

**The Effectivity of the Terra Preta  
Sanitation (TPS) Process in the  
Elimination of Parasite Eggs in Fecal  
Matter: A Field Trial of Terra Preta  
Sanitation in Mindanao, Philippines**

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- The potential of creating terra preta from bio-waste such as human excreta is a possibility which needs to be investigated.
- Earlier studies have shown that *Ascaris lumbricoides* ova persist in dried human feces from UDDT vaults even up to 10 months without secondary treatment (Itchon et al, 2008).

## Introduction

- To determine the effects of a bacterial mix (obtained from Dr Jurgen Reckin) as a fermenting medium, in combination with charcoal, as well as the influence of time on pathogen and parasite egg reduction.
- NB: Bacterial mix made up of:  
*Bacillus subtilis*, *Bacillus mesentericus*,  
*Geobacillus stearothermophilus*, *Azobacter croococum*, and *Lactobacillus sp.*

## General Objective

- To determine the optimum C:N ratio suitable for vermicomposting;
- To investigate the potential of TP as a source of nutrients to plants.

## **Specific Objectives**

- Type of Study: Analytic Observational
- Study Location: Lumbia and Palalan, Cagayan de Oro City, Philippines

## **Materials and Methods**

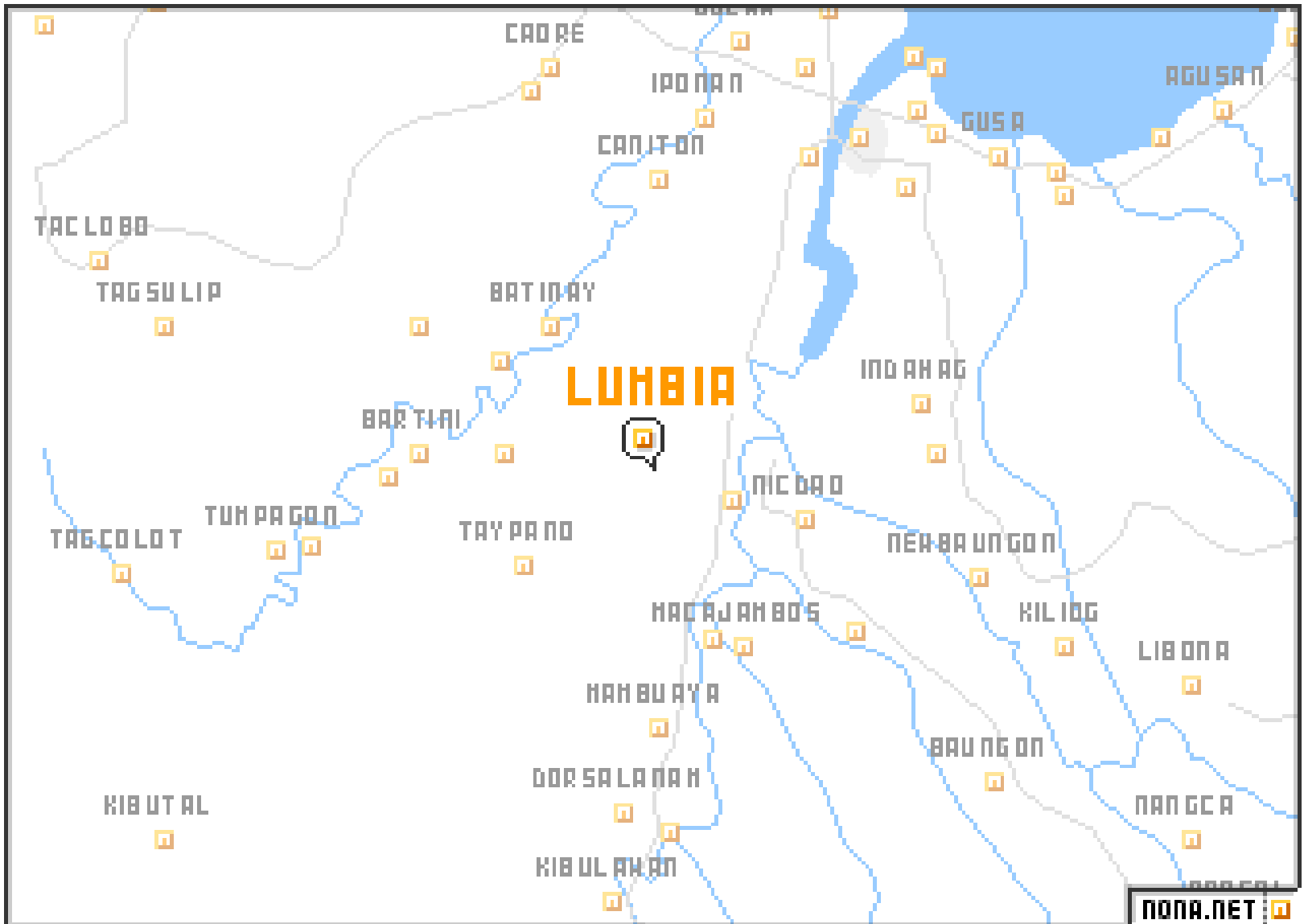


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- The study was conducted using twenty (20) UDDTs in Lumbia and Palalan, Cagayan de Oro City, in Mindanao, Philippines.
- The users of 10 UDDT toilets were told to add powdered charcoal and 20 ml of the bacterial mix after using their toilets for defecation, while owners of 10 different toilets were told to just add charcoal after defecation.

- The study was conducted for three (3) months after which the stored faeces from all the UDDT toilets were collected, stored for another 3 months, and were then vermicomposted separately for six (6) weeks.

- At the end of 60 days, 6 toilets were discarded as experimental units in Palalan because of a number of problems. Among the problems seen were the following: wet fecal material (water being mixed with the faeces); charcoal was not added adequately; identification of other discarded material in the toilet vaults (food scraps).

- The feces collected from all the experimental UDDTs were put in separate black plastic garbage bags and transported to the storage shed of the community in order to undergo drying for 6 weeks. There were 10 bags from Lumbia (with bacterial mix) and 4 bags from Palalan (without bacterial mix).

- After 6 weeks of drying, the feces from Lumbia and Palalan were put in 2 separate beds for vermicomposting. 44 k of feces with bacterial mix and 44 k of feces without bacterial mix were placed in 2 beds. C:N ratio of 70:30 was used and 1 k of African night crawlers was used for composting for each of the beds.
- Standard vermicomposting procedures were used.

- Fecal samples were then taken at 2 week intervals to further monitor for the presence of parasite eggs for the next 6 weeks during the vermicomposting phase.
- Samples were also taken for N P K analysis after 6 weeks (done at the Regional Soil Testing Laboratory of the Department of Agriculture Regional Office 10).

# Results

**Table 1. Number and Type of Parasite Ova in Fecal Samples with Bacterial Mix**

	<b>Baseline</b>	<b>After 30 days</b>	<b>After 60 days</b>
Ascaris	5-6	Irregular 2-3	0 (none seen)
Taenia	0-1	0 (none seen)	0 (none seen)
Trichuris trichura	2-3	0 (none seen)	0 (none seen)

**Table 2. Number and Type of Parasite Ova in Fecal Samples without Bacterial Mix**

	<b>Baseline</b>	<b>After 30 days</b>	<b>After 60 days</b>
Ascaris	3-4	Irregular 1-2	2-4, Irregular
Trichuris	2-3	1-2	0 (none seen)
Enterobius vermicularis	0-1	0 (none seen)	0 (none seen)



**Table 3. Number and Type of Parasite Ova in Fecal Samples with Bacterial Mix During Vermicomposting**

	<b>After 30 days</b>	<b>After 60 days</b>	<b>After 90 days</b>
No parasite ova	0 (none seen)	0 (none seen)	0 (none seen)

**Table 4. Number and Type of Parasite Ova in Fecal Samples Without Bacterial Mix During Vermicomposting**

	<b>After 30 days</b>	<b>After 60 days</b>	<b>After 90 days</b>
Ascaris ova	Irregular 0-1	0 (none seen)	0 (none seen)

**Table 5. Assay for Vermicast of Fecal Samples with Bacterial Mix**

Contents (Constituents)	Air Dry Basis (%)	Oven Dry Basis (%)
Total Nitrogen (N)	1.61	1.79
Total Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> )	0.80	0.89
Total Potassium (K <sub>2</sub> O <sub>5</sub> )	1.27	1.41
<b>TOTAL N,P,K =</b>	<b>3.68</b>	<b>4.09</b>
Available Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> )		
Calcium Oxide (CaO)		
Calcium Carbonate (CaCO <sub>3</sub> )		
Magnesium Oxide (MgO)		
pH of the Sample		
Moisture Content (as received - 73.5)	10.00	

**Table 6. Assay for Vermicast of Fecal Samples Without Bacterial Mix**

Contents (Constituents)	Air Dry Basis (%)	Oven Dry Basis (%)
Total Nitrogen (N)	1.24	1.33
Total Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> )	0.80	0.86
Total Potassium (K <sub>2</sub> O <sub>5</sub> )	1.03	1.11
<b>TOTAL N,P,K =</b>	<b>3.07</b>	<b>3.30</b>
Available Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> )		
Calcium Oxide (CaO)		
Calcium Carbonate (CaCO <sub>3</sub> )		
Magnesium Oxide (MgO)		
pH of the Sample		
Moisture Content (as received - 73.5)	7.00	

- 1. The terra preta sanitation (TPS) process is an effective secondary treatment method for human faeces collected in UDDT vaults;
- 2. Vermicomposting of dried human faeces that have undergone the TPS process requires a slightly higher C:N ratio (70:30 instead of 60:40);
- 3. Assay of vermicompost from dried human faeces which have undergone the TPS process conformed to Philippine standards for organic fertilizer in terms of NPK and moisture content.

## **Conclusions:**

- The TPS process may be used as a secondary treatment method for faeces collected from UDDT toilets particularly in countries like the Philippines, with a tropical climate and where re-use of faeces poses a risk to health and hygiene because of high parasite load in the population.

## **Recommendations:**

- A larger scale field trial be conducted in order to validate the findings of this study.

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## References

**Kiitos! Thank you!**  
**Maraming salamat po!**