# PREPARATION AND CHARACTERIZATION OF COMPOSTED ORGANIC FERTILIZERS PREPARED FROM ORGANIC WASTES (COW DUNG, CORN STALK AND KOKKO LEAVES)

Thin Thin Nwe[1], Tin Moe Khaing[2], Thi Thi Aye[3]

## Abstract

Organic wastes from animals, plants and agricultural sources, posing serious environmental and health problems can be managed, through production of compost. In the present research work, raw organic materials (cow dung, corn stalk and kokko leaves) that are well suited for application to the soil as a fertilizer or soil conditioner were used as materials for composting. Five kinds of composted organic fertilizers were prepared by using various ratios of these organic waste materials and EM solution and then some physicochemical properties (pH, moisture, EC, Organic matter, C:N ratio, total N, total $P_2O_5$, total $K_2O$, Ca, Mg, S) and trace elements (Fe, Zn, Mn and Cu) necessary for plants of composted organic fertilizers were qualitatively and quantitatively characterized by EDXRF, AAS, and others modern and conventional methods. According to these data, the nitrogen and phosphorus contents of sample 3 (cow dung+ EM) are higher than the others (sample 1,2,4 & 5). However, secondary nutrients, micronutrients and trace elements were higher in samples 1, 2, 4, & 5. Therefore, macronutrients, micronutrients and trace elements needed for plant growth were found in these fertilizers. Thus, making combination of different organic wastes as compost is beneficial for plants by fulfilling of plant nutrients through organic resources and their application in a balanced way for maintaining soil productivity. Furthermore, the use of composted organic fertilizer will not only supplement the chemical fertilizers, but also reduce environmental pollution.

**Keywords:** Composted organic fertilizer, EM, Macronutrient, Micronutrient

## Introduction

Composting is the natural process of decomposing and recycling organic materials into a humus-rich soil amendment by the successive action of bacteria, fungi, actinomycetes, or earthworms. Many common materials can be composted on-site, including food wastes, leaves, grass clippings, plant

1. 3 PhD, Candidate, Department of Chemistry, University of Yangon
2. Lecturers, Department of Chemistry, University of Yangon
3. Associate Professor, Department of Chemistry, University of Yangon

trimmings, straw, shredded paper, animal manure, and municipal solid wastes. Many of these materials were composted to destroy weed seeds and potential human and plant pathogens; to enhance their nutrient availability; and to facilitate their storage, transport, and application to land. The final product is a stable dark-brown or black humus material with an earthy smell. Like other recycling efforts, composting has many benefits to agriculture, the environment, the economy, and the society.

In this study, raw materials (cow dung, corn stalk and kokko leaves) were used in composting. These materials can be available in Myanmar. Cow dung has been used for centuries as a fertilizer for farming (Bokhtia and Sakurai, 2005). It can improve the soil structure (aggregation) so that the soil holds more nutrients and water, and therefore becomes more fertile. Cow dung also encourages soil microbial activity which promotes the soil's trace minerals supply, improving plant nutrition. Corn stalk is a waste product from the harvest of other economically important plant parts and high in cellulose, hemi-cellulose, lignin and other components (minerals and moisture) and a source of nutrients and organic matter which helps keep soil fertile. Composting of maize residues is useful method of producing a stabilized product and substantial organic matter because a high C/N ratio also produces humus that can be used as a source of organic materials and slow the release of nutrients. Kokko leaves are a source of organic fertilizer on the soil chemical properties and the highest value for organic carbon, total nitrogen and potassium (Haque, 2000).

EM is a fermented mixed culture of naturally occurring species of co-existing microorganisms in acidic medium (pH below 3.5). Among the main microorganisms in EM culture are the species of photosynthetic bacteria (Rhodopseudomonas plastris and Rhodobacter sphacrodes), lactobacilli (L.plantarum, L.casei, and streptococcus lactis), yeast (saccharomyces spp) and actinomycetes (stretomycetes (Streptomyces spp). Microorganisms in EM improve crop health and yield by increasing photosynthesis, producing bioactive substance such as hormones and enzymes, accelerating decomposition of organic materials and controlling soil borne disease.

Compost has been considered as a valuable soil amendment for centuries. Most people are aware that using composts is an effective way to increase healthy plant production, help save money, reduce the use of chemical fertilizers, and conserve natural resources. Compost provides a stable organic matter that improves the physical, chemical and biological properties of soils, thereby enhancing soil quality and crop production. Nowadays, Organic fertilizers are needed in organic farming. Organic farming preserves the ecosystem. Organic farming neither demands the use of synthetic nor the harmful chemicals (pesticides and fungicides) for controlling weeds, insects and pests. Organic farming relies on large-scale application of animal or farmyard manure (FYM), compost, crop rotation, residues, green manure, vermicompost, bio-fertilizers and bio-pesticides (Naeem & Iqbal,2006).

## Materials and Methods

### Sample Collection and Preparation

Cow dung, corn stalk and kokko leaves were collected from Einkyitaw village, Mahlaing Township, Mandalay Region. Each sample was dried in air, ground and sieved into mesh size 150 μm and stored in air-tight plastic bags. Then, some physicochemical properties of raw materials were qualitatively and quantitatively characterized by EDXRF, AAS and other moderns and conventional methods. Five piles (approximately 3m length, 3m width and 3m height) were made for the preparation of compost. Then all materials viz., raw materials (cow dung, corn stalk and kokko leaves) were used in the composting process. Firstly, a layer of raw materials was spread on the bottom of the pile. Then EM solution (EM: molasses: water = 1:1:98 v/v) was sprinkled to attain adequate moisture content (Apnan, 1995). The procedure was repeated three times. Then, they were covered with plastic sheet. Temperature of the compost pile was measured two times (9 am and 5 pm) daily and the average of two was recorded. Generally, the temperature gradually up and reached its optimum (62˚C). The mixture was maintained its optimum temperature for several days and then dropped (32 ˚C) gradually.

After one month later, when the temperature of the pile was dropped to ambient temperature, the pile was turned over. The pile was covered with plastic sheet and measured temperature daily. After another one month later, the pile was turned over and the temperature of the pile was again dropped to ambient temperature (Mi Mi Hliang, 2011). Finally, after 75 days, the compost was ready to be used. The fertilizers were kept in air-tight container and used for chemical analyses. The following different types of composted organic fertilizers were prepared.

- Sample 1 ➡ Cow dung + Corn stalk + kokko leaves +EM (30kg+ 20kg+ 10kg +5L)
- Sample 2 ➡ Cow dung + Corn Stalk + EM (30 kg+ 30 kg + 5L)
- Sample 3 ➡ Cow dung + EM (60 kg + 5L)
- Sample 4 ➡ Cow dung + Corn stalk + kokko leaves +EM (30kg+ 10kg + 20kg +5L)
- Sample 5 ➡ Cow dung + Corn stalk + kokko leaves +EM (20kg+ 20kg+ 20kg +5L)

**Methods**

Measurement of pH was carried out by a pH meter (Digital pH Meter), moisture content was determined by oven drying method. Nitrogen content was determined by Kjeldahl's method. Phosphorous content was determined by UV-Visible Spectrophotometric technique and potassium content was determined by Flame photometric technique. Qualitative elemental contents of raw materials were determined by EDXRF technique and quantitative elemental contents were determined by AAS technique. Organic matter was determined by Walkley and Black's method and Electrical conductivity contents of composted organic fertilizers were determined by Conductivity meter. Total sulphur of composted organic fertilizers was determined by turbidity method. In the analytical procedures of the experiments, recommended methods and techniques were applied (Vogel, 1968 ; AOAC, 1984).

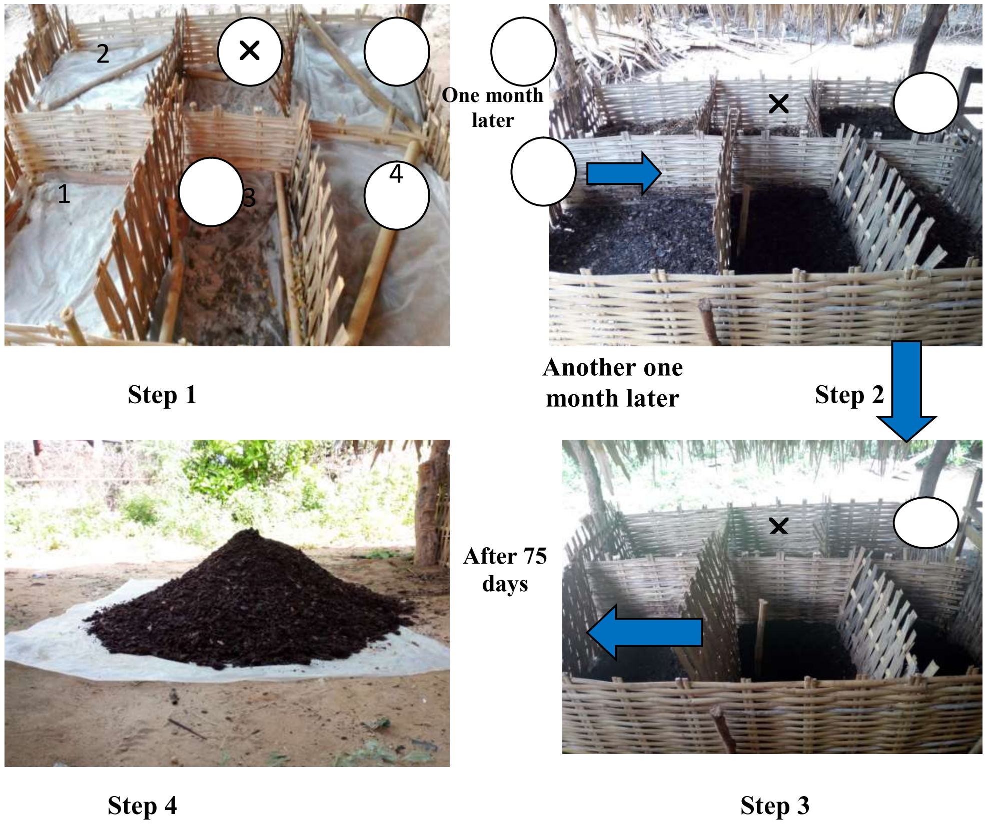


**Figure 1:** Procedure for the Preparation of composted organic fertilizers

## Methods

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## Results and Discussion

This research is mainly concerned with the preparation of composted organic fertilizers by using organic wastes (cow dung, corn stalk and kokko leaves). These raw materials are plentiful in rural areas. Before preparing composted organic fertilizers, some physicochemical properties of these organic wastes were determined. Some physicochemical properties are pH, moisture, total N, total $P_2O_5$, total $K_2O$ and then qualitative and quantitative elemental contents of raw materials were determined. The resulting data are shown in Table 1, 2 and 3. According to these experimental data indicated that macronutrients (NPK) and the other micronutrients necessary for the growth of plants and soil fertility were found in cow dung, corn stalk and kokko leaves. Therefore, these raw materials were used in composting as organic fertilizers. Then, five kinds of composted organic fertilizers were prepared by using these raw materials. After lasting 75 days, composted organic fertilizers were ready to be used in the field. During the composting process, temperature of compost pile was measured. Temperature is also a good indicator of the various stages of the composting process. Composting is a method of speeding natural decomposition under controlled conditions. Raw organic materials are converted to compost by a succession of organisms. During the first stages of composting, bacteria increase rapidly. Later actinomycetes (filamentous bacterial), fungi and protozoans go to work. After much of the carbon in the compost has been utilized and the temperature has fallen, centipedes, millipedes, sowbugs, earthworms and other organisms continue the decomposition. As microorganisms decompose the organic materials, their body heat causes the temperature in the pile to rise dramatically.

**Table 1**: Some Physicochemical Properties of Raw Materials (Cow dung, Corn stalk and Kokko leaves)

| No | Raw Materials | Parameters | | | | |
|---|---|---|---|---|---|---|
| | | pH | Moisture (%) | Total N (%) | Total $P_2O_5$(%) | Total $K_2O$(%) |
| 1 | Cow dung | 8.82 | 8.142 | 0.942 | 0.585 | 0.554 |
| 2 | Corn stalk | 6.20 | 9.244 | 2.302 | 0.730 | 0.501 |
| 3 | Kokko leaves | 5.57 | 8.287 | 3.249 | 0.312 | 0.290 |

**Table 2:** Elemental Analysis of Raw Materials (Cow dung, Corn stalk and Kokko leaves) by EDXRF

| Elements | Relative Abundance (%) | | |
|---|---|---|---|
| | Cow dung | Corn stalk | Kokko leaves |
| Si | 44.300 | 19.540 | 4.086 |
| K | 19.208 | 29.342 | 22.696 |
| Ca | 14.576 | 41.089 | 59.363 |
| Fe | 10.965 | 3.645 | 6.249 |
| Al | 3.794 | - | - |
| Ti | 1.742 | 1.277 | 0.522 |
| S | 1.700 | 1.939 | 3.455 |
| Mn | 1.666 | 1.277 | 3.189 |
| P | 1.458 | 1.680 | 0.050 |
| Zn | 0.153 | 0.193 | 0.247 |
| Sr | 0.127 | 0.112 | 0.144 |
| Cr | 0.075 | - | - |
| Rb | 0.070 | 0.079 | - |
| Zr | 0.068 | - | - |
| Cu | 0.054 | 0.094 | - |
| V | 0.043 | - | - |

**Table 3:** Elemental Contents in Raw Materials (Cow dung, Corn stalk and Kokko leaves) by AAS

| No | Raw Materials | Elements (ppm) | | | | |
|---|---|---|---|---|---|---|
| | | **Ca** | **Mg** | **Mn** | **Cu** | **Zn** |
| 1 | Cow dung | 17.26 | 8.595 | 1.057 | 0.045 | 0.063 |
| 2 | Corn stalk | 9.989 | 8.597 | 0.579 | 0.052 | 0.114 |
| 3 | Kokko leaves | 15.71 | 8.451 | 2.603 | 0.051 | ND |

ND= Not Detected

**Table 4:** Temperature Changes of Compost Pile (1, 2 and 3) during Composting Process (75 days)

| Day | Temperature ( ˚C ) | | | Day | Temperature ( ˚C ) | | | Day | Temperature ( ˚C ) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sample 1 | Sample 2 | Sample 3 | | Sample 1 | Sample 2 | Sample 3 | | Sample 1 | Sample 2 | Sample 3 |
| 1 | 33 | 33 | 33 | 26 | 52 | 44 | 46 | 51 | 47 | 48 | 50 |
| 2 | 33 | 33 | 33 | 27 | 50 | 43 | 46 | 52 | 50 | 49 | 50 |
| 3 | 37 | 33 | 33 | 28 | 49 | 42 | 46 | 53 | 54 | 49 | 53 |
| 4 | 39 | 35 | 36 | 29 | 46 | 42 | 45 | 54 | 57 | 50 | 54 |
| 5 | 42 | 35 | 36 | 30 | 46 | 39 | 40 | 55 | 61 | 52 | 55 |
| 6 | 43 | 36 | 38 | 31 | 44 | 37 | 40 | 56 | 61 | 52 | 55 |
| 7 | 46 | 38 | 39 | 32 | 40 | 37 | 40 | 57 | 59 | 52 | 55 |
| 8 | 47 | 38 | 40 | 33 | 39 | 35 | 39 | 58 | 59 | 51 | 57 |
| 9 | 52 | 40 | 40 | 34 | 38 | 32 | 38 | 59 | 55 | 51 | 57 |
| 10 | 53 | 42 | 43 | 35 | 37 | 32 | 36 | 60 | 55 | 49 | 56 |
| 11 | 54 | 45 | 45 | 36 | 37 | 32 | 36 | 61 | 54 | 49 | 54 |
| 12 | 55 | 45 | 46 | 37 | 35 | 33 | 34 | 62 | 53 | 49 | 53 |
| 13 | 57 | 47 | 46 | 38 | 35 | 33 | 34 | 63 | 52 | 48 | 52 |
| 14 | 58 | 47 | 50 | 39 | 36 | 35 | 34 | 64 | 50 | 46 | 52 |
| 15 | 59 | 48 | 52 | 40 | 36 | 37 | 32 | 65 | 46 | 46 | 52 |
| 16 | 60 | 49 | 52 | 41 | 37 | 38 | 32 | 66 | 44 | 42 | 52 |
| 17 | 60 | 50 | 55 | 42 | 39 | 40 | 32 | 67 | 44 | 42 | 50 |
| 18 | 60 | 50 | 55 | 43 | 39 | 42 | 33 | 68 | 40 | 40 | 47 |
| 19 | 59 | 48 | 55 | 44 | 40 | 42 | 35 | 69 | 38 | 39 | 45 |
| 20 | 58 | 48 | 54 | 45 | 40 | 42 | 35 | 70 | 38 | 38 | 43 |
| 21 | 57 | 47 | 53 | 46 | 42 | 43 | 35 | 71 | 36 | 36 | 40 |
| 22 | 56 | 46 | 50 | 47 | 42 | 43 | 37 | 72 | 34 | 33 | 40 |
| 23 | 55 | 46 | 50 | 48 | 46 | 45 | 39 | 73 | 34 | 33 | 35 |
| 24 | 55 | 46 | 49 | 49 | 46 | 46 | 44 | 74 | 34 | 33 | 35 |
| 25 | 53 | 45 | 47 | 50 | 47 | 46 | 44 | 75 | 34 | 33 | 35 |

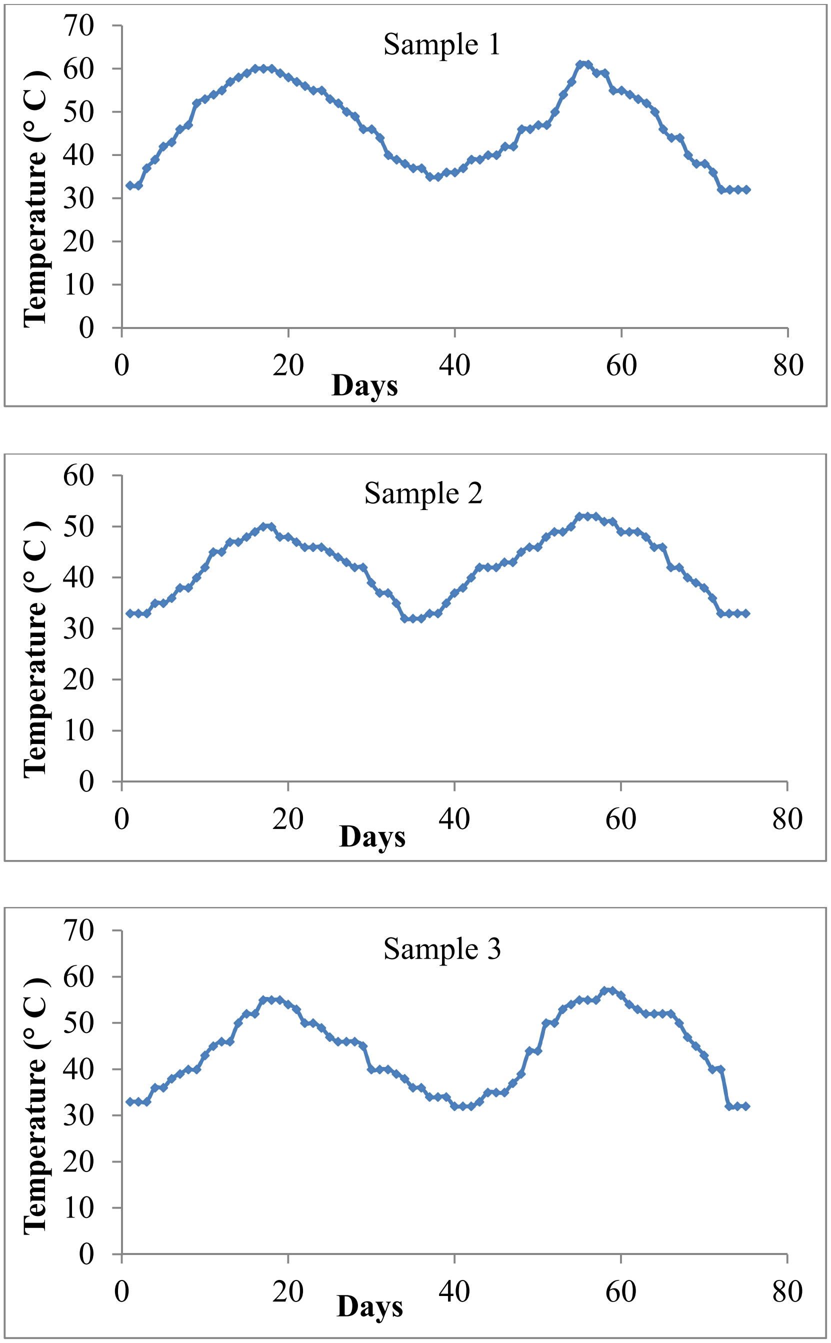


**Figure 2**: Temperature changes of compost samples (1, 2 and 3) during composting process

**Table 5:** Temperature Changes of Compost Pile (4 and 5) during Composting Process (75 days)

| Day | Temperature (˚C) Sample 4 | Temperature (˚C) Sample 5 | | Day | Temperature (˚C) Sample 4 | Temperature (˚C) Sample 5 | | Day | Temperature (˚C) Sample 4 | Temperature (˚C) Sample 5 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 33 | 33 | | 26 | 47 | 44 | | 51 | 50 | 43 |
| 2 | 33 | 33 | | 27 | 47 | 44 | | 52 | 54 | 45 |
| 3 | 35 | 33 | | 28 | 46 | 43 | | 53 | 55 | 45 |
| 4 | 36 | 34 | | 29 | 43 | 42 | | 54 | 57 | 48 |
| 5 | 38 | 35 | | 30 | 43 | 42 | | 55 | 59 | 49 |
| 6 | 39 | 37 | | 31 | 42 | 40 | | 56 | 60 | 50 |
| 7 | 40 | 37 | | 32 | 40 | 40 | | 57 | 62 | 52 |
| 8 | 41 | 37 | | 33 | 40 | 40 | | 58 | 62 | 53 |
| 9 | 42 | 40 | | 34 | 38 | 38 | | 59 | 62 | 54 |
| 10 | 45 | 42 | | 35 | 37 | 37 | | 60 | 61 | 54 |
| 11 | 45 | 43 | | 36 | 36 | 35 | | 61 | 61 | 54 |
| 12 | 48 | 45 | | 37 | 35 | 32 | | 62 | 58 | 53 |
| 13 | 50 | 46 | | 38 | 34 | 32 | | 63 | 58 | 52 |
| 14 | 53 | 47 | | 39 | 33 | 31 | | 64 | 54 | 51 |
| 15 | 57 | 49 | | 40 | 33 | 30 | | 65 | 53 | 49 |
| 16 | 59 | 49 | | 41 | 35 | 30 | | 66 | 50 | 48 |
| 17 | 60 | 50 | | 42 | 37 | 33 | | 67 | 46 | 48 |
| 18 | 60 | 50 | | 43 | 37 | 33 | | 68 | 44 | 45 |
| 19 | 58 | 50 | | 44 | 38 | 34 | | 69 | 43 | 41 |
| 20 | 57 | 48 | | 45 | 38 | 34 | | 70 | 43 | 38 |
| 21 | 55 | 47 | | 46 | 38 | 34 | | 71 | 40 | 37 |
| 22 | 54 | 46 | | 47 | 40 | 36 | | 72 | 32 | 35 |
| 23 | 52 | 45 | | 48 | 44 | 36 | | 73 | 32 | 33 |
| 24 | 50 | 45 | | 49 | 44 | 40 | | 74 | 32 | 33 |
| 25 | 49 | 44 | | 50 | 48 | 40 | | 75 | 32 | 33 |

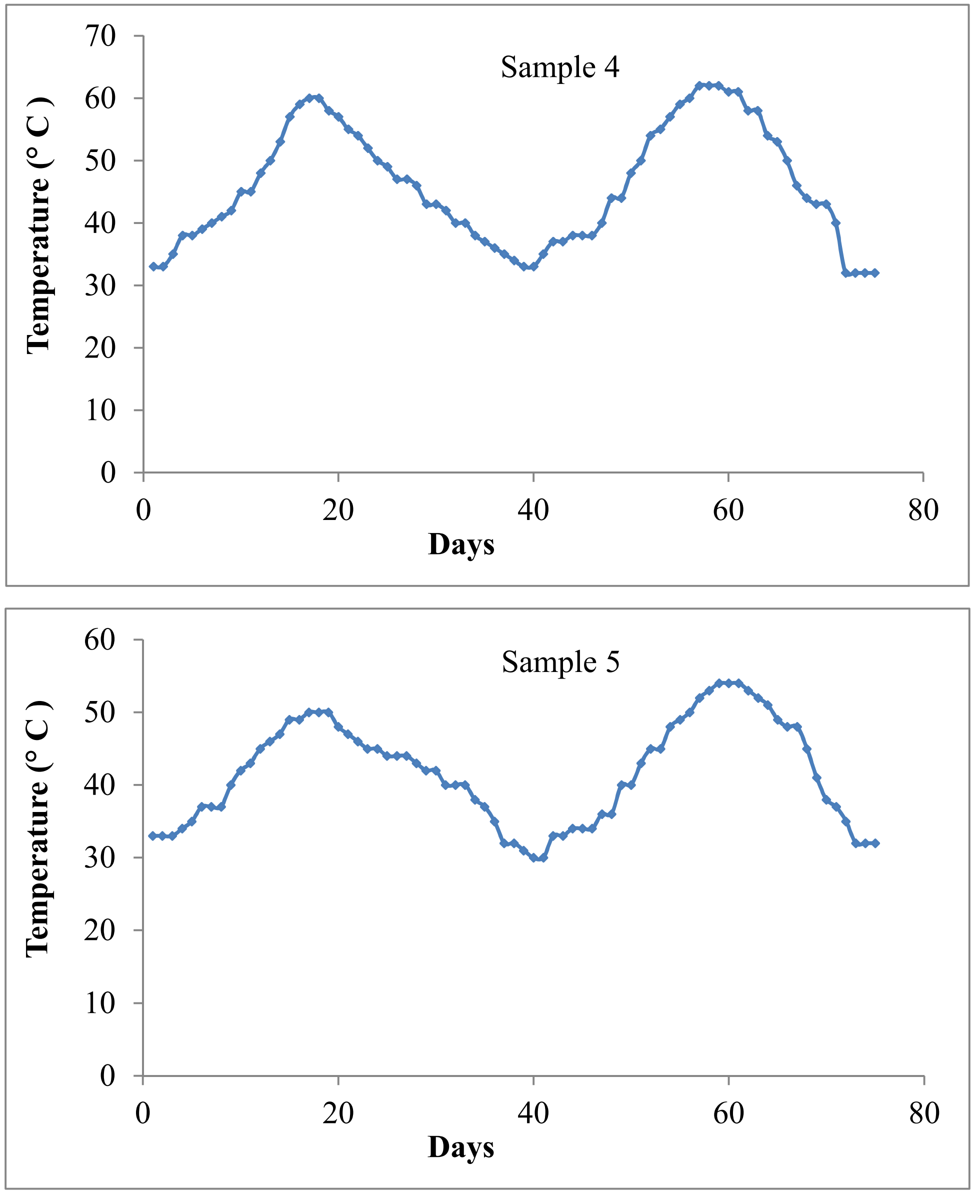


**Figure 3:** Temperature changes of compost Sample (4 and 5) during composting process

**Some Physicochemical Properties of Composted Organic Fertilizers**

Some physicochemical properties of composted organic fertilizers are pH, moisture, electrical conductivity, total organic carbon, total organic matter, C:N ratio, total nitrogen, total phosphorus, total potassium, calcium, magnesium, sulphur and trace elements were determined. Composted organic fertilizers have pH above 7. The pH values of composts are slightly alkaline. The moisture contents ranged from 7.478 to 15.838% for different compost types. The lowest value of moisture content (7.478%) was found in sample no 5 and the highest value of moisture content (15.838%) was obtained for sample no 3. The EC values ranged from 2.42 to 3.62 $dSm^{-1}$. This EC range is in the optimum range (2.0 to 4.0 $dSm^{-1}$) for growing media. Regarding total organic carbon was found to be 13.589 -19.951% for different compost types which are higher than the reported value 10% (Batjes., 1996). The total organic matter values ranged from 23.428 to 34.396%. Regarding the C/N ratio, it ranged from 14.406:1 to 16.647:1 for different compost types. These results are in agreement with the results ranged from 15:1 to 20:1 is ideal for ready to use compost (Rosen et al., 1993). These resulting data are shown in Table 6.

**Table 6 Physicochemical Properties of Composted Organic Fertilizers**

| Samples | Parameters | | | | | |
|---|---|---|---|---|---|---|
| | pH | Moisture (%) | EC | Organic Matter (%) | Organic C (%) | C:N |
| Sample 1 | 7.61 | 9.628 | 2.95 | 27.818 | 16.136 | 14.406 |
| Sample 2 | 7.70 | 9.582 | 2.60 | 23.428 | 13.589 | 15.529 |
| Sample 3 | 7.60 | 15.838 | 3.62 | 34.396 | 19.951 | 15.833 |
| Sample 4 | 7.75 | 7.564 | 2.69 | 24.109 | 13.984 | 16.647 |
| Sample 5 | 7.73 | 7.478 | 2.42 | 25.529 | 14.808 | 16.271 |

EC = Electrical conductivity

Nitrogen is an essential element required for successful plant growth. The total nitrogen values ranged from 0.84 to 1.26% for different compost types. The lowest value of total nitrogen 0.84% for sample no. 4 and the highest value of total nitrogen (1.26%) were found in sample no. 3. These results are in agreement with those obtained by Bento et al. (2006) whose found that the total nitrogen rate ranged from 0.99 % to 2.01%. Like nitrogen, phosphorus and potassium are also essential elements for plant growth. Phosphorus stimulates root growth, helps the plant set buds and flowers, improves vitality and increases seed size. Potassium improves overall vigor of the plant. It helps the plants make carbohydrates and provides disease resistance. The total phosphorus and total potassium values ranged from 0.420% to 0.594% and 0.906% to 1.488%, respectively, for different compost types. According to these phosphorus and potassium, the contents of phosphorus and potassium in these composted organic fertilizers are suitable for plant growth. The secondary nutrients-calcium, magnesium and sulphur and trace elements (iron, zinc, manganese and copper) necessary for plants were found in these composted organic fertilizers. The resulting data are shown in Table 7 and 8.

**Table 7:** Macronutrient Contents of Composted Organic Fertilizers

| **Samples** | **Macronutrients** | | | | | |
|---|---|---|---|---|---|---|
| | **Total N(%)** | **Total $P_2O_5$(%)** | **Total $K_2O$(%)** | **Ca(ppm)** | **Mg (ppm)** | **S (%)** |
| Sample 1 | 1.120 | 0.480 | 1.488 | 154.4 | 9.264 | 0.077 |
| Sample 2 | 0.875 | 0.442 | 1.296 | 151.8 | 9.251 | 0.071 |
| Sample 3 | 1.260 | 0.594 | 1.152 | 151.2 | 9.125 | 0.069 |
| Sample 4 | 0.840 | 0.420 | 0.906 | 152.3 | 9.158 | 0.076 |
| Sample 5 | 0.910 | 0.467 | 1.008 | 146.8 | 8.994 | 0.061 |

**Table 8:** Micronutrient Contents of Composted Organic Fertilizers

| **Samples** | **Micronutrients** | | | |
|---|---|---|---|---|
| | **Fe (%)** | **Zn (ppm)** | **Mn (ppm)** | **Cu (ppm)** |
| Sample 1 | 1.90 | 1.391 | 8.415 | 0.157 |
| Sample 2 | 2.09 | 1.240 | 10.300 | 0.179 |
| Sample 3 | 1.78 | 0.761 | 4.475 | 0.112 |
| Sample 4 | 1.94 | 2.069 | 7.020 | 0.137 |
| Sample 5 | 2.15 | 1.278 | 6.213 | 0.125 |

## Elemental Contents in Composted Organic Fertilizers by EDXRF Technique

The relative abundance of some elemental contents in composted organic fertilizers was determined by EDXRF technique. According to these data in Table 9, all composted organic fertilizers contained high amounts of Si, Ca, Fe, K, Al, Ti and S and many trace elements necessary for plants were found.

**Table 9:** Relative Abundance of Composted Organic Fertilizers by EDXRF

| Elements | Relative Abundance (%) | | | | |
|---|---|---|---|---|---|
| | Sample 1 | Sample 2 | Sample 3 | Sample 4 | Sample 5 |
| Si | 29.057 | 34.261 | 24.675 | 24.239 | 30.704 |
| Ca | 27.376 | 20.117 | 35.528 | 36.03 | 26.689 |
| Fe | 16.972 | 20.188 | 17.045 | 15.854 | 18.835 |
| P | - | 0.138 | 0.194 | - | 0.047 |
| K | 16.379 | 13.251 | 12.87 | 13.459 | 13.086 |
| Al | 5.929 | 7.345 | 5.051 | 5.925 | 6.085 |
| Ti | 1.532 | 1.86 | 1.547 | 1.47 | 1.641 |
| S | 1.109 | 0.912 | 1.33 | 1.195 | 1.103 |
| Mn | 0.699 | 0.772 | 0.72 | 0.769 | 0.735 |
| Sr | 0.335 | 0.321 | 0.453 | 0.412 | 0.348 |
| Zr | 0.118 | 0.171 | - | 0.13 | 0.128 |
| Zn | 0.117 | 0.083 | 0.165 | 0.157 | 0.11 |
| Rb | 0.11 | 0.117 | 0.109 | 0.107 | 0.108 |
| Cr | 0.092 | 0.144 | 0.118 | 0.081 | 0.141 |
| V | 0.063 | 0.066 | 0.063 | 0.065 | 0.077 |
| Br | 0.058 | - | 0.082 | 0.062 | 0.049 |
| Ni | - | 0.052 | - | - | 0.058 |
| Cu | 0.053 | 0.045 | 0.052 | 0.043 | 0.056 |
| Y | - | 0.016 | - | - | - |

## Conclusion

In this research work, some physicochemical properties of five kinds of composted organic fertilizers prepared by using organic wastes (cow dung, corn stalk and kokko leaves) have been studied. Before making composted organic fertilizers, some physicochemical properties of raw materials were characterized by conventional methods and modern instrumental techniques. According to the results, these raw materials contain macronutrients, micronutrients and trace elements necessary for plants and therefore were used in composting. Five kinds of composted organic fertilizers were prepared and some physicochemical properties of these different compost types were determined. The obtained results indicate that the pH value ranged from 7.61 to 7.75, moisture contents ranged from 7.478% to 15.838% and EC values ranged from 2.42 to 3.62 $dSm^{-1}$. The total organic carbon values ranged from 13.589 to 19.951%, the total organic matter contents ranged from 23.428 to 34.396% and the C/N ratio values ranged from 14.406:1 to 16.647:1. Macronutrients (primary and secondary nutrients), primary nutrients-total nitrogen values (0.840 to 1.260%), total phosphrous values (0.420 to 0.594%), total potassium values (0.960 to 1.488%) and secondary nutrients- calcium contents (146.8 to 154.4 ppm), magnesium contents (8.994 to 9.264 ppm) and sulphur contents (0.061 to 0.077%). The trace elements contents were iron (1.78 to 2.15%), manganese (4.475 to 10.300 ppm), copper (0.112 to 0.179 ppm) and zinc (0.761 to 2.069 ppm), respectively for different compost types. According to the experimental results, macronutrients, micronutrients, trace elements for plants and organic matter for good soil fertility were found in all composted organic fertilizers. Organic matter enhances root growth and nutrient uptake resulting in higher yields. Organic fertilizers add humus to the soil and this has the ability to hold positively charged ions (cations) and negatively charged ions (anions) make them available to the plants through the process of exchange capacity. Composted organic fertilizers provide plant nutrients, and improve soil biophysical properties, soil organic matter and crop yields (Naeem and Iqbal, 2006). Therefore, these composted organic fertilizers can be used to grow various kinds of crops in agriculture.

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