

A photograph showing a large pile of dark brown, moist compost inside a wooden structure. Thick white steam or vapor is rising from the pile, indicating high temperature. The structure has a wooden frame and a corrugated metal wall. The text "Aerobic, High Temperature Compost" is overlaid in red.

**Aerobic, High Temperature  
Compost**

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# Advantages of Composting over Burning

|                                   | Composting              | Burning   |
|-----------------------------------|-------------------------|---|
| Is Oil necessary ?                | No(self-heating)        | Yes   |
| Cost                              | Cheap                   | Expensive   |
| CO <sub>2</sub> generated         | Fewer                   | Larger  |
| Pollution                         | No toxic gas generation | NO <sub>x</sub> , SO <sub>x</sub> , dioxin etc will be produced |
| Utilization of the final products | Fertilizer              | Useless   |
| Wide space, Long time             | Necessary               | No  |

# **Microbes can eat “almost” everything**

- **Toxic substances such as KCN, dioxins**
- **Substances hard to digest such as bones, skins, papers, woods, etc**
- **However, microbes cannot (or can only slowly) eat heavy metals, salts, most of synthetic plastics, etc**

# Composting has a long history

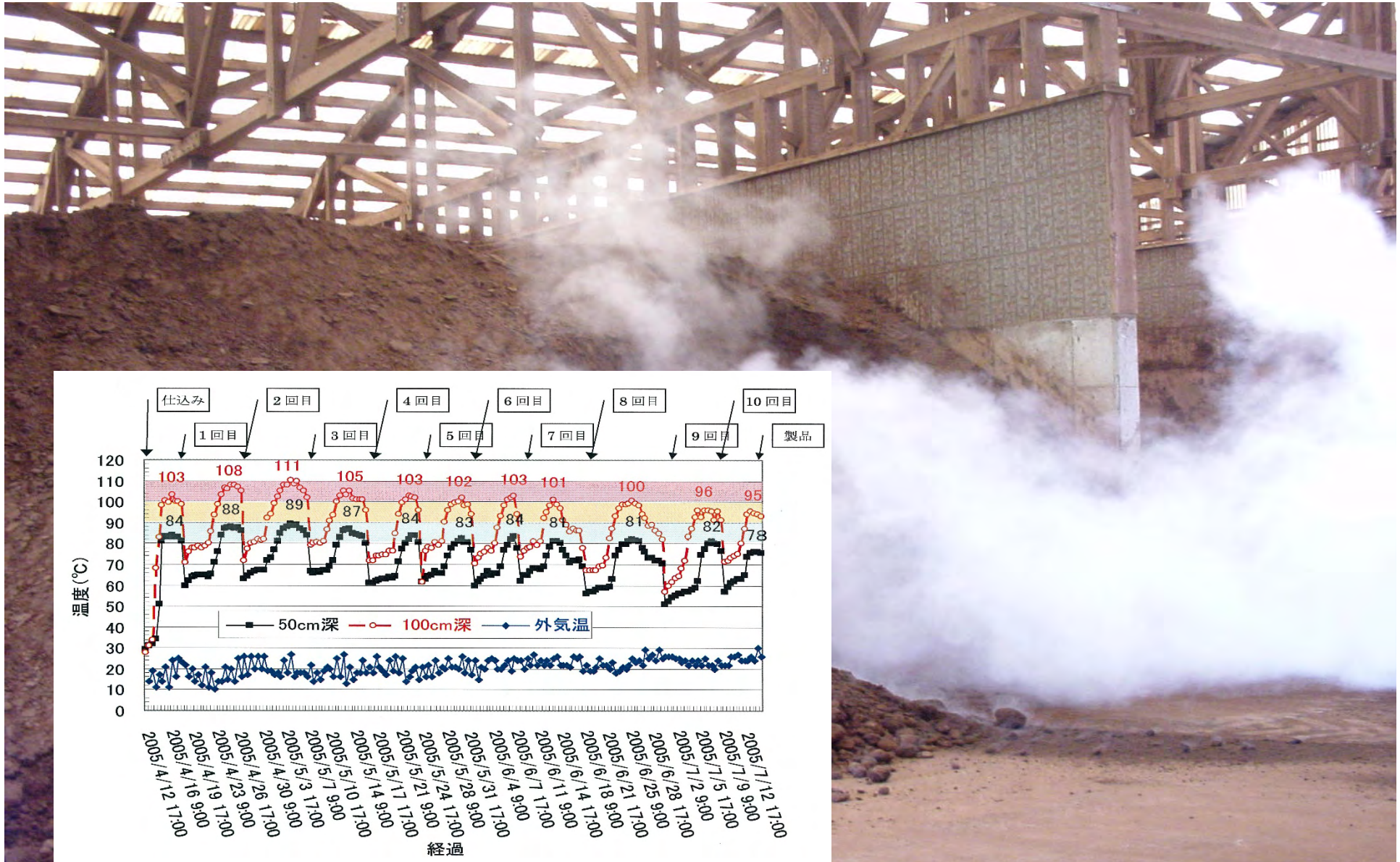
## An example of old fashioned compost



## Uniqueness of Composting Invented by Sanyu Company (=our compost)

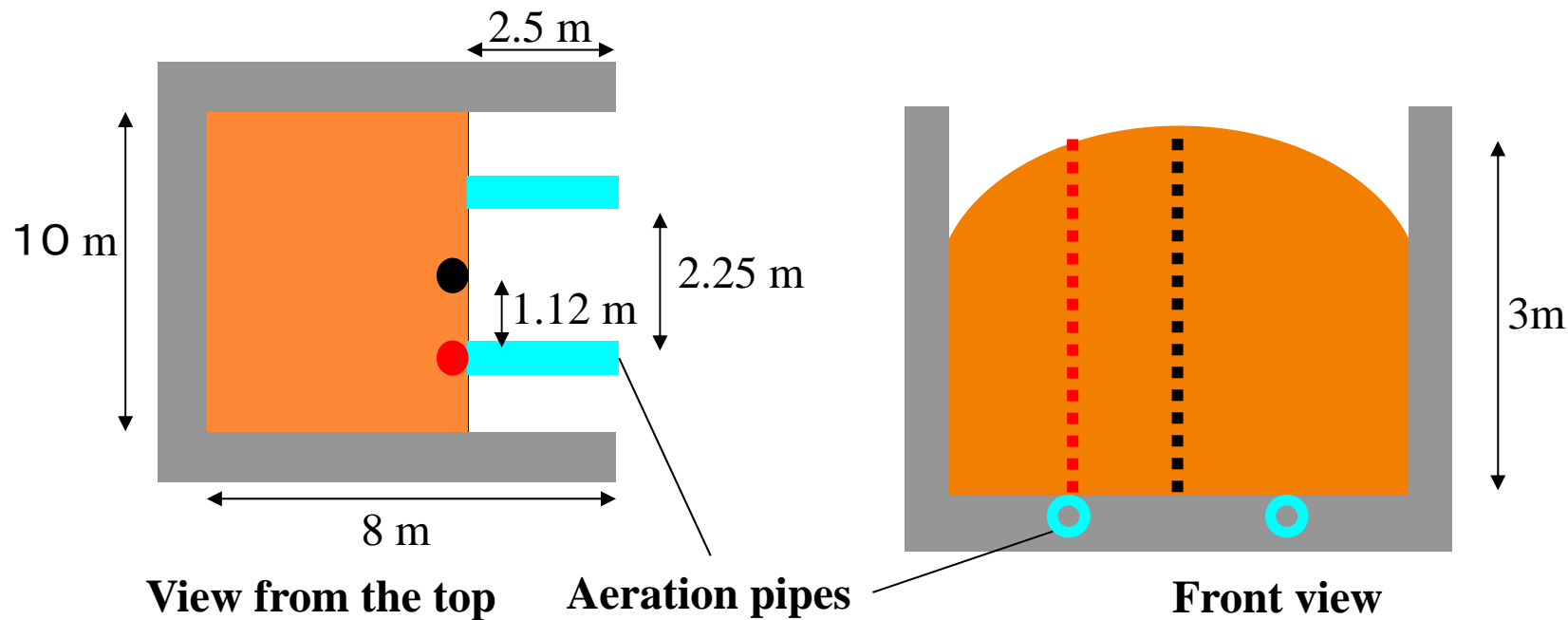
|                                      | <b>Old fashioned</b>       | <b>High Temp., Aerobic, Composting</b> |
|--------------------------------------|----------------------------|--|
| <b>Temperature inside</b>            | <b>~70°C</b>               | <b>&gt; 95°C</b>                       |
| <b>Degrading power</b>               | <b>Normal</b>              | <b>Higher</b>                          |
| <b>Sterilizing power</b>             | <b>Low</b>                 | <b>High</b>                            |
| <b>Aerobic</b>                       | <b>Partially anaerobic</b> | <b>Strongly aerobic</b>                |
| <b>Air supply</b>                    | <b>No</b>                  | <b>Compulsory</b>                      |
| <b>Bad smell</b>                     | <b>Strong</b>              | <b>Almost no</b>                       |
| <b>Methane production</b>            | <b>Yes</b>                 | <b>No</b>                              |
| <b>Reduction of mass</b>             | <b>Moderate</b>            | <b>Remarkable</b>                      |
| <b>Additives (Chips, Straw, etc)</b> | <b>Required</b>            | <b>Not necessary</b>                   |

# Temperature inside is over 100°C



# Structure of a compost pile

- \* Air is constantly supplied through holes of 2–3 pipes buried in the floor of each fermentation compartment.
- \* Physical parameters such as water content, pH, temperature, etc, and chemical compositions such as nitrogen and carbon contents, are changeable depending upon sites and composting stages and other conditions



# Advantages of our aerobic, high temperature composting

- Aerobic → smell can be reduced  
no production of dangerous substances
- High temperature → rapid degradation  
safe  
kill pathogenic bacteria  
kill seeds of weed



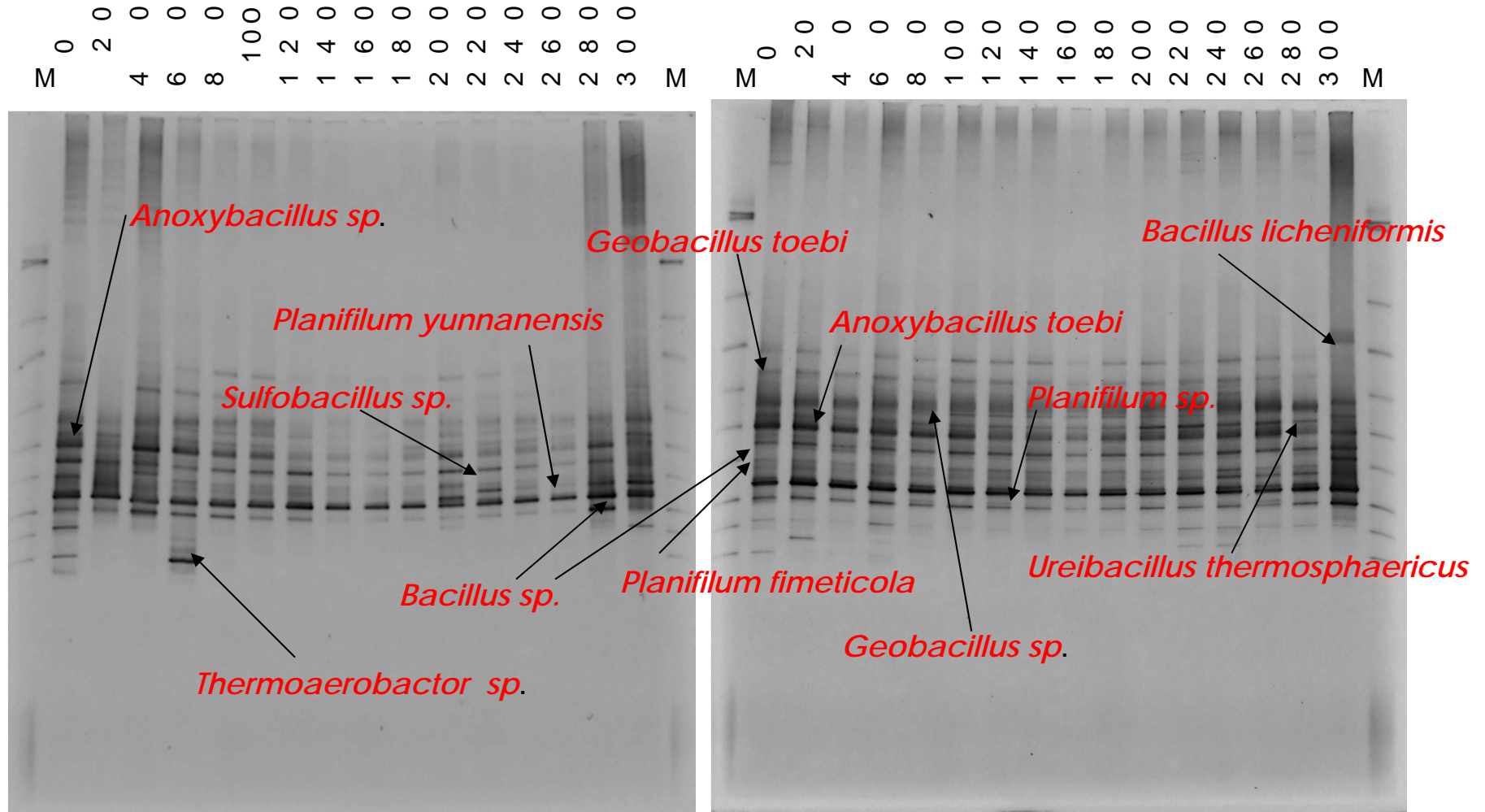
# Microbes in compost piles

- **How many? More than 100, 000,000,000 per 1 g and 1,000 different species. But no one knows exactly. Why?**

**Because compost is a 「super-organism」**

- 1 Co-operation of too many organisms**
  - 2 99% of them can not grow in a lab**
  - 3 Changeable depending on time, place, operation, low materials, and so on**
- **We started to analyze using the state-of-the-art technology=DNA technology**

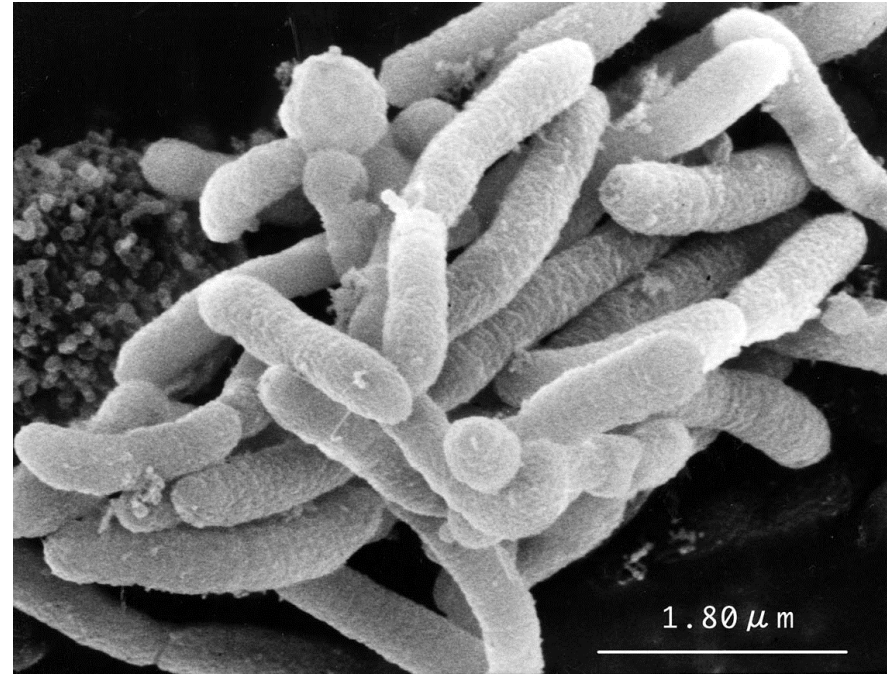
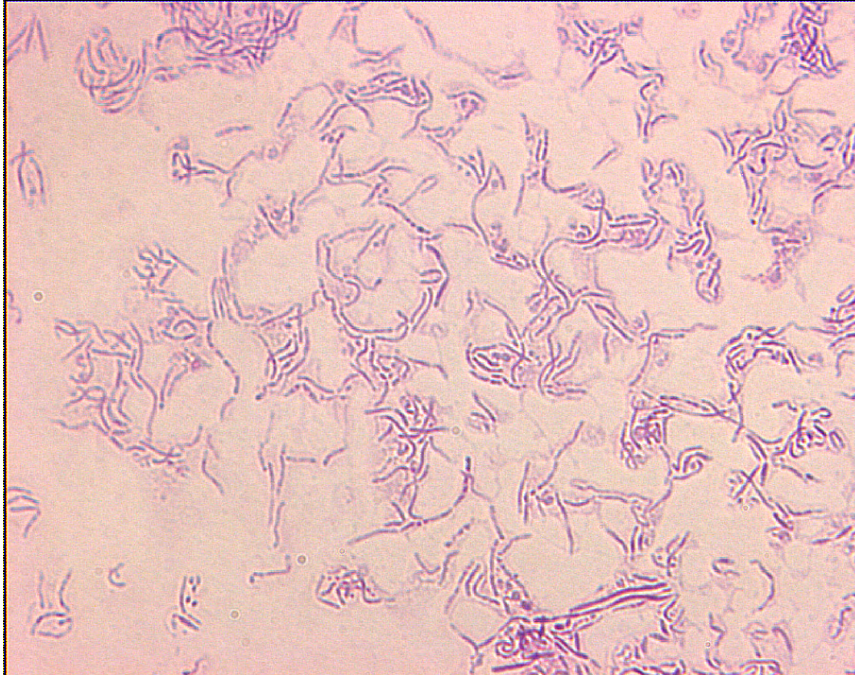
# Microbial analysis using DNA technologies



On an aeration pipe

On the middle of two aeration pipes

# We discovered new thermophilic bacteria



One example is *Calditerricola satsumensis* YMO81

The strain is the championship holder in terms of the highest growth temperature among the soil microorganisms.

**We devised “Laboratory Reactors” in which fermentation processes inside of our compost piles are reproduced**



**2 liter reactor**

**8 liter reactor**



# Dead bodies of rats disappear within a day



Three dead bodies of rats were added in the morning



After 1 H



In the evening of the day



**Recently we treated  
dead bodies of cow which were  
contaminated with radio active Cs in  
Fukushima due to disaster of the Atomic  
Power House**

- We collected cows in the evacuation zone near-by the Atomic Power House in Fukushima ( Next slides )**
- After radio-activities were measured, the dead bodies were treated in our compost piles**









# Dead bodies of cow were disappeared after 8 weeks



**After 1 week**



**After 4 weeks**

**After 8 weeks,  
I could see  
only nose  
rings!**



<(.\_.)> **Thank you for your kind attention.**



**The building is my research institute**