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Original Research Paper

Characterization and Valuation of the Domestic Solid Waste of Fidjrosse District in Cotonou (Republic of Benin) by Aerobic Composting

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ABSTRACT

This work proceeded in Fidjrossè district in Cotonou from November 2009 to December 2010. It consisted with a field investigation, with the characterization of the urban solid waste collected in this district, with valorisation by aerobic composting of the fermentable fraction of the waste. From work of investigation it arises that 25 % of households continue to throw their faeces on wild dumps while 13.33 % continue to make the incineration. 81. 67% of the surveyed households have a daily production of waste lower than 1 kg. The characterization of collected waste records in mass 50.19% of biodegradable matters; fine sand 32.18%; 0.63% of shells, carapaces of crabs and pearls; 0.13% of engraved and pieces of brick; 8.31% of plastics; 4% of paperboard; 1.58% of metal; 1.11% of textile and debris of mattress; 1.01% of glasses; 0.79 of shoes and leathers; 0.7% of used batteries; 75% of moisture for the fermentable fraction. On the whole, 262kg of fermentable waste was composted with an output of 65, 67% which is approximately 172kg of ripe compost. The physico-chemical characteristics of the compost obtained give inter alia values a report of ratio C/N of 11.69% and one rate of total phosphorus 0.062%. The real-mould of our compost has a heavy CEC and holds the nutritive mineral ions as the cations K^+ and Ca^{2+} and phosphate so as to make available for plants for their growth and to improve the soil fertility of the site as well as its increased need for organic soil conditioner.

INTRODUCTION

The continuous extension of the African cities towards the domestic solid waste raises more and more acute issues of management to be solved and remains irreconcilable with the improvement of the hygiene and the environment protection (Ndunbe et al. 1995).

In these cities and in the economic capital of Benin, 40 % of wastes are collected and evacuated by approved structures (D.S.T./city hall of Cotonou 2007) and this is done without any processing. The surplus that is not evacuated, estimated at 60% per day, affects the quality of life of Cotonou. The proof is the presence of big heap of filth in the middle of the city in vacant spaces, in swamps and on secondary streets causing aesthetic pollution, proliferation of disease vectors and atmospheric pollution due to the nauseating emanations and the emission of greenhouse gases. Cotonou is faced with this situation because it is lacking appropriate sites of transfer which can serve as transitory discharges of the urban solid waste. This triggers difficulties of layout and environmental pollution.

The increasing unemployment urged a fringe of the Cotonou population to develop an outer-urban agriculture, using important quantities of synthetic agricultural inputs (artificial, pesticidal fertilizers) on a sandy soil. This was not done without harmful consequence on the chemical quality of surface waters and groundwater. Facing this situation of quasi-generalized insalubrity, coupled with the development of an outer-urban agriculture at risk for ponds and subterranean waters, it is important to find a mechanism allowing at the same time to effectively face the purification of the city of Cotonou and the problem of chemical contamination of water resources. Thus, the valuation of the domestic solid waste by composting seems to be one of the possible solutions from which "Characterization and valuation of domestic solid waste of Fidjrosse district in Cotonou by aerobic composting" is essential and timely. The compost obtained constitutes a complement and/or a substitute for imported artificial fertilizers whose use on poor soils in organic matters as those of Cotonou accelerates their runoff towards subterranean and/or of surface waters (Soclo et al. 1999).

MATERIALS AND METHODS

Fidjrosse lies between 6°21' and 6°23' North latitude and 2°22' and 2°24' East longitude. Fig. 1 depicts the study area.

The methodology used consisted of on-site works (surveys and interviews, pre-collection operations of household waste, sorting, composting of fermentable fraction of household waste) and laboratory physico-chemical analyses in order to determine the agronomic fertilizing quality of the finite compost.

On-site Works

Before undertaking the practical stage of the research, an investigation guided by means of questionnaire of survey was carried out on a sample of 60 households among which 30 were randomly identified respectively at Fidjrosse Centre and 30 at Fidjrosse-Kpota. At the same time the investigation concerned 60 truck farmers and compost producers of Houeyiho, Sheraton and Fidjrosse at the rate of 20 truck farmers and/or producers of compost involved by site. The aim of this investigation was to collect information on:

- The way of managing the garbage in households
- The way of processing the household refuse
- The sorting of household waste by truck farmers and/or compost producers
- The management and practice of composting at their level
- The possibilities of use of the produced compost in truck farming

Technique of pre-collection: At this level the approach consisted of adding 30 households of modest standard of living from two small districts (Fidjrosse Centre and Fidjrosse-Kpota) to the households regularly subscribed to pre-collection structures at the rate of 15 households per small district. This approach finds its justification in the fact that we supposed that the households subscribed to NGO pre-collection structures have a relatively high standard of living and this fact risks to bias our results if we wanted to characterize exclusively waste stemming from the NGOs' collection. Thus, a pre-collection of 30 households parallel to the one carried out by the NGOs was organized from November 11th till December 23rd, 2009. It was operated door-to-door. Waste was collected in half-barrels previously handed to the chosen households preceded by a campaign of raising awareness. All the household waste daily collected in the district was converged by cart on a transitory discharge site identified for the occasion. The site was located in the neighbourhood of rails near a sandbank at Fidjrosse. Its surface was about 100 m^2. It was a basic environment whose soil is grey close to the hydromorphs soils. On this site waste was mixed in order to be characterized and the fermentable fraction to be composted.

Waste separation/characterization: 522kg of household waste pre-collected after mixture was immediately weighed and sorted out freehand in eleven categories respectively: 1. biodegradable matters consisting mainly of kitchen waste (peels of fruits, vegetables, leftovers) and of plant waste (dead leaves, boughs, flowers and wooden fragment); 2. fine mineral materials consisting mainly in fine sand and ashes; 3. plastics (especially by-products of oil such as: bags, shopping bags, old utensils, toys and rubber); 4. papers and cardboards; 5. metallic materials (cans and forge rests); 6. textiles and mattresses debris; 7. glass (pieces of broken glass and glass bottles); 8. shoes and/or leather pieces; 9. shells and pearls; 10. gravel and pieces of bricks; 11. used batteries. Every fraction was then weighed and the percentage of the various components was calculated.

Composting: The adopted technique was of aerobic composting from January 06th to March 25th, 2010. It consisted in preparing the compost body with branches of palm tree before its putting on swath. The 262 kg of biodegradable materials which constitute the fermentable organic matters of household waste were used to make two rectangular swaths of 5m × 2m × 1m size. Both swaths were spaced out of 10 m. The temperature and humidity values were regularly recorded.

During this stage, the measurement was carried out every ten days by means of a portable thermometer. In case of decline in temperature, swaths were returned to allow the aeration of the latter and boost the microbial activity. Every reversal was followed by a controlled watering. The reversal allowed the complete admixture of the compost and its homogeneous evolution. At the end of approximately 3 months the compost reached maturity. It was stored in heap and covered in a corner where the maturation still continued during two weeks and more. After this period it was put in a bag and preserved. Sample was collected for the physico-chemical analyses and agronomic tests.

Laboratory physico-chemical analyses: The physico-chemical analyses were carried out respectively in the Laboratory of Applied Hydrogeology of the Faculty of Sciences and Technology (FAST) and in the Laboratory of the Earth, Water and Environment Sciences (LEWES) of the INRAB. These analyses consisted in determining:

***The pH (water)*:** In this case 20g of compost was mixed with 50mL of deionized water. After 20 minutes of vigorous shaking the mixture was set aside for 30 minutes to settle and the pH was measured by means of a pH meter HANNA HI 8014 make.

***pH (KCl)*:** The experimental approach was the same as the previous one with the only difference that the distilled water was replaced by a solution of 1M KCl. The interest of this measure is that it allowed the estimation of the contribution of the argilo humique complex in the acidity of the soil solution. This was due to the fact that KCl released ions

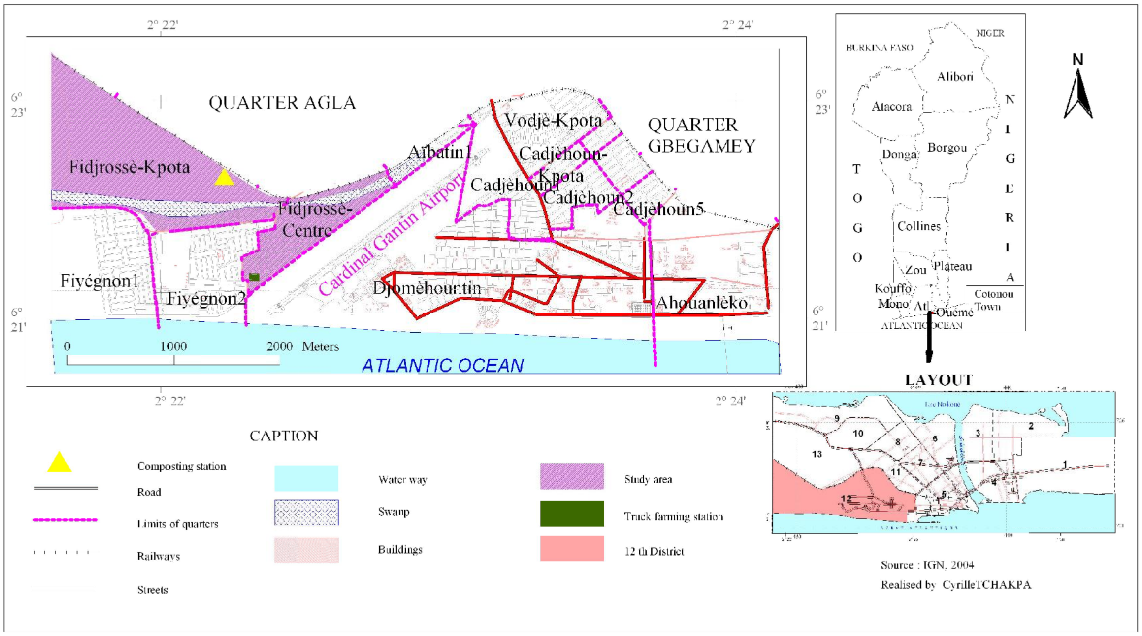

Fig. 1: Map of the study area.

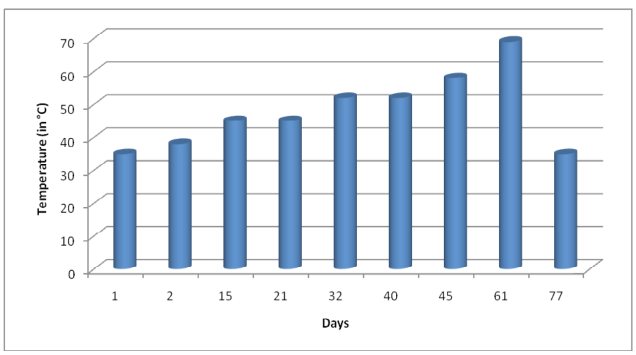

Fig. 2: Temperature variations during composting according to days.

Fig. 3: The finite compost made at Fidjrosse.

H^+ from the argilo humique complex which are added to those free in the suspension. So the pH (KCl 1M) was lower than the pH (water) from 0.5 to 1 unit average.

***Dried matter (DM), organic matter (OM), and mineral matter (MM)*:** They were determined in laboratory with the help of an oven and a microscale. The determination of the dry matter was made by dehydration at 105°C in an oven for 48 hours. The percentage of the dry matter was given by the following formula:

$$\text{DM (\%)} = \frac{\text{Weight of the dried sample} \times 100}{\text{Weight of the wet sample}}$$

Hence, the moisture was calculated by: moisture (%) = 100-(DM %). The mineral matter (MM) was determined by mineralizing at 625°C. The ash resulted was weighed and corresponded to MM mass of the treated sample. Thus, the mineral matter (MM %) was given by: MM (%) = mass of the ash resulted × 100/weight of the wet sample. The organic matter OM (%) was given by: (MS-MM) × 100/weight of the wet sample.

***Total organic carbon*:** Total organic carbon was determined by the method of Walkley & Black (1934). The oxidation took place in cold conditions, but it was incomplete. The proportion of oxidized carbon varied from 60 to 86%, with an average of 76 % which was used as correction factor 100/76 = 1.32.

***Total phosphorus*:** Total phosphorus was determined by

Table 1: Results of investigation from the households. Source: On-site works, November, 2009.

Survey	Answers			Percentage
Do you have a trash can for your garbage?	Yes: 58			96.67%
	Non~No: 2			3.33%
Have you subscribed to a pre-collection structure?	Subscribed to a collection structure÷ 37			61.67%
Where do you throw your garbage?				
Do you bury them? Or do you cremate them?	Dispose on vacant dumping grounds : 15			25%
	Burying÷ 00			00%
	Burning÷ 8			13.33%
What is the amount of household waste that you produce per day?	≤ 1kg÷ 49			81.67%
	Between 1kg et 2kg÷ 9			15%
	> 2kg÷ 2			3.33%
Do you know the fate of your garbage after you get rid of it?	Yes: 10			16.67%
Do you think that you can manage your waste differently?	No÷ 50			83.33%
In other words, can your waste be subjected to a sustainable and effective processing manner?	Yes: 53	An answer : 36	60%	88.33%
		No answer÷ 17	28.33%	
Valuation through composting?	No÷ 7	An answer÷ 6	10%	11.67%
		No answer÷ 1	1.67%	

Table 2: Results of investigation at the level of truck farmers and producers of compost.

Questions	Number of persons answers / type of answer		Percentage
Are you truck farmers and/or producers of compost?	Truck farmers: 24		40%
	exclusive manufacturers of compost: 5		8.7%
	Both: 31		51.67%
What method of composting do you use?	Aerobic Composting: 30		100%
	anaerobic Composting		0%
How you obtain the raw material	From pre-collection structures: 00		0%
	In markets, hotels and households		100%
Do you sort out waste before composting?	Yes: 30	From the source: 30	100%
		On-site: 00	0%
	No: 00		0%
Average volume of organic waste composted by cycle	≤ 21m^3: 18		60%
	Ranging between 21 and 25m^3: 12		40,%
	> 25m^3: 00		0%
Average volume of finite compost obtained per cycle	≤ 2000kg: 18		60%
	Ranging between 2000 and 2500kg: 12		40%
	> 2500kg: 1		0%
Duration of the composting per cycle	≤ 3 months: 30		100%
	Between 3-6 months: 00		0%
	> 6mois: 00		0%
What is the fate of your compost?	Use in the truck farming : 15		50%
	~For sale: 15		50%
What fertilizers do you use in your professional activities?			
synthetic fertilizers, compost	Only synthetic fertilizers: 00		0%
	synthetic fertilizers + (bird) droppings 11		36,67%
	only Compost 6		20%
	synthetic fertilizers + compost 13		43.33%

Source: On-site works, December, 2009

mineralization of the sample in the presence of potassium sulphate in concentrated sulphuric acid medium at 120°C for 2 hours where phosphate ions were generated. The latter were measured by spectrophotometry using ammonium molybdate.

***Total Kjeldahl nitrogen*:** Nitrogen of the organic matter was transformed in ammoniacal nitrogen while boiling under the effect of sulphuric acid (oxidizer) in presence of copper sulphate, selenium and potassium sulphate. Nitrogen is transformed into ammonium sulphate. The formed ammonium was released and collected in a boric acid solution, which was later titrated.

Table 3: Results of the characterization of household waste from Fidjrossè.

Periods	Quantities (kg)										
	Biodeg radable materials	Fine materials	plasti-ques	Paper, cardboards	Metals	Textile, rags	Glass	Shoes, leather	Bones ans shells	Gravel, pieces of brick	Batte-ries	Total
1st week	56.2	36	9.2	3.8	1.3	1.1	1.0	0.7	0.4	0.3	0.0	110
2nd week	68.9	44.2	10.8	6.6	2.9	1.5	1.6	1.1	1.2	0.0	0.2	139
3rd week	60.5	38.7	10	4	0.7	1.2	1.1	0.9	0.6	0.2	0.1	118
4th week	76	49	13.4	7.1	3.1	2	1.6	1.3	1.1	0.3	0.1	155
Total	261.9	167.9	43.4	20.5	8.0	5.8	5.3	4.1	3.3	0.7	0.4	522
(%)	50.19	32.18	8.31	4	1.58	1.11	1.01	0.79	0.63	0.13	0.7	100

Source: On-site works, February, 2010

Potassium and sodium: Potassium and sodium were analysed by flame photometric method.

RESULTS

Results of Investigation Concerning the Households

Table 1 shows the results recorded from the households. The data reveal that 96.67 % of the investigated households owned trash cans and 61.67% had subscribed to the pre-collection structures. This denotes the importance granted by the population to the purification of the living environment owing to the multiple efforts of raising awareness done by NGOs and the local authorities. In spite of the multiple bans and repressive measures taken by both of Ministries of Health and of Environment, 25% of the households continued to throw their garbage on wild garbage dumps, whereas 13.33 % continued to incinerate them. Although this behaviour denotes a common lack of civic sense, it seems to relate to the poverty of those who practise it, people whose income does not allow them yet to subscribe to a pre-collection structure. Actually the burying of garbage during night is not done any more. Most of the people inquired knew by now the fate of their waste after having got rid of it. 81.67 % of the investigated households had a daily production of about 1kg of household waste while 15 % produced an amount of waste ranging between 1kg and 2 kg. These households were generally of a high standard of living. The rest of the people investigated (3.33%) generated a daily amount of waste higher than 2 kg.

In its great majority this fringe of our sample was made up of sellers of perishable foodstuffs (fruits and vegetables) whose waste results from their commercial activities enlarged their household waste. 88.33% of households thought that they could manage their waste differently and suggested reinforcement of their knowledge, but as for the question to know how, 60% proposed the method of composting.

Results of Investigation Concerning Truck Farmers and the Producers of Compost from Houeyiho

The results of investigations on truck farmers are given in Table 2. Forty percent (40 %) of the interviewed people were truck farmers; 8.33 % produced compost and were exclusively made up of pre-collection structures. 51.67 % were truck farmers and producers of compost who manufacture and use the compost for truck farming. The latter admitted manufacturing the compost from raw materials received from markets, hotels and pre-collection structures of urban waste. Hundred percent (100%) of manufacturers of compost use biodegradable materials pre-sorted at the source. They all asserted making the aerobic composting in three months maximum. The average amount of composted waste per cycle was lower or equal to 21m^3 for 60% of the manufacturers.

This proportion of manufacturers asserted producing an average amount of compost lower or equal to 2000 kg per cycle of composting; 50% of the manufacturers of compost admitted partially or half selling the compost produced by the outer-urban farmers. For all the questioned truck farmers, synthetic fertilizers always came in complement to organic fertilizers. 36.67% of them used synthetic fertilizers with droppings. They had never used the compost and wished to try it while 43.33% used synthetic fertilizers with compost. Only 20 % truck farmers used exclusively compost for the production of fruits and vegetables.

Out of the aforementioned analysis, it can be noticed that Fidjrosse district, which is one of the suburbs of Cotonou, met with notorious improvements in the field of purification of the living environment, still additional efforts remain to be made. Contrary to the current habits in Cotonou, in the past the pre-collected urban wastes were simply disposed in slums, but here the wastes are partially valued through composting. It is also one of the districts where the outer-urban farming is developing by using at the same time

Table 4: Results of the physico-chemical analyses of the compost according to house wastes.

Parameters		Unit	Norm	Method
Dry matter		%		58
Moisture		%		42
Mineral matter		%		88.92
Organic matter		%	15 -20	11.08
Total organic carbon		%		6,43
Total nitrogen		%		0.55
C/N		-	10-15	11.69
Total phosphorus		%		0.062
Nitrate		%		0.35
water pH		-		6.72
KCl pH		-		6.11
Sodium	Exchangeable base	mEq/100gMS		1.82
Potassium	Exchangeable base	mEq/100g MS		8.22
Calcium	Exchangeable base	mEq/100g MS		16.31
Magnesium	Exchangeable base	mEq/100g MS		19.22
Total exchangeable bases		mEq/100g MS		45.57
CEC (Cation Exchange Capacity)		mEq/100g MS		66.33
>2000µm (Non degradable matter)	Granulometry	%		29.8
2000-200 µm /(coarse sand)	(Size grading)	%		67.1
200-50µm (fine sand)		%		2.94
50-20 µm (coarse silt)		%		0.568
20-2 µm (Fine silt)		%		0.105
2-0 µm (Clay)		%		0,.7
Texture		Coarse		

Source: Analyses at Applied Laboratory of Faculty of Sciences and Technology, at LSSEE of INRAB, November and December 2010

compost with artificial fertilizers and droppings from poultry.

Pre-Collection and Waste Separation

The pre-collection of garbage, carried out within the households, allowed us to make a waste separation on a site identified at Fidjrosse.

Table 3 presents the results stemming from the separation of household waste from Fidjrosse and its characterization.

The data analysis of Table 3 shows that 50.19% of the collected and treated waste was made up of biodegradable materials most of which were waste from kitchen (kitchen leftovers, peels of fruits, vegetables), and vegetable waste (dead leaves, boughs, flowers, wood fragments); 32.18 % of fine sand; 8.31% of plastics; 4% of cardboards and papers; 1.58% of metals; 1.11 % of textiles and rags; 1.01% of glasses; 0.79% of shoes and leathers; 0.63% of shells, crabs and pearls; 0.13% of burnt materials and pieces of bricks; and 0.7 % of used batteries.

A measurement at the level of the heap revealed that the percentage of moisture of waste was 75 %. This value is similar to those reported by Adjahossou & Aguewe (1995) who found a rate of 75 % moisture for the household waste of the suburbs of Cotonou. However, it is different from the rates of moisture ranging between 57.1 % and 65 % found for some cities of Central Africa. It could emerge from the study of Adjahossou & Aguewe (1995) that the rate of moisture varied not only according to the seasons, but also according to the standard of living of the investigated populations.

With regard to the composting, some authors think that a strong rate of moisture does not enhance the penetration of the air in at least 50% of the mass of the compost, and therefore it blocks the composting progress. So the National Agency for the Recycling and Elimination of Waste proposes a rate of moisture ranging between 50 % and 60 % in the starting up of the composting, whereas others recommend values ranging between 50 % and 75%. Our moisture value fell within these last limits.

All in all, 262 kg of biodegradable materials were composted on an area of 100 m^2. With these results recorded for the present investigation, it could be deduced that the domestic solid waste of Fidjrosse contained strong proportions of fermentable organic matter.

Survey of Composting

Control of the evolution of the temperature of swaths (Fig. 2): The average temperatures of the swaths ranged from 35°C on the 1^{st} day, which rose slightly to 38°C on the 2^{nd} day and 45°C on the 15^{th} day. From that value onwards it remained constant until the 21^{st} day indicating a slow down and even a stop of the degradation process of the biomass.

On that particular occasion, swaths were reversed and watered to boost the microbial activity for the first time. From the 21st day to the 32nd the temperature rose from 45°C to 52°C. This increase of the temperature was an indication of the resumption of the activity of decomposing microorganisms. From the 32nd to the 40th day, the temperature became again constant at 52°C indicating the second stop of the microbiological process. At this moment the second reversal of swaths was carried out on the 40th day which caused the temperature to rise from 52°C to 58°C on the 45th day, and finally the third reversal was carried out and was followed by a rise in temperature from 58°C to 69°C on the 61st day. From then on, the temperature started decreasing till 35°C and even 25°C on the 77th day. The experimentation of the National Agency for the Recycling and the Elimination of Waste (France) led to temperatures ranging between 60°C and 70°C by composting household waste produced in France. Studies those of Bintou (1995) led to high temperatures included between 70°C and 73°C by composting waste and vegetable substrata in the Sahelian area and in the city of N'djamena. According to him, waste rich in microorganisms and nitrogen enhance well the fermentation. Higher levels of temperatures allow us to obtain a healthier product. In fact, the sizing of the swath influences the variation of temperatures.

This temperature variation of the compost was an indication of the biological activity which took place. According to Onifade (2006), the temperature of the compost started rising when the microbial activity was very intense and the degradation of the organic matter had begun. This rise of the temperature during the composting operation was a means of destruction of pathogenic germs thus leading to the harmlessness of the compost once it reached maturity. As soon as the amount of organic matter stopped decomposing, the activity of microorganisms stopped and the temperature decreased to its lowest value. At this stage the composting came to an end, but the compost stemming from the operation was still not fully finite. It had to be re-piled up and carefully covered for a period of about two to three weeks to allow its maturation. During that phase, the mineralization of the organic matter ended and the compost could be used for the physico-chemical and bacteriological analyses, as well as for the agronomic trials. Fig. 3 depicts the manufactured compost.

Finite compost: Out of 262 kg of fermentable waste as input, we obtained 172 kg of fresh compost as output thus 65.67% as rate. Compared to the mass of collected garbage this rate was of 43%. That processing rate for household waste was significant and can further considerably contribute to reduce the pollution if the collection and the composting are regularly carried out. The compost obtained was morphologically homogeneous with a dark grey colour and exhibited the characteristics of finite compost. From these results, it could be deduced that the composting of this domestic solid waste could be a way to reduce the pollution and its harmful effects in Fidjrosse district.

Physico-Chemical Characteristics of the Finite Compost

In order to determine the physico-chemical characteristics of the compost, a sample was collected for physico-chemical analyses in the laboratory. The results of these analyses are presented in Table 4.

The analysed compost presented a more or less strong rate of moisture and low acidity but has higher values for organic matter. Also higher values for exchangeable bases (Ca = 16.31; Mg = 19.22; K = 8.22; Na = 1.82) and for cation exchange capacity were recorded.

The assessment of the quality of compost is a complex matter for the particular needs of soils and plants, it varies and adds to the range of methods of composting. The National Standard of Canada concerning the organic amendments (1996) stipulates that a finite compost has to have a C/N ratio lower or equal to 25 because generally, the decomposition of a compost having a C/N ratio lower or equal to 25 in a soil does not trigger the immobilization of the nitrogen in the soil to the detriment of vegetables.

The maturity is also often estimated by the C/N ratio. It is proved that a C/N ratio close to 10-15 corresponds to finite compost which can considerably enrich the soils from which plants take their nutrients (Namkoog 1999). As regards the compost manufactured in the present study, its C/N ratio was 11.69 which was completely acceptable. This indicates that the compost was mature. This value is slightly higher to that reported by Gnonzan (2003), i.e., 11.50. A C/N ratio ranging between 10 and 25 is stabilizing for the soils to which the compost is applied. But the only C/N ratio is not sufficient to assess the maturity of compost, it is necessary to combine it with other physico-chemical parameters.

Several authors demonstrated that a compost having CEC higher or equal to 60 meq/l00g is mature. CEC recorded with the compost produced in our trials exceeded that value. Cation exchange capacity is the capacity of an organic matter to irreversibly catch the cations. The humus had a strong CEC and fixed the nourishing mineral ions such as K^+ and Ca^{2+} cations and phosphates so as to make them available to plants for their growth and development (Mustin 1987). CEC is a general maturity index for compost and its value tends to increase gradually during composting and then peaks.

The pH is also a maturity index for the compost. Indeed, mature composts have a pH ranging between 7 and 9 (Avnimelech 1996). The recorded pH values ranging from

6.11 to 6.72 were little bit low and could be due to the acid soils of the city of Cotonou where the experiment was carried out.

The particles whose size was lower than 2 mm represented the most important proportion whatever the processing was. The compost presented a structure whose particles were smaller and rather more homogeneous, and the texture got closer to that of a soil. This result was in agreement with those reported by several authors like Soudi (2001). Non-degradable matters amount to 29.8%.

The strong rate of fine elements of the compost could be due to the process of decomposition/degradation during the composting and the high contents in fine elements of waste. The strong proportions of the fine elements prove a good quality of compost although the refusals were close to 29.8 %. These results allow us to state that if used in acceptable dose, the studied compost could be valued in for farming.

CONCLUSION

The present work allowed us to obtain information on the management of household waste in Fidjrosse. Collection, characterization and composting of the fermentable fraction of this waste allowed us to assess the physico-chemical characteristics of the finite compost. In order to meet that goal, exhaustive inquiries were carried out within households, pre-collection structures and truck farmers. The total amount of pre-collected waste was about 522 kg. 262 kg of waste represented biodegradable materials. The percentage of humidity of waste was 75%. A 65.67% rate was obtained during the composting of waste. In view of the pH values the compost was basic and could easily balance acid soil. Its capacity of retention of water was more or less 43%. A C/N ratio of 11.69 recorded was stabilizing for the soils to which the compost was applied. The humus of our compost had strong CEC and fixed the nourishing mineral ions such as the K^+ and Ca^{2+} cations and phosphates so as to make them available on plants for their growth and development. Then the compost served as medium for the cultivated plants; it was an organic fertilizer.

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