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Production unit for composting and worm California

Niño A.[1]*, Escobar A.[2] and Guevara S.[3]

[1]Facultad de Ingeniería Química, Benemérita Universidad Autónoma de Puebla, México
[2]Facultad de Arquitectura, Coordinador de Laboratorio de tecnología Aplicada, Benemérita Universidad Autónoma de Puebla, México
[3] Facultad de Ingeniería Química, Colegio de Ingeniería Ambiental, Benemérita Universidad Autónoma de Puebla, México

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ABSTRACT

The aim of the construction and assembly of the stonemasonis in short spaces, protected from the weather, in the backyardor garden of homes and reduce generating sources from the problema of organic waste, using it as raw material feed blood worm California, in this speceis processed and transformed natural organic fertilizer with macro-micronutrients, while allowing play back worm nuclei, this method generates self-consumption to a pilot or commercials caleorganic fertilizer for use of green areas, in the production of vegetables in green houses displacing agrochemicals used in agricultura industry and nucleiworm for food natural poultry in the poultry industry, the cost of investment capital for construction mason with fixed and variable costs are low, recoverable in the short term with the sale and marketing of these products and in this way to support conservation measures, improvement and problem of soil contamination from a land fillfate of municipal waste, land reclamation intended to produce food for agriculture, increasing its productivity, the nutrients that the final product has been validated, by physico-chemical analysis

Key words: worm, **o**rganic fertilizer, nutrients, solid waste,canter.

INTRODUCTION

Today humans organic waste discarded reaching municipal disposal; inadvertently before being wasting nutrients for better crop management by natural[1], techniques avoid the chemicals that are killing our making them in fertile lands. Therefore the vermicomposting is a natural technique to take advantage of these nutrients we throw in homes, and their final destination in land fills[2]. California blood worm is what contributes to the production of vermicomposting as shown in image 5, stainless steel sieve, by digestion of the leachate from the degradation of organic waste home[3], thereby generating a humus obtained in a given time can sift or purify ingorganic fertilizer for excellent macronutrients called micronutrients minerals[4].

AREA FEATURES

The selection of the area that is intended to vermiculture is vital for the development of cultura and its dimensions depend on the type of operation to be carried out[5]. The area must meet the following requirements:

Being located near a water source without contamination.
Being close to the main source of waste that will be used.
Possess good drainage and build the planter with a slight slope to the drainage of leachate[6].
Being away from areas of frequent flooding or heavy rainfall drags.
Possessing artificial or natural shade palapa type[7].

MATERIALS AND METHODOS

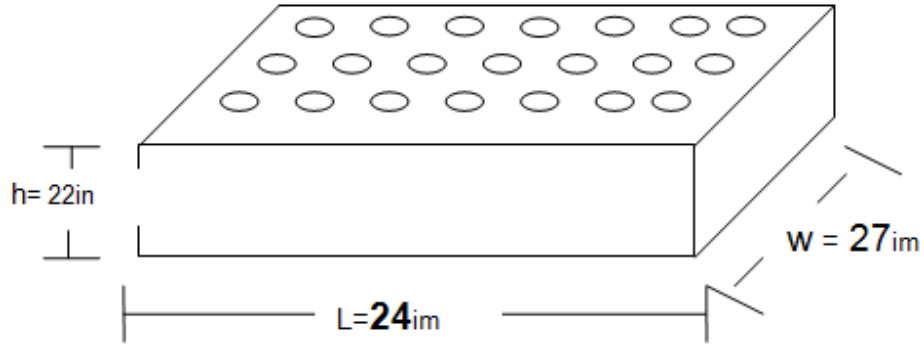
Classification of population:
LA= Adult worm
LJ= Juvenile earthworm
H = Cocoon or capsule

The population density is defined as the number of individuals present per unit area and can reach a maximum when the conditions for its development are optimal, in image 6, is illustrated using traditional mesh or burlapas a means of separating the castings produced nuclei[8]. When in a small area there is high population density, food is scarce and the living space is reduced[9], dominate the strongest and best adapted individuals in this case can be seen migrating adult populations, shortage of cocoons and abundance of juvenile worms. As shownin Figure1, calculating the population density and the area of the production unit. The images 7, 8 and 9 illustrate the manual method separation of compost and worm nuclei in the production unit or stonemason[10].

The simple population was performed with a cylindrical container, as indicated in Figure 2, the sample collector is introduced at the surface, the simple is removed and placed on a clean surface for the count of the population [11].

The heuristicrule states that a 1in² must have 40% of adult worm, then there will be 60% of juvenile worm. 500 cocoons per square inch approximately [12].

Figure 1. Area drawn trench for calculating population density



h = 22in
A = 24inx 27 in = 648in^2
V= A x w= 648 x 22 = 14256 in^3

$$\frac{30\ kg\ \text{organic waste}}{14256\ in^3}$$

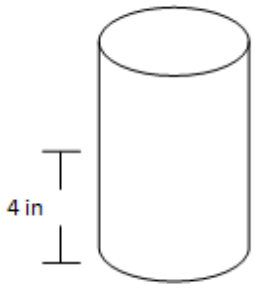
Design equation: $F = \frac{1\,in^2}{a}$

From where: F = factor worm
a = area of vessel

Calculation of population density

Area of circle: A = π x r²=π (1.5in)² = 7.68in²

Figure 2. Sample collector for calculating the density of population



$$F = -\frac{1550\ in^2}{7.68\ in^2} = 202$$

F = 202
F = 202 X 6 = 1,212 LA.
F = 202 X 10 =2,020 LJ.

$$\Sigma = 3{,}232 \text{ worms}$$

3,332 ⟶ 100%
1,212 ⟵ 37.5 % LA.
3,232 ⟶ 100%
2,020 ⟵ 62.5 % LJ.

$$\Sigma = LA + LJ = 100\% \text{ worms}$$

3 buds ⟶ 7.068 in^2
657buds ⟶ 1550 in^2

RESULTS AND DISCUSSION

Chemical analysis in the production of fertilizer-organic

Analyses were divided according to the following groups:

Physical measurements: organic matter, ash, moisture, pH and temperature.

Chemical determinations: macronutrients N, P, K, Na, and Mg. Kjeldalh Using the method for the determination of total nitrogen.

Total phosphorus parameter by color development method is determined.

The team called colorimeter with blue filter.

Determinations of K, Ca and Mg. were carriedout in the atomic absorption spectrum air-acetylene mixture, using lamp for each of the parameters and constructing calibration curve measured in ppm units.

Micronutrient chemical determinations Fe, Cu, Zn, Mn and Ca in the atomic absorption spectrum air-acetylene mixture using lamp for each of the parameters and constructing calibration curve measured in ppm units.

For the determination of physicochemical parameters on wormcomposting, Technical Manual for Chemical Analysis vermicompost prepared by the Soil Institute of Havana Cuba was used and the Official Mexicana Norm NMX-FF-109-SCFI-2008 [13-15].

Approximate costs required for the acquisition of the calculated weights for the construction of the worm drive production in puts are estimated in Table 3.

Fixed	Costs		Variable costs	
Amount	Concept		Concept	
3	Cement cuvettes	$47.00	Garbage colleted, homogeneized	$9.85
3	Gravel trays	22.5	Seed stok california nearthworm	25.93
1	Shovel gardener	50		
1	Zapapico	50		
1	Sand	80		
2	Containers	60		
2	Sieves	100		
2	idlers	100		
1	Bale cardboard sheet	170		
10	Blocks hand made	125		
1	Pruning shears	40		
1	Physicochemical analysis	2,250.00		
1	Roman scale	200		
Subtotal		$3,294.50	Subtotal	$35.78

Table 3 economic balance with the costs daring designand construction of the planter to produce compost and worm cores California. [16-19]

Selling Price for each kg of organic fertilizer = $ 50.00

$$x = \frac{C_f}{v_u - c_v} = \frac{\$3294.50}{[50 - 35.78]\frac{\$}{kg.Fertilizer}} = 231.68 kg.Fertilizer \quad \text{(Breakeven)}$$

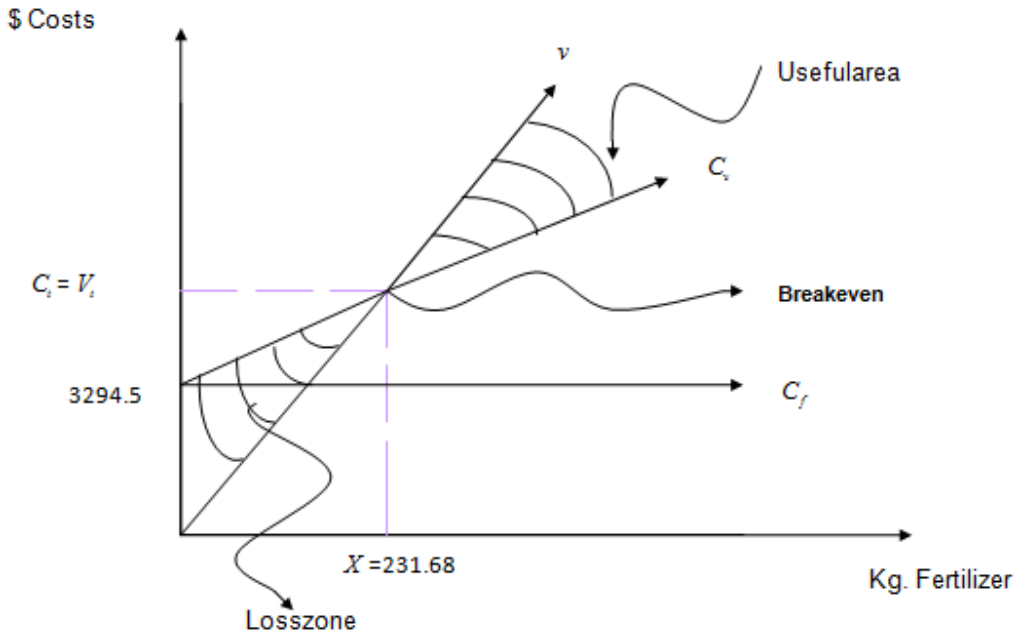
Economic analysis:

$$C_T = C_F + c_v x\, C_T = \$3294.50 + \frac{231.68 kg.(\$35.78)}{kg} = \$11{,}584$$

$$V_T = v_u x\, V_T = \frac{\$50}{kg}(231.68 kg) = \$11{,}584$$

In equilibrium $V_T = C_T$ U = $V_T - C_T$ U = 0

In Figure 4 benefits with fixed and variable costs founds in the utilities drewis



The chart4 indicates where the balance point is at231.68Kg. Compost produced from this amount are beginning to reap the rewards, which is the online sales(v)

C_f = Fixed costs

C_v = Variable costs

C_t = Total costs

V_t = total sales

V_u = Utility value

v = Sales[20 - 24].

Image 5 Separation of organic manure produced on the unit

Image 6 Mesh or burlap separator, the worm gets caught in this

Image7 Separation California worm manually or craft

Image 8 Tank container for temporary section worm California adult and Juvenile

Image 9 California adult worm list to include other production units or for sale

CONCLUSION

Once the worm separate production unit, humus can be harvested and stored in sacks, conserving moisture by 70%, should be stored under shade, allow good air circulation or adequate ventilation, protect chickens from predators such as birds, cats, ants, centipedes.

Do not allow people to grow food competitors like woodlice, beetles etc.

By consolidating this activity producers, plus benefit from consumption, recovering soils and with a significant savings by reducing the purchase of fertilizers and protects the environment, can sell the surplus of both humus, liquid worm humus and meat.

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