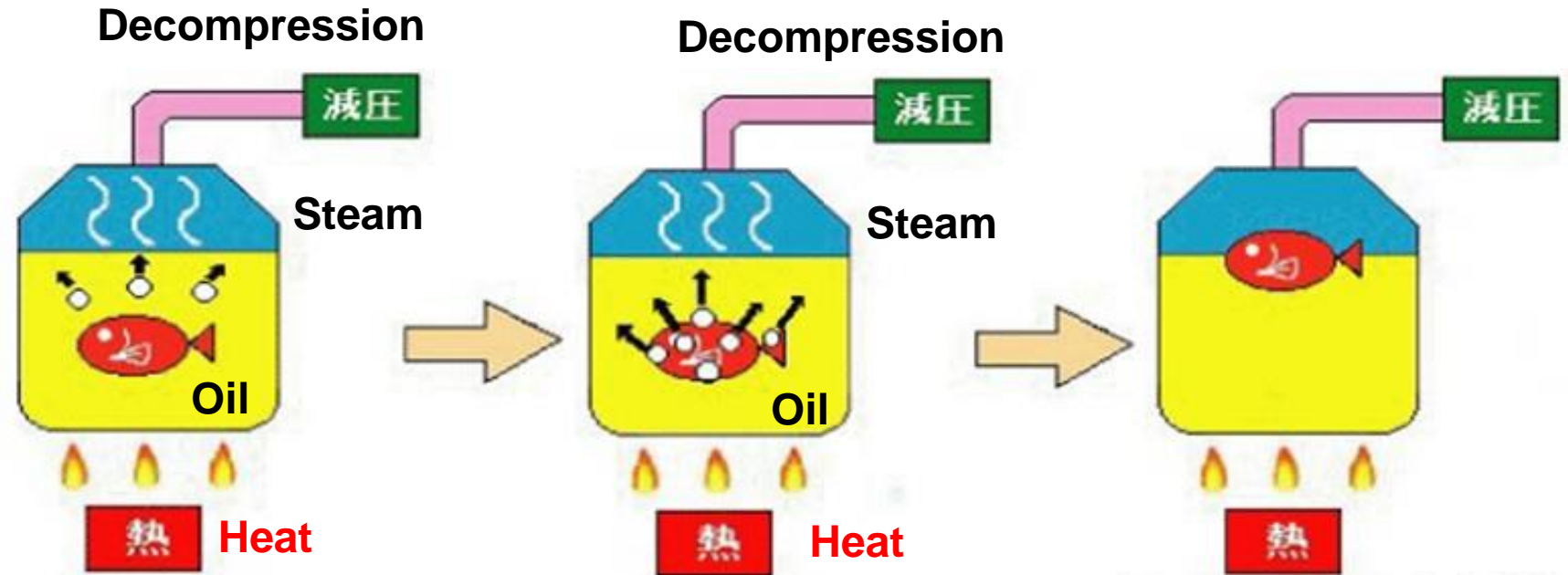
The oil temperature decompression dryer uses (waste) oil as the heating medium to rapidly and uniformly evaporate the moisture content of the waste by mixing the oil with the food waste and heating under a state of reduced pressure (a vacuum). This drying method is commonly referred to as the **tempura method**.

This same method has been repeatedly proven in Japan as a technique for converting meat processing residue, marine product processing residue, and other unused resources into feed for livestock and aquaculture.

Today, this method is used by many recycling facilities as a means for making feed out of bulk food waste.

Drying principle for Oil Temperature Decompression Drying method

“tempura method”

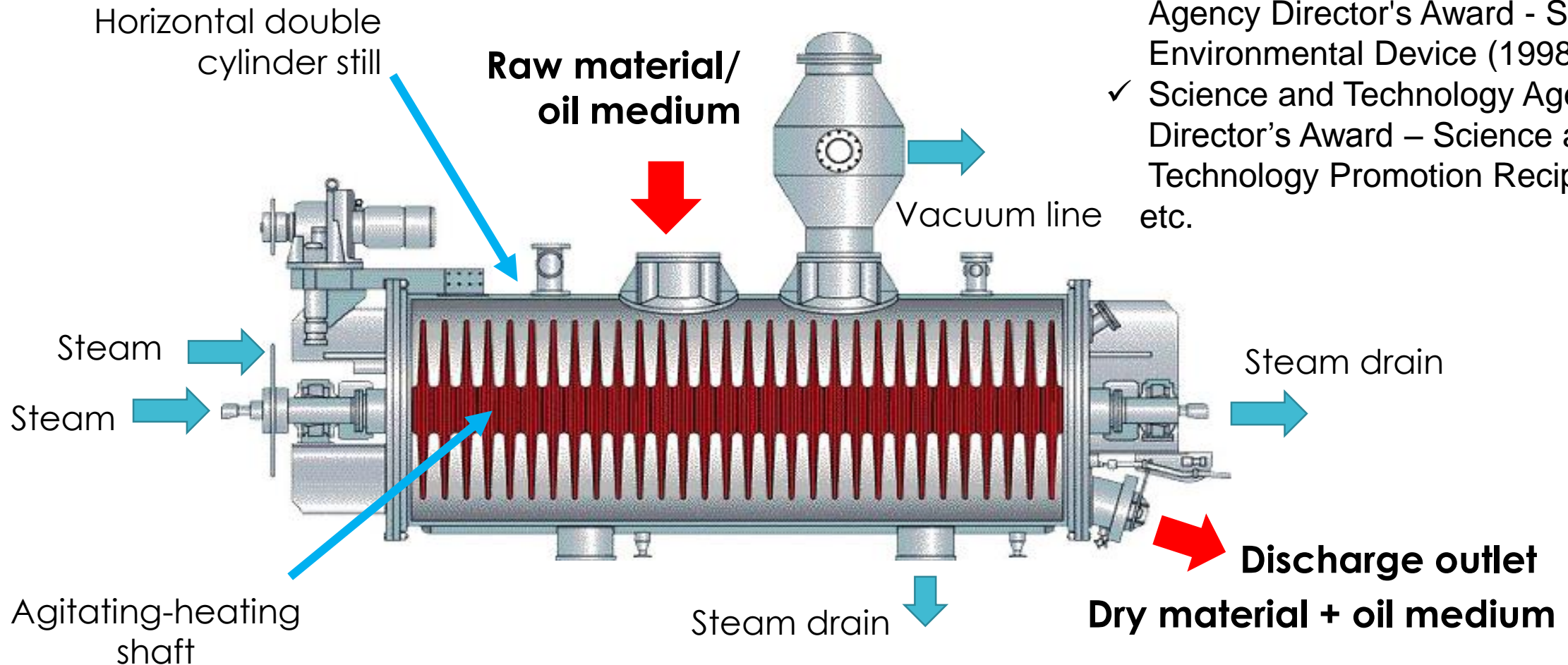


Heat is applied to oil and material, and moisture begins to evaporate.

With material surface moisture evaporated and pressure lowered, moisture in the material core evaporates further.

At approximately 100°C (vacuum approx. -700 mmHg), the object is completely dry.

Structure and Sample Installments of Oil Temperature Decompression Dryer (so called "COOKER")



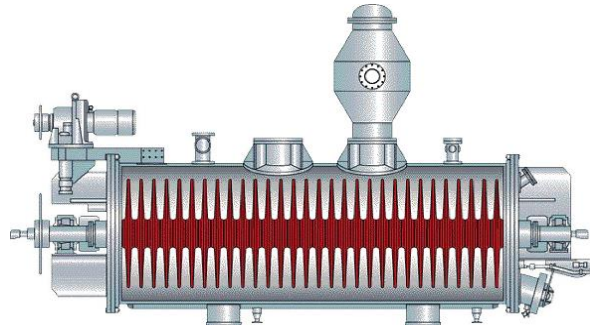
Public recognitions:

- ✓ Small and Medium Enterprise Agency Director's Award - Superior Environmental Device (1998)
- ✓ Science and Technology Agency Director's Award – Science and Technology Promotion Recipient etc.

CASE 1: Food Waste × COOKER



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Food Waste

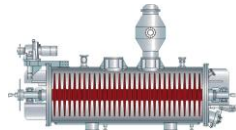
COOKER

Material
for
Animal Feed

TOKYO Super Eco Town Project Food Waste recycling Plant - Animal Feed Production -



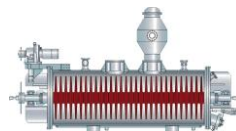
Capacity:
168 tons/day



Jonan-jima Food recycling Plant



Capacity:
170 tons/day



Jonan-jima 2nd food recycling Plant

Food waste accepted from the Tokyo metropolitan area.



Using a cooker, 10 tons of food waste (80% moisture) is completely dried in approx. 90 mins.



Food waste gets a fresh start as chicken feed or other feed material.

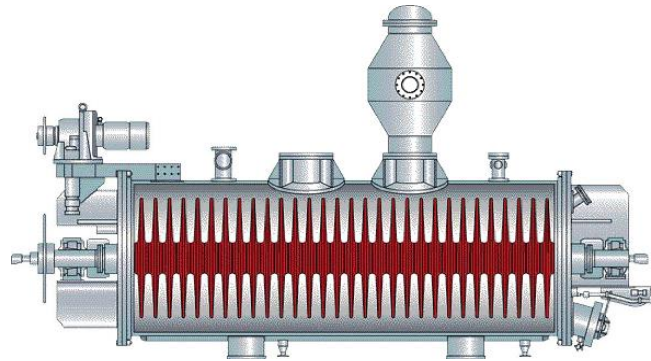


CASE 2: Olive Mill Waste × COOKER



Olive Mill Waste

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COOKER

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① Second pressing olive oil (pomace oil)



② Material for animal feed

Case in Morocco

Verification Survey with the Private Sector for Disseminating Japanese Technologies for **Recycling of Olive Mill Waste by use of Oil Temperature Decompression Dryer** in Kingdom of Morocco

✧Currently applying to JICA for project implementation

【Moroccan Counterpart Organization: Agency of Hydraulic Basin Sebou】

◆ Future business plan: To build a olive mill waste recycling plant



Capacity and Price

For Recycling Business



Capacity

100 - 200 ton / day
(60 min - 90 min / 10 ton)

**Acceptable
waste**

Food waste,
waste from meat [fish] industry,
olive mill waste, sewage sludge

**Price of
the base unit**

From \$909,000 USD

For Pilot Project



800 kg / day
(60 min / 100 kg)

***Material for animal feed,
fertilizer, fuel,
edible fat and oil***

From \$327,000 USD

※Please inquire for prices including the following add-on items:

1) Field study, 2) design, 3) ancillary facilities, 4) transport, 5) installation, 6) training, etc.

Summary: Drying Technology to Help Solve Africa's Waste Issues

Feature 1: Uniform drying – high performance and fast

The food waste and oil is agitated during the drying stage, resulting in a product with a uniform (not average) moisture of 3-5% after drying. This process completes extremely fast compared to other drying methods.

Feature 2: Produces safe, high-protein feed

As the water-soluble protein in the food waste is retained, the process can produce high-quality feed. In Japan, feed made with this drying method is certified as Eco-feed (food waste feed).

Feature 3: Extracts oil content from the raw (waste) material

Oil content present in the food waste can also be extracted in the waste drying stage. Thus, oil can be extracted from olive mill waste (oil content: 5-11%) to produce second pressing oil.

Feature 4: Produces fuel with calorific values as high as coal

In tests using olive mill waste, the fuel produced had a high calorific value of 21.12 MJ/kg. This is on level with coal.

“Seeing is believing!”



Photo: Oil Temperature Decompression Dryer on vehicle type



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