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Study of the Physico-Chemical Characteristics of Methacompost from a Poultry Company in Ivory Coast: Test for Growing Big Sun Chilli

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Abstract

The objective of this work was to determine the suitability of poultry methacompost from the 2nd methanizer of the BRIN FOUNDATION in Yaokokoroko (Bondoukou, Côte d'Ivoire), to be used in the improvement of soil fertility. The methacompost studied has a C/N ratio = 17.26, which could characterize a stable methacompost with high amending power. It also contains mineral elements Nitrogen (N) = 0.68% DM; Phosphorus (P) = 0.084% DM; Potassium (K) = 0.67% DM; Calcium (Ca) = 0.65% DM; Magnesium (Mg) = 0.15% DM. red in the standard relating to the organic amendments (NFU 44-051). The methacompost has fertilizing and amending properties and could not present any risk for vegetation and soils.

Keywords

Poultry Methacompost, Methanization Digestate, Trace Metal Elements (TME), Organic Amendment, Poultry Farm

1. Introduction

Today, large farms and agribusinesses are the primary producers of organic waste that has a high potential for methane production. In particular, animal production has been the object of strong criticism in recent years, both from the public and from environmentalists. Indeed, the odors emitted during the management of liquid manure, the contamination of groundwater by pathogens, the emission of greenhouse gases, etc. are denounced [1]. The use of anaerobic digestion has the potential to be used in many sectors that generate waste, particularly agricultural waste of animal origin. In this respect, animal waste is particularly interesting to use when it is produced in large and regular quantities [2] and especially when it is biologically treated (by methanization) before use [3]. Moreover, the agronomic use of methanization residues fits well with the current trend towards agrobiological practices, given the significant reduction in the pollutant load of dejecta after biological treatment [4]. Several studies have revealed that the restoration of the organic fraction of soils is essential for maintaining soil fertility and improving land productivity [5]. The high costs of mineral fertilizers, the low availability of organic matter and the need to compensate for mineral exports argue for the agricultural valorization of other available and low cost organic substrates through composting [6]. In such a context, the valorization of poultry methacompost in the improvement of the fertility of soils depleted in organic matter is necessary. In a dynamic of sustainability, the characterization of poultry methacompost is crucial for an optimal use of it as organic amendment in agriculture. It is in this perspective that the theme "Study of the physico-chemical characteristics of the methacompost of the poultry farm, FONDATION BRIN SARL" was the subject of the present study. Thus, the general objective of this work is to determine the suitability of poultry methacompost from the 2nd methanizer of the BRIN FOUNDATION in Yaokoko (Bondoukou, Côte d'Ivoire), to be used in the improvement of soil fertility. More specifically, it will be a question of characterizing the poultry methacompost and of evaluating its capacity in adequacy with the standard relating to the organic amendments (NF U44-051). The aim of this study was to determine the suitability of poultry methacompost from the methanization of the FONDATION BRIN farm at Yaokokoroko (Bondoukou, Côte d'Ivoire), for use in improving soil fertility, and also as a test for Big Sun chilli pepper cultivation. To achieve these objectives, laboratory analyses were carried out to determine the composition of this methacompost in terms of mineral elements (N, P, K, etc.) and trace metals such as lead, cadnium, etc.

2. Materials and Methods

2.1. Presentation of the Study Area

The Gontougo region is a decentralized community. It was created by Decree No. 2011-388 of 16 November 2011 on the organization of the national territory into districts and regions. It is located in the North-East of Côte d'Ivoire. The Gontougo region has the city of Bondoukou as its capital. The village of Yaokokoroko is part of the sub-prefecture of Tabagne. It is located in the North-East of Côte d'Ivoire and is between latitudes 8˚3'47.83'' North and longitudes 3˚4'59.76'' West.

2.2. Material

2.2.1. Biological Materials

The poultry methacompost "solid by-product", object of this study, is derived from the methanization of poultry biomass. The digester, producing this residue, was financed by the Fund for Science, Technology and Innovation (FONSTI) through the FONSTI-CRDI PROJECT N°3 for the production of biogas located in Yaokoroko, in the Gontougo region within the company FONDATION BRIN SARL for the heating of chicks.

Description and operating principle of the 2nd methanizer of the study:

The methanization technology adopted for the production of biogas and poultry methacompost in this study is the Indian system. This system uses the gobar type digester.

The Indian gobar digester has a continuous mode of operation without agitation and is usually buried in the ground to limit variations in its internal temperature. In these digesters, only the naturally produced biogas is used as a "micro-mix". The methanizer studied has a capacity of 20 m3, fed continuously by poultry droppings.

It is composed mainly of four (04) compartments (**Figure 1**), closed and unclosed tanks or pits. For the feeding ratio, three (03) ratios were chosen, namely 1/1, 1/2 and 1/3.

This translates into:

- 200 kg of poultry droppings for 200 L of water: ratio 1/1;
- 200 kg of poultry droppings for 400 L of water: ratio 1/2;
- 200 kg of poultry manure for 600 L of water: ratio 1/3.

Figure 1. Overview of the 2nd Methanizer of the BRIN FOUNDATION. 1: Methanizer; 2: Manual feeding tank; 3: Automatic feeding tank; 4: Expansion tank; 5: Retention tank for digestate (compost room); 6: Biogas filtration and purification system; 7: Temperature sensors (digester and digestate).

A dashboard which displays and allows to follow in real time the temperatures of the methanizer and the digestate of methanization. **Figure 1** shows the methanizer system.

Methacompost is a product resulting from the composting of digestate from the methanization of organic waste or other fermentable organic materials. The name methacompost is sometimes used to describe dehydrated or solid digestate.

Experimental material:

The duration of the experiment was 30 days. It started on September 12, 2022. The first week was dedicated to the study of the water and dry matter content of the poultry methacompost. This study was developed in the laboratory of the Institut National Polytechnique Félix Houphouet Boigny of Yamoussoukro.

Equipment:

To carry out our study several devices/laboratory instruments were used.

The equipment used in this study includes:

- An oven to dry the digestate samples and sterilize the glassware;
- An OHAUS electronic balance (three digits) for the different weighing of the studied samples;
- A Nabertherm muffle furnace for calcining the poultry methacompost;
- A magnetic stirrer was used to homogenize the different mixtures;
- An AnalytikaJena multiWin N/C 3100 TOC meter for the measurement of organic carbon (Corg) and total nitrogen (Ntot);
- A pH meter type HANNA HI 8424 to measure the pH of the different solutions;
- A digital camera to take pictures.

2.2.2. Data Processing Material

The software used in this study was Microsoft Office Excel 2019. Microsoft Office Excel 2019 was primarily used for data storage, manipulation, and graphing.

2.3. Methods

2.3.1. Daily Evolution of the pH of the Methanation Digestate

Over a 30-day period we sampled and determined the pH of the methanation digestate *in situ* daily using a pH meter. This consisted of monitoring the daily evolution of the pH of the methanation digestate.

2.3.2. Daily Evolution of the Temperature of the Methanisation Digestate

Over a period of 30 days we sampled and determined the temperature of the digestate *in situ* with a thermometer. The purpose of this process was to follow the daily evolution of the temperature of the methanation digestate.

Determination of Water Content (%H)

Water content (% H) was determined according to the method reported by Kouadio (2019) [7]. The sample of initial mass $m0$ was dried in the oven at a temperature of 105˚C for 24 h, at its exit from the oven, its new mass is $m1$. The calculation of the water content is done according to the relation:

$$\%\text{H} = \frac{m0 - m1}{m0} \times 100 \quad (1)$$

With

%H: the water content,

$m0$: the initial mass of the sample before drying (in g),

$m1$: the mass of the sample after drying (in g).

The sample was weighed using a balance to determine the initial mass before drying as well as the mass after drying in order to apply the formula in Equation (1).

Using an OHAUS electronic balance, the mass measurements necessary for the different manipulations were carried out.

2.3.3. Determination of Dry Matter Content

The dry matter content (DM) is the complementary rate of the moisture content. It is thus to determine the degree or moisture content which is none other than the percentage of water in the material under consideration using oven drying [8]. The determination of the Dry Matter (DM) content is made from the percentage of water content. The calculation of the Dry Matter content is done according to the relationship:

$$\%\text{MS} = 100 - \%\text{H} \quad (2)$$

With:

%DM: dry matter content,

%M: water content.

2.3.4. Determination of the Hydrogen Potential (pH)

The method used to determine the hydrogen potential (pH) of poultry methacompost is that reported by literature [9]. The pH is measured after putting 20 g of the sample in solution, in 100 ml of distilled water. The method used is to prepare a suspension of the dried diluted substrate in 5 times its volume of water (1:5), leave it in agitation for 5 min, then let it stand for at least two hours. The pH reading is done with a pH meter.

2.3.5. Determination of Organic Carbon (Corg)

The method reported by Rakotomalala, (2015) was adopted for the determination of Organic Carbon [10]. A stock solution was prepared by adding 5 g of methacompost in 50 mL of distilled water. This solution was stirred at constant speed for 5 min using a magnetic stirrer. The supernatant was collected after 30 min of rest. From this supernatant was prepared daughter solutions (C = 5 g/L). These daughter solutions were used for the measurement of Organic Carbon in the TOC-meter.

2.3.6. Determination of Mineral Element Content (N, P, K, Ca, Mg)

The determination of mineral element content (N, P, K, Ca, Mg) was determined according to the method reported by M'Sadak and M'Barek (2015).

- **Nitrogen**

Nitrogen (N) was determined by the method of KJELDAHL.

- **Potassium**

Excess potassium (K) can interfere with calcium and magnesium absorption.

Indeed, there is an antagonism between calcium and potassium. Its content is determined by the flame spectrophotometric method.

- **Calcium**

Calcium (Ca) stimulates transpiration and promotes the growth of young roots.

The higher the Ca content of a substrate, the more intact the root system is. Its content is determined by the flame spectrophotometric method.

- **Phosphorus**

The total phosphorus (P) content in compost varies, in general, from 0.7 to 0.9 of the mass of the DM, of which 50% to 60% is assimilable. The determination of P is done by atomic absorption spectrometry.

2.3.7. Determination of Organic Matter Content

The organic matter content is obtained as a function of the percentage of organic carbon [11]. It is expressed in relation to the dry matter. The calculation method is characterized by the following formula:

$$\text{Organic matter}(\%\text{DM}) = \text{Organic carbon}(\%\text{DM}) \times 1.72 \quad (3)$$

The organic matter content is one of the criteria used in the evaluation of the amending power of an organic product; for a methanization digestate, it varies widely between 40% and 85% in relation to the dry matter depending on the nature of the waste [12].

2.3.8. Determination of the C/N Ratio

The C/N ratio is obtained by calculation. This calculation method is represented by the ratio of Organic Carbon (% DM) to Nitrogen (% DM). The result of the calculation is considered as a constant value without unit. Similarly, the concentration of dissolved organic carbon and the corresponding C/N ratio are considered as indicators of the biodegradability of organic matter in methanation digestates [13]. The C/N ratio remains the most significant parameter of mineralization kinetics. In particular, it affects the availability of nitrogen. Organic matter, under the action of microorganisms, decomposes to give humus. More than 50% of organic matter is made up of carbon C, which is used by microorganisms. Microorganisms use 1 kg of nitrogen for every 30 kg of carbon [14].

2.4. Determination of the Contents of Metallic Trace Elements (TME)

In parallel to the characterization (determination of physicochemical parameters) of the poultry methacompost, the content of metallic trace elements (As, Zn, Cu, Ni, Pb, Hg, Cd, Se, Cr) was sought by the ICP (Inductively Coupled Plasma) method. In order to determine the content of these trace metals, the samples taken were analyzed by the ICP method at the laboratory of the Institut National Polytechnique Félix Houphouët Boigny (INP-HB) in Yamoussoukro.

3. Results and Discussion

The value of poultry methacompost can vary depending on the use that will be made and the effect that is sought by the user [15]. Only agronomic use as an organic amendment is considered in this study.

3.1. Daily Evolution of the pH of the Methanation Digestate

Figure 2 presents the data of the Hydrogen potential (pH) of the digestate obtained *in situ* over a period of 30 days.

From Figure 2, it is possible to appreciate the daily evolution of the hydrogen potential (pH) of the methanation digestate. The pH values of the methanation digestate vary between 7.25 and 7.82, giving an average pH of 7.56. This means that the digestate from the laying hen droppings is characterized by a pH close to neutral. This pH value of the digestate is related to the evolution of the reaction medium during the digestion process [16]. Our results are close to those found by Soré (2018) who states that the pH of composts from Solid Household Waste (SHW) is 7.85 ± 0.01 [17].

3.2. Daily Evolution of the Temperature of the Methanization Digestate

Figure 3 shows the temperature data of the digestate obtained *in situ* over a period of 30 days.

From Figure 3, it is possible to appreciate the daily evolution of the digestate temperature obtained over a period of 30 days. The temperature of the digestate varies between 28˚ and 29.5˚, which indicates a good digestion of the organic matter by the micro-organisms. Figure 3 shows the daily evolution of the temperature of the methanation digestate.

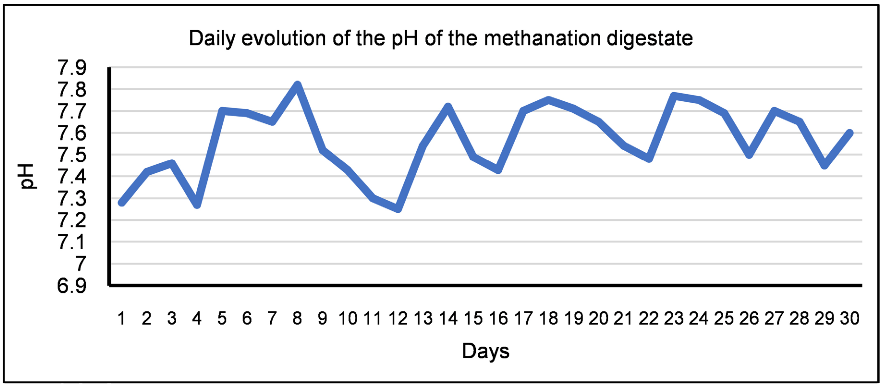

Figure 2. Daily evolution of the pH of the methanation digestate.

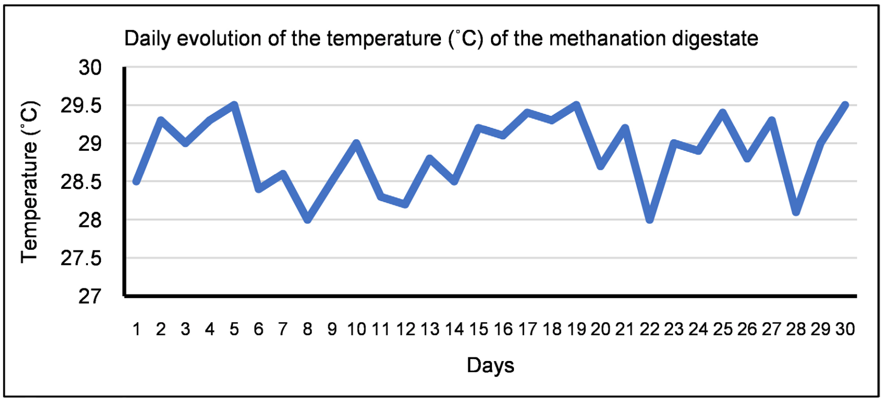

Figure 3. Daily evolution of the temperature (˚C) of the methanation digestate.

3.3. Characterization of the Poultry Methacompost

3.3.1. Water Content and Dry Matter

The water content of the poultry digestate (solid digestate/dehydrated digestate) is found to be 60% of the raw material. The dry matter content is calculated to be 40% of the raw material. This means that the poultry methacompost is characterized by more water than dry matter. It is suggested that this water availability was the result of the addition of water during the anaerobic digestion process. For water and dry matter contents, the results of the study are close to the results found by Rakotomalala (2015) with a water content for the solid digestate (methacompost) poultry found to be 57.90% compared to the raw material. And a dry matter content calculated at 42.10% in relation to the raw material.

3.3.2. Organic Matter Content

The result of the calculation on the organic matter content of the poultry methacompost showed a value of 20.19% DM. This means that the poultry methacompost from the methanization of laying hen droppings is characterized by ash, *i.e.* by mineral matter. This result is caused by the fact that organic materials are used by the anaerobic digestion processes, *i.e.* by the microorganisms. During the anaerobic digestion process and during the study, there is a significant reduction of the organic matter content. The anaerobic digestion (methanization) causes a significant reduction in the rate of OM, which is about 20.19%. The degradation of OM in poultry droppings during anaerobic digestion explains this result. A too high degree of degradation of poultry droppings, resulting from a longer digestion time, may decrease the organic value of the poultry methacompost produced. This result is in accordance with the ADEME (2006) which confirms that the digestate produced is poor in organic matter [18].

The result of the study is very close to that found by Soré (2018) who shows that the Organic Matter content (%OM) is 25.62 ± 2.59 for Dehydrated Faecal Sludge (DFS).

3.3.3. Hydrogen Potential (pH)

The hydrogen potential (pH) of poultry methacompost is evaluated at 7.45. This means that the poultry methacompost resulting from the methanization of the droppings of laying hens is characterized by a pH close to neutrality. This pH value of the poultry methacompost is related to the evolution of the reaction medium during the methanization. For the study, the poultry methacompost has a pH = 7.45. This result confirms the idea of Meres (2005) on the digestates which are characterized by a pH close to neutrality [19]. This result of the study is also close to the result quoted by FAO (1994) with a digestate characterized by an average pH of 7.40 ± 0.21 (n = 15) resulting from the methanization of slaughterhouse waste. Nevertheless, this pH value is also the final consequence of the pH evolution during the methanization process. The pH value of a mature compost is normally between 7 and 8 [20], or even between 7 and 9 [21]. Acidic pH values characterize unstable and therefore immature composts, while mature composts are characterized by pH values between 7 and 9 [22]. The pH varies during the composting process and stabilizes at neutrality in many cases at the end of the process. pH is not an accurate measure of compost maturity. Therefore, a low pH may indicate poor aeration rather than a specific stage in the process. But, according to Albrecht (2007), pH was one of the first indicators of compost maturity [23]. For the study, poultry methacompost, having a pH equal to 7.45, can thus be considered a relatively mature substrate.

The results of the study are close to the results found by Rakotomalala (2015) with the pH of the solid digestate evaluated at 7.65.

3.3.4. Mineral Elements (N, P, K, Ca, Mg)

The content of mineral elements (N, P, K, Ca, Mg) in poultry methacompost is shown by **Table 1**.

For poultry methacompost, the content of N, P, K, Ca and Mg is shown in **Table 1**. It is found that Nitrogen (N) content of 0.68% DM predominates. These results showed the existence and composition of N, P, K, Ca and Mg in poultry methacompost from the methanization of laying hen droppings.

The content of Nitrogen (N) is caused by the fact that the nitrogen is transformed in ammoniacal form and it is found in the liquid fraction of the digestate of methanization (process juice). The other elements are influenced by the

Table 1. Mineral content of poultry methacompost.

Mineral elements	Content in % DM
Nitrogen (N)	0.68
Phosphorus (P)	0.084
Potassium(K)	0.67
Calcium (Ca)	0.65
Magnesium (Mg)	0.15

mineral requirements of the microorganisms during the digestion process. Calcium (Ca) makes the environment favorable to soil microorganisms, agents of OM decomposition, humification, mineralization and symbiotic fixation. The poultry methacompost produced has a Ca content of about 0.65% DM.

The result of the study about the Nitrogen content (0.68% DM) is consistent with that of M'Sadak and M'Barek (2015) whose results show that the Nitrogen (N) contents in compost, generally vary from 0.6% to 1.3% of the Dry Matter (DM) mass and of which 5% to 20% are directly assimilable. The result of the study about Potassium content (0.67% DM) is consistent with that of Soré (2018) whose results showed that the Potassium (K) content in compost based on Dewatered Faecal Sludge (DFS) was 0.74 ± 0.03. Our results corroborate with those found by Soré (2018) who argued that the Magnesium (Mg) content in the compost based on Dewatered Faecal Sludge (DFS) was 0.16 ± 0.02. For N, P and K content, the results of the study are close to half of the results found by FAO (1994) with a digestate containing 1.60% DM in Nitrogen, 1.40% DM in Phosphorus and 1.20% DM in Potassium.

The overall richness in mineral elements of poultry methacompost could be a good indicator for its valorization as an organic amendment.

3.3.5. C/N Ratio

The analysis result on the carbon and nitrogen content gives the value of the ratio Carbon and Nitrogen of the solid digestate or methacompost (C/N):

$$-C = 11.74\%\ DM \text{ and, } -N = 0.68\%\ DM \text{ then } -C/N = 17.26$$

The C/N ratio of the poultry manure is calculated to be C/N = 17.26. This means that the poultry methacompost is dominated by about 18 times more organic carbon than nitrogen. This result is related to the fact that poultry methacompost has a low amount of nitrogen compared to organic carbon. The analysis of the poultry methacompost shows a C/N ratio = 17.26 against C/N = 9.04 for the substrate. According to Charnay (2005), it is confirmed that when the C/N ratio of the compost is high, *i.e.* between 15 and 20, the organic matter will evolve slowly in the soil and the release of minerals will be low [24]. On the other hand, the compost will give durable substrates that will contribute to the reinforcement of the soil structure. This result (C/N = 17.26), which is close to 18, is in agreement with that of Chanay (2005), who states that a high C/N ratio of between 15 and 20 characterizes a stable compost with high amending power. Thus the need for nitrogen covered to allow a good decomposition of the carbonaceous matter: active microorganisms, good decomposition of the Organic Matter. The result of the study is similar to Wong et al (2001) who found that a C/N ratio value around or below 20 is satisfactory. Our results also corroborate with those of Soré (2018) who argued moreover that the C/N ratio for Dewatered Faecal Sludge (DFS) is at 18.99 ± 8.12. However, our results differ from those obtained by Haug (1993) whose results from this work showed that a C/N ratio between 25 and 35 allows for optimal composting.

3.3.6. Trace Metal Content (TME)

Within the framework of the standard relating to the organic amendments (NFU 44-051), nine (9) metallic trace elements (ETM) are sought: Arsenic (As), Cadmium (Cd), Chromium (Cr), Mercury (Hg), Nickel (Ni), Lead (Pb), Selenium (Se), Zinc (Zn) and Copper (Cu).

The results obtained for the trace metal element (TME) content of the poultry methacompost are contained in Table 2.

The results obtained from the contents of metallic trace elements show that the poultry methacompost is free of Lead and Selenium. Thus, the presence of some metallic trace elements (As, Zn, Cu, Ni, Hg, Cd, Cr) in the poultry methacompost could be justified by the use of certain quantities of veterinary products rich in these elements in poultry farms.

Table 3 presents the values of the results obtained from the studied poultry methacompost and the limit values fixed in the standard relating to the organic amendments (NF U44-051).

It is true that the results of the values obtained attest that the studied poultry methacompost contains some metallic trace elements such as (As, Zn, Cu, Ni, Hg, Cd, Cr) but in the order of ten power minus three (10-3). This shows that the values obtained in metallic trace elements (TME) of the studied poultry methacompost is much less than the one fixed in the standard relating to the organic amendments (NFU 44-051). Thus, the use of the studied poultry methacompost as organic amendment does not present any risk for the vegetation and the soils. On the contrary, poultry methacompost is suitable for use in improving the fertility of soils depleted in organic matter.

The results obtained during our work, revealed the presence of seven essential metallic trace elements at levels generally much lower than the limit values defined by the standard relating to organic amendments (NFU 44-051).

Table 2. Trace metal contents (TME) of the studied methacompost.

Trace metals	Content in mg/kg MS
Arsenic (As)	16.139×10^{-3}
Cadmium (Cd)	26.562×10^{-3}
Chromium (Cr)	105.052×10^{-3}
Mercury (Hg)	107.749×10^{-3}
Nickel (Ni)	58.623×10^{-3}
Lead (Pb)	0.00
Selenium (Se)	0.00
Copper (Cu)	$1.020.\ 611 \times 10^{-3}$
Zinc (Zn)	184.448×10^{-3}

Table 3. Results of poultry methacompost studied and limit values according to standard NF U44-051 [25].

Trace metals (TMEs)	Values obtained from poultry methacompost in TME (mg/kg MS)	Limit values in TME (mg/kg MS) according to the NF U44-051 standard
Arsenic (As)	16.139×10^{-3}	18
Cadmium (Cd)	26.562×10^{-3}	3
Chromium (Cr)	105.052×10^{-3}	120
Mercure (Hg)	107.749×10^{-3}	2
Nickel (Ni)	58.623×10^{-3}	60
Lead (Pb)	0.00	180
Selenium (Se)	0.00	12
Copper (Cu)	1020.611×10^{-3}	300
Zinc (Zn)	184.448×10^{-3}	600

4. Test Cultivation of Big Sun Peppers with Methacompost

The big sun pepper, commonly known in Ivorian parlance as the "sense bon" pepper, is highly prized in Côte d'Ivoire. In Côte d'Ivoire cuisine, it is eaten fresh or dried for its pungent taste, which contains antioxidants that are useful for fighting free radicals that cause cardiovascular disease, certain cancers and other age-related illnesses. It is also rich in nutrients including vitamin C, iron, manganese, copper, vitamin B6 and vitamin K. This pepper therefore offers a great business opportunity for any agricultural entrepreneur.

The bigsun harvest begins 90 days after transplanting. At the end of a 220-day growing cycle, the farmer will have produced an average of 10 tonnes of chilli, or 10.000 kg of bigsun chilli per hectare. It's a highly profitable product that should be encouraged.

As a logical extension of our study, we used methacompost to test big sun in order to determine its effectiveness as a fertilizer.

Figures 4-8 show respectively big sun chilli seedlings with methacompost in the cells, the start of seed development, big sun chilli development, big sun chilli fruit and big sun chilli harvest.

The results observed from this test using methacompost at nursery level lasted only 30 days instead of the 45 days planned. Also, by observing the different evolutions after transplanting, the leaves are green and the plants are growing faster than expected. In addition, the flowers and fruits of big sun chillies appeared after 70 days, instead of the usual 90 days.

Figure 4. Seeding with methacompost in the trays.

Figure 5. Beginning of seed evolution.

Figure 6. Evolution of big sun pepper.

Figure 7. Big sun pepper fruits.

Figure 8. Big sun chilli harvest.

5. Conclusion

This study enabled us to characterize poultry methacompost, which represents the solid fraction of digestate from the methanization of poultry droppings. The results obtained showed that the methacompost is characterized by a water content of 60%, a dry matter content of 40%, of which 20.19% MS is Organic Matter with a C/N ratio = 17.26. This result characterizes a stable poultry methacompost with high amending power and fertilizing properties that would not present a risk for vegetation and soils. Furthermore, it contains no lead or selenium, but certain TMEs (As, Zn, Cu, Ni, Hg, Cd, Cr) in very low concentrations (in mg/kg DM). The values obtained for each MTE were compared with those required by the standard for organic soil improvers (NFU 44-051) in mg/kg DM. The MTE values obtained for the poultry methacompost studied are well below those required in the standard for organic soil improvers (NFU 44-051). The big sun pepper cultivation trial carried out with poultry methacompost was very successful, with a relatively shorter cultivation time than with chemical fertilizers. Trials with maize, one of the main poultry feedstuffs in the study area, are planned.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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