

Maturity Test of Compost (Results)

Capacity Building for Extension Trainers for Small Scale Livestock Farming in Malawi

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Compost samples were collected at Sarabetsu composting facility on the occasion of site excursion. (Compost samples piled since November 2008, compost sample piled since April 2009, soil from beet, and potato pulp)

Extraction

50 g raw compost

500 mL distilled water

Extract 30 min at 60 C.

Cool down to room temperature.

Centrifuge at 9000 rpm for 15 min.

(Filter through a 0.45 µm membrane filter.)

1) Moisture content

A portion of raw sample is weighed into a ceramic dish.

Samples are dried at 40C for 5 days.

Three weights are recorded.

Weight of dish A

Weight of dish + raw material B

Weight of dish + dried material C

Moisture % is $(B-C)/(B-A) \times 100$

2) Determination of pH

Calibration of pH meter at pH 7 and pH 4..

20g of raw material + 200mL water.

pH measurement of 1:10 mixture.

After pH measurement, the mixture is heated in a hot water bath at 60C for 30 min, then centrifuged at 9000rpm to separate the water extract.

3) Determination of EC (Electrical conductivity)

Calibration of EC meter

Measurement of 1:10 extracted solution

EC of dried compost : distilled water (1:5) mixture.

Used for quality control of compost.

4) Determination of ammonium ion (Sign of immaturity)

Pack test for NH_4^+ ion

Suck a portion of sample solution into a tube.

Compare the developed color with the color chart.

5) Determination of nitrate ion (Sign of maturity)

Pack test for NO_3^- ion

Suck a portion of sample solution into a tube.

Compare the developed color with the color chart.

6) Determination of optical density at different wavelengths

Optical densities at 280, 465, 665 nm were used by Mathur et al (1993).

We measure also optical densities at 400 and 600 nm.

Ratio of optical density is calculated.

This ratio will increase with maturing of compost.

$\text{OD}_{665}/\text{OD}_{465}$

$\text{OD}_{600}/\text{OD}_{400}$

7) Germination test by the seeds of *Brassica campestris* (Started on July 25)

Two filter papers are dipped into the solution. (Cotton sheet is used instead)

30 – 50 seeds will be sowed on the filter paper. (30 seeds were sowed)

10 mL of the water extract (60C 30 min) is transferred into a laboratory dish.

2 mL of water extract and 8 mL of water is also tested.

The dish is covered and left at room temperature for 3-6 days.

Germination rate and the length of root is measured.

8) Growth test of the seedling of *Brassica campestris* (Started on July 18)

350 g of soil, 150 g of compost, 0.25 g of ammonium sulfate, 0.25 g of potassium sulfate, and 0.25 g of phosphate fertilizer are measured and mixed and put into a pot.

For control, only 500g of soil and fertilizers are mixed.

Twenty seeds of *Brassica campestris* were sowed on July 18.

Results of Compost Maturity Test for JICA Malawi Course

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Maturity test by chemical characteristics of water extracts

	Compost since Nov. 2008	Compost since Apr. 2009	Soil from beet	Potato pulp
Moisture	63.4	67.6	69.2	76.1
pH of extract	7.40	8.46	8.19	5.25
EC of extract mS/cm	0.598	2.32	2.49	0.671
NH ₄ ⁺ (x 25) ppm	0.5	5	3	0.2
NO ₃ ⁻ (x 5) ppm	0.2	n.d.	n.d.	n.d.
NH ₄ ⁺ (x 1) ppm	12.5	125	75	5
NO ₃ ⁻ (x 1) ppm	1	n.d.	n.d.	n.d.

Maturity test by plant seed (*Brassica campestris*)

	Compost Nov. 2008	Compost Apr. 2009	Soil from beet	Potato pulp	Control
Germination test (1:10 extract, No dilution)					
Number of Germinated seeds	30	23	28	29	29
Length of seedling mm	15.8 A	8.6 B	12.7 AB	8.9 B	10.0 B
Seedlings growth test					
Germinated seeds	17	8	13	17	12
Length of shoot	78.3 A	37.1 B	43.9 B	51.0 B	78.1 A
Weight of shoot (g)	1.432	0.263	0.650	0.595	0.834

Values with different letters (A and B) are significantly different at 95% level.

Earthworm test

Earthworm crept into the compost since November 2008.

From the other compost or material, earthworm escaped.

C o n c l u s i o n

Compost since November 2008 (8 months compost) was considered mature.

Its pH was near to 7, EC was low, ammonia was low, and nitrate was detected.

It showed a favorable effect on seed germination and seedling growth of *Brassica campestris*.

Earthworm test showed that earthworm crept into the compost and did not escape.

Compost since April 2009 (3 months) was considered immature with respect to the above standards.

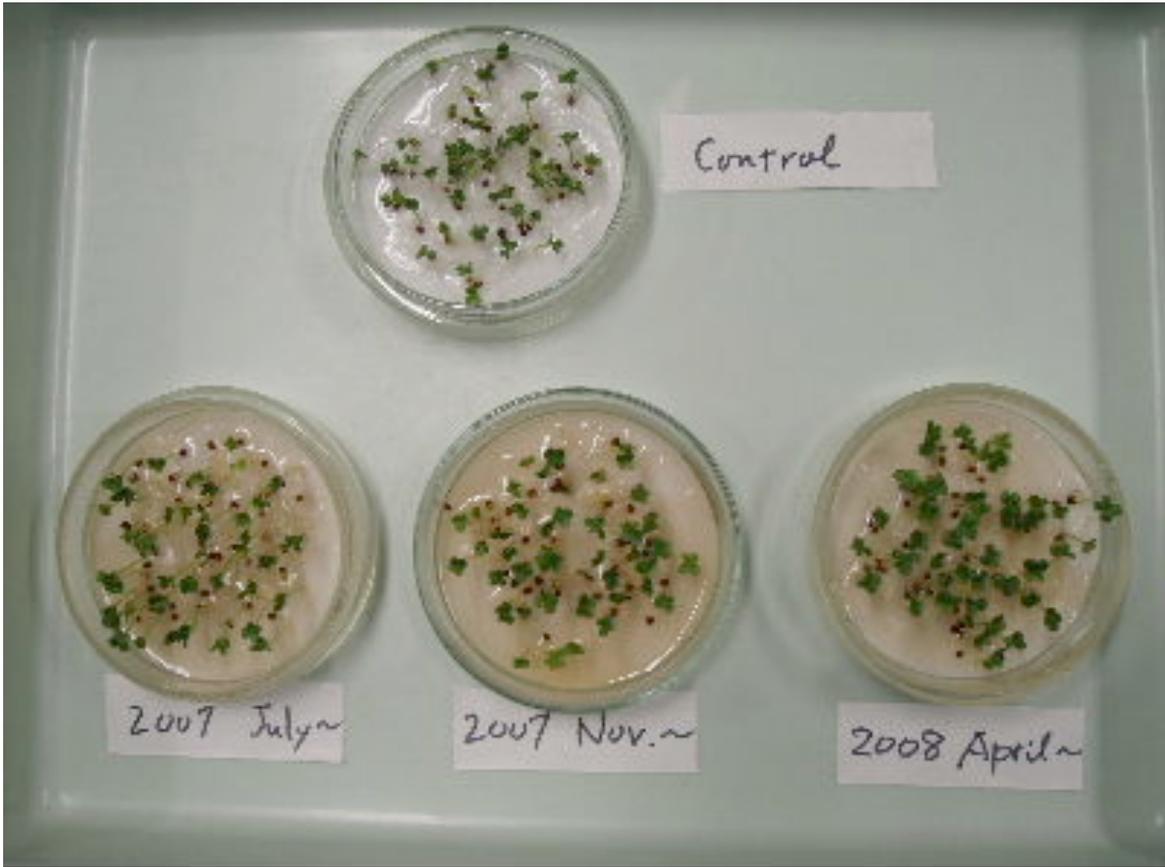
Moisture

	Tare of dish	Dish + raw m.	Dish + dried m.	Raw weight	Dry weight	Moisture %
Compost Nov. 2008	219.25	296.39	247.49	77.14	28.24	63.4
Compost Apr. 2008	213.29	287.80	237.41	74.51	24.12	67.6
Soil from beet	214.97	287.36	237.28	72.39	22.31	69.2
Potato pulp	218.94	276.92	232.78	57.98	13.84	76.1



Seedling growth test

Left: control, right: with compost



Germination test