

## Workshop of KITA-Q (Takakura Composting) Method

29.June. 2011  
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## Important item of composting

- **Microorganisms**
- **Moisture control**
- **Aerobic(O<sub>2</sub>:Oxygen)**

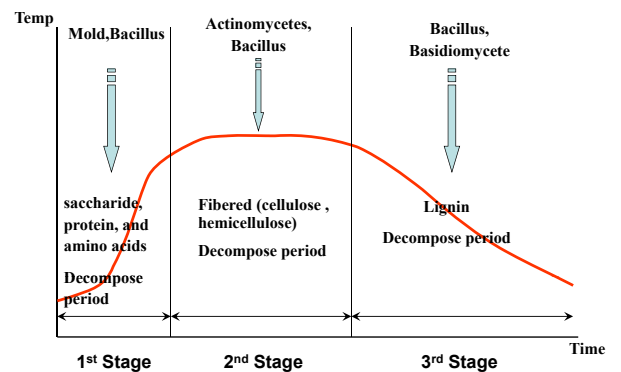
## Various Microorganisms relate to the composting

- The composting cannot be finished by only one kind of Microorganism .
- The priority kind of Microorganism changes according to the stage of the composting.
- Bacillus, Mold, Actinomycete , and Basidiomycete are necessary.
- Also in the category of the same kind of Microorganism, it's better a lot of kinds. (Diversity)



You do not expect the bacterium to proliferate naturally.  
You adjust the bacterium with a purpose.

## Transition of composting and microorganisms (It is advanced at the same time in the compost container.)



## Composting the 1<sup>st</sup> Stage

### ◎An important thing

Easily decomposable organic matters are quickly decomposed with a useful bacterium.

Both good and bad Microorganisms can use the easily decomposable organic matter.

For example,

Mold and E. coli bacteria proliferate on the condition. And, food poisoning and the allergy might be caused.



Countermeasure

## Composting the 1<sup>st</sup> Stage

Increasing a large amount of harmless  
Molds and Bacillus in the compost.

"**Fermented food** such as Aspergillus  
oryzae and lactic acid bacteria" is  
added with a purpose.

→ It comes to prevent rot.

## Composting the 2<sup>nd</sup> Stage

⊙The majority of a botanical organism such as the vegetables is fibered.

cellulose , hemi cellulose, Lignin



Countermeasure

Actinomycetes is suitable for the decomposition of cellulose and the hemi cellulose.

(Actinomycetes lives in the hums.)

The hums can be made though a long time is needed.

## Composting the 3<sup>rd</sup> Stage

⊙The decomposition of the lignin contained in the plant such as the vegetables is slow.



Countermeasure

The basidiomycete is suitable for the resolution of lignin.

The basidiomycete is Mushroom

## The fermentation microorganisms are gathered in the region.

- The microorganisms that relate to the fermented food is effective.
  - When the fermented food is unavailable, "**Decomposed fallen leaves (hums)**" are very effective.
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- Moreover, the bacillus, the type, Actinomycetes, and Basidiomycota can be collected at the same time.

## The fermentation bacterium is gathered in the region.

- In addition, effective Microorganisms for the composting are on the surface of the vegetable and the fruit.
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- They are collected by applying Japanese pickles [asazuke] by using salt water.
  - The increasing of miscellaneous germs is controlled with the salt. And, aimed **lactic acid Bacillus** and **yeast fungus** are collected.

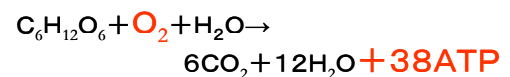
## Anticipated efficacies in the fermentation Microorganisms

It is not only effective for the composting.

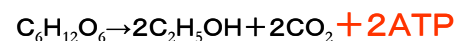
- Microorganisms collected **in the local area** are good matching the soil in that area.
- We expect fermentation Microorganisms can produce the substance like hormone and the material like vitamin and the **effect of promoting** the plant growth .
- A certain kind of Actinomycetes makes the **antibiotic**.

## As for the composting, aerobic decomposition is good.

- Aerobic decomposition



- Anaerobic decomposition (alcoholic fermentation)



ATP (Adenosine triphosphoric acid):  
Energy source of all lives

**Aerobic decomposition is fast**

## The moisture control

The good condition is 40~60%.

- The activity of the microorganisms become slow when moisture is a little.
- When moisture is much, it becomes the oxygen-deficiency.  
→ anaerobic and rot.



When moisture control is to 40-50% , the failure is few.  
When moisture control is to 50-60% , decomposition is fast

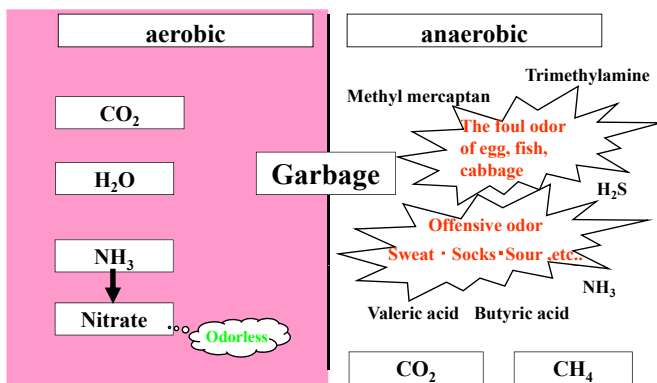
moisture and oxygen are related.

- Oxygen in air is 21%.
- Oxygen in water is 0.0008%(8ppm)
- When it is high moisture, much water enters the space and it changes to anaerobic.

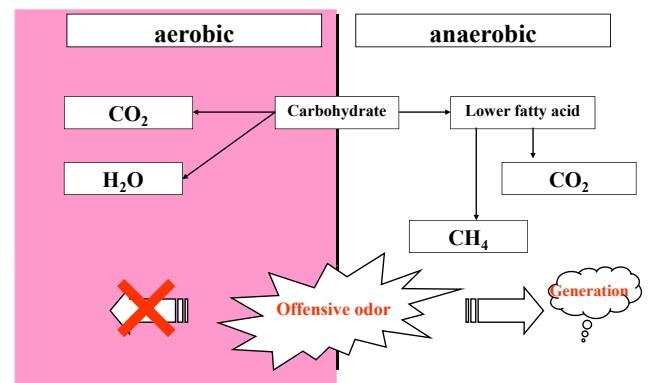


When it is high moisture, it is perishable.

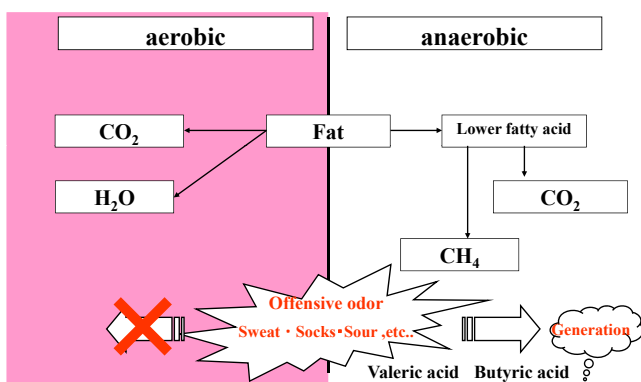
## Difference between aerobic and anaerobic -1



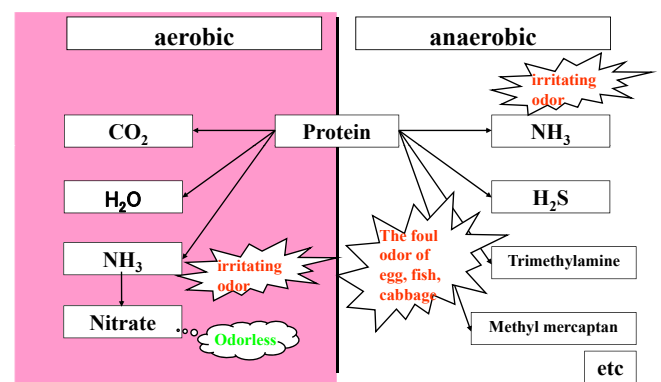
## Difference between aerobic and anaerobic -2



## Difference between aerobic and anaerobic -3



## Difference between aerobic and anaerobic -4



### Composting and C/N ratio (ratio of carbon/nitrogen)-1

- The best C/N ratio of the composting is 20.
- When the C/N ratio is high, decomposition is slow. (It needs long time)



- We need to adjust the C/N ratio for the garbage composting?

→No necessary, because the C/N ratio of garbage is 20 or less.

### Composting and C/N ratio (ratio of carbon/nitrogen)-2

- What material is high C/N ratio?

→Hard plants are high.

Fallen leaves : 50~100, Straw : 110~150,

Rice straw and Rice husk : 70,

Sawdust : 300~1300 (The conifer is high.)



### Composting and C/N ratio (ratio of carbon/nitrogen)-3

- Then, when material of the fermentation is made by sawdust, adjustments are necessary?

→Sawdust is not made compost. It only uses as a base material.

When garbage is decomposed, the entire C/N ratio falls. At the end, It becomes C/N ratio that can be used as compost.