Zea Mays L Compositing Implementing Different Bulking Agents

Rakesh Kumar Saini, Vikram Singh, Devki Tatawat, Himanshu Meena, Kamlesh
Department of Civil Engineering,
Poornima Group of Institutions, Jaipur

***Abstract*–A uniquely American contribution to world agriculture, corn (originally maize) is divided into several groups depending on the ultimate use of the grain. Field corn is planted for livestock feeding. Sweet corn is used for human food when fresh, and can be frozen. Popcorn makes a nutritious natural snack and fine baking flour. Some varieties of corn, commonly known as Indian corn, are also grown as ornamentals. When these cobs are no longer wanted as decorations, the ears can be fed to cattle or chickens.**

Composting is nature's process of recycling decomposed organic materials into a rich soil known as compost. Anything that was once living will decomposesorganic wastes is composted by vermi composting process in order to convert the organic waste into bio-compost. Waste is collected from about our local areas. And make the small pieces for shredding purpose and placed into the wooden box.waste taken from the pre compost yard were prepared into three vermin culture formulations as Bed-I, (garden waste, food waste) Bed-II, (paltry waste) and Bed-III, (vermin composting)The cow-dung was used as inoculants to accelerate the process.

The moisture is maintained by spraying water over the beds and temperatures also monitored. Every week samples from all the above three beds were collected to analyse pH, Electrical Conductivity (EC), Organic Carbon, Nitrogen, Phosphorous, Potassium, C/N ratio and copper contents. It is observed that the waste from Bed-I converted into bio-compost in 60 days and Bed-II in 50 days and Bed-III in 40 days.In conclusion, it is clear that maize is a very important crop in today's farming industry. Many different varieties, systems and techniques have been developed which makes the topic a very interesting one to research.The quality of the maize that is now being produced is clearly very high which makes its cultivation particularly attractive for farmers, as the returns are desirable, especially when maize is used as a feed supplement for dairy and beef herds. The development of the maize proved to be a very worthwhile task as the development of the crop forms a very large part of maize production. I also really enjoyed taking part in the sowing of the maize under plastic

Keywords— Vermi Compost, Nitrogen, Phosphorous, Potassium, Carbon/Nitrogen (C/N) ratio, Bio compost.

I. INTRODUCTION

A. Composting

Composting is nature's process of recycling decomposed organic materials into a rich soil known as compost. Anything that was once living will decompose. Basically, backyard composting is an acceleration of the same process nature uses. By composting your organic waste, you are returning nutrients back into the soil in order for the cycle of life to continue. Finished compost looks like soil–dark brown, crumbly and smells like a forest floor.

B. Types of composting

There are three type of composting.

1. *Backyard composting*
   if you have a yard and a balance of browns(fallen leaves or straw) and greens (grass clippings and food scraps). You have all you need to make compost.
2. *Worm composting (vermin composting)*
   if you have a tiny yard or live in an apartment or have an abundance of food scraps,this type of composting is for you.
3. *Grass cycling*
   If you have grass clippings and don't want to use them in a compost pile you can leave them on the lawn to decompose. Read about grass cycling for tips, techniques and benefits.

II. LITERATURE REVIEW

Composting is nature's process of recycling decomposed organic materials into a rich soil known as compost. Anything amount to about 65 to 70 million tons, relatively small compared to the annual output of around 500 million tons of yellow maize.

Scraps from healthy plants and vegetables -- including corn kernels, cobs, husks and stalks -- are appropriate for compost heaps. Corncobs provide potash, and husks add carbon, both of which are essential in maintaining the pH balance of a compost bin. If you're adding large numbers of corncobs or husks, you should add nitrogen sources and water to balance the moisture content and carbon to nitrogen ratio in your pile.

The primary policy objective for almost all white maize producing countries is to satisfy national requirements from domestic production. Exports in most cases are a result of excess production in years of favorable weather and of domestic stocks exceeding levels deemed necessary for food security purposes. In order to maintain a high degree of self-sufficiency, many potential exporting countries applied policies aimed at keeping minimum producer prices relatively high, which compromised their competitive position on the international market. In addition, white maize from southern and eastern Africa, the principal producing and consuming areas, face long distances between major production areas andocean ports which contribute to high transport costs in many cases.As a result, when surpluses did occur, they could only be exported in years of high prices without incurring losses. This situation has resulted in several countries being

competitive only in swap arrangements or triangular transactions for deliveries to neighboring countries.

Recent efforts to deregulate national cereal sectors and to enhance market liberalization may have significant effects on the future supply and demand situation for white maize. White maize production in developing countries is expected to grow at a rate of 3.3 percent per annum between 1987-89 and 2000, but these rates of growth depend upon continued expansion of production in sub-Saharan Africa. In some countries in the region where area growth is no longer a major component of expanding production, it is unclear if yield increases will be forthcoming to sustain these relatively high predicted growth rates in production.

The international market, being primarily supplied by southern Africa and the United States, is expected to continue to be volatile in the future. Supplies will dependon the export availabilities of a few producers and most countries will continue to import only in years of inadequate domestic supplies occasioned by crop shortfalls.

In maize research for developing countries, improvement of white-grained varieties and hybrids has been greater than in developed countries, where nearly all plant breeding research has focused on yellow maize. Nonetheless, in many countries where white maize is important, adoption of improved material has been slow and limited.

Major constraints are the development of seed systems that adequately serve small farmers. Crop management research that solves the problems of soil fertility and unpredictable rainfall will also be crucial to continued that was once living will decomposes. Basically, backyard composting is an acceleration of the same process nature uses.World production of white maize is estimated to growth in white maize production.

Particularly in sub-Saharan Africa, policy changes as well as institutional and technical advances are required if white maize is to continue to meet the food needs of a rapidly growing population.

III. MATERIAL USE

Three wooden boxes, Corn wastes, Food waste,Garden waste,Paltry waste,Water,Plywood,Trowel,Animal excreta and carries bags,Wooden dust,Worm etc.

IV. METHODOLOGY

First we collect the corn waste from different places and shops.Crushed it manually. Wastes are choosing to compost with corn; these are food waste, animal excreta, paltry wastes, garden waste, and wooden ash. Take three equal size wooden boxes. This box is used to give platform for composting. All the wastes are collected from different places. Every waste material composting is taking approximate four weeks so it is time consuming process. In first box, first we prepared lower bed mixture of animal excreta and soil. Second layer is prepared from wooden dust. Third layer is prepared from garden wastes. Fourth layer is prepared from crushed corn waste. Final layer is made from food waste. A desirable amount of water is added. Box is covered for a ply wood, for making safe from water or other materials. To reduce the odors composting. All the layer of composting is shaking from trowel and fabda. Day by day,it is done for aeration process. Composting is time consuming process so it is need to analyses continuously. Our main object of this study is enhancing the soil fertility value. Soil fertility value is does not increase after adding the manure. Soil required time to increases their fertility.

So we take a crop which life time is less so we can test the soil after adding the manure easily. So we used pea crop.

Data Tables

The chemical characteristics of bio-compost obtained from Bed I, Bed II, Bed III are presented in Table1, 2, 3,4,5 and 6 respectively.

TABLE I. PHYSICAL CHARACTERISTICS OF BED I

S/N	Characteristics	Standard data	Composition as per analysis	Variation
1.	Moisture in%	15-25%	22.10%	-
2.	Bulk Density(g/cm^3)	<1	1.70	+.70
3.	Particle Size	Min.90% material shall pass through 4.0 mm IS sieve	96.89%	-

TABLE II.CHEMICAL CHARACTERISTICS OF BED I

S/N	Characteristics	Standard data	Composition as per analysis	Variation
1.	Total Organic Carbon (%)	Min weight 12%	18.22%	+6.22%
2.	Total Nitrogen(as N %)	Min weight .8%	1.91%	+1.11%
3.	C:N Ratio	<20	9.53:1	-
4.	Total Phosphates (as P_2O_5 in %)	Min weight .4%	.62%	+.22%
5.	Total Potash(as K_2O in %)	Min weight .4%	.52%	+.12%
6.	pH	6.5-7.5	8.84	+1.34
7.	Conductivity(as dsm-1)	<4	1.60	+1.34

TABLE III. PHYSICAL CHARACTERISTICS OF BED II

S/N	Characteristics	Standard data	Composition as per analysis	Variation
1.	Moisture in%	15-25%	18.72%	-
2.	Bulk Density(g/cm^3)	<1	3.89	+2.89
3.	Particle Size	Min.90% material shall pass through 4.0 mm IS sieve	88.72%	+1.28%

TABLE IV. CHEMICAL CHARACTERISTICS OF BED II

S/N	Characteristics	Standard data	Composition as per analysis	Variation
1.	Total Organic Carbon (%)	Min weight 12%	15.18%	+3.18%
2.	Total Nitrogen(as N %)	Min weight .8%	1.02%	+.22%
3.	C:N Ratio	<20	14.88:1	-
4.	Total Phosphates (as P_2O_5 in %)	Min weight .4%	.57%	+.17%
5.	Total Potash(as K_2O in %)	Min weight .4%	.49%	+.09%
6.	pH	6.5-7.5	9.70	+2.20
7.	Conductivity(as dsm-1)	<4	1.39	_

TABLE V. PHYSICAL CHARACTERISTICS OF BED III

S/N	Characteristics	Standard data	Composition as per analysis	Variation
1.	Moisture in%	15-25%	24.08%	-
2.	Bulk Density(g/cm^3)	<1	1.36	+.36
3.	Particle Size	Min.90% material shall pass through 4.0 mm IS sieve	90.98%	_

TABLE VI. CHEMICAL CHARACTERISTICS OF BED III

S/N	Characteristics	Standard data	Composition as per analysis	Variation
1.	Total Organic Carbon (%)	Min weight 12%	20.36%	+8.36%
2.	Total Nitrogen(as N %)	Min weight .8%	2.10%	+1.30%
3.	C:N Ratio	<20	9.69:1	-
4.	Total Phosphates (as P_2O_5 in %)	Min weight .4%	.89%	+.49%
5.	Total Potash(as K_2O in %)	Min weight .4%	.61%	+.21%
6.	pH	6.5-7.5	9.37	+1.87
7.	Conductivity(as dsm-1)	<4	1.70	_

Advantages and Disadvantages on corn composting

Advantages

1. Comes from corn, which is a renewable resource.
2. Does not contain toxins.
3. Producing this kind of plastic creates much less greenhouse gas emissions conventional plastic production (a reduction of 68 percent)
4. Corn starch plastic can be composted in facilities for industrial composting.
5. 65 percent less energy is needed to produce corn-based plastic than to conventional plastic.
6. PLA (poly lactic acid) plastic is competitive with conventional plastic in of cost, since petroleum prices are only going up.
7. PLA is safer, since there is no danger of explosions in its production.

Disadvantage

1. Although PLA is compostable, there are very few facilities where this can actually be done (in the USA only about 113 sites for this exist)
2. Most likely consumers will not compost corn starch plastics properly, and just put them in regular recycling. This could contaminate the recycling stream.
3. Composting PLA in large quantities could undermine conventional composting, since the polymer contained in corn-based plastic makes regular compost more acidic.
4.Since there is a lack of adequate infrastructure to compost PLA, most of it will probably still go into landfills.
5.MRFs – Material Recovery Facilities – are responsible for paying for sorting and disposing of PLA.

V. BENEFITS OF THE STUDY

A. *Economic Benefits*

By composting food and organic waste, businesses should be able to reduce the size of their traditional waste containers or reduce the frequency of pick-ups or both, which will lower the cost of traditional waste hauling. In addition, the use of smaller containers and less frequent pick-ups will also result in lower county user fees since there are no user fees associated with food and organic waste. Finally, the tipping fee for food and organic waste is $25/ton versus $66/ton for traditional waste, a lower cost that can be passed on directly to businesses by Food Waste Disposal.

B. *Environmental Benefits*

Not only do food androgenic wastes have large economic impacts in terms of disposal costs, they also have immediate environmental impacts. When food is disposed in the landfill it quickly rots and becomes a significant source of methane — a potent greenhouse gas with 21 times the global warming potential of carbon dioxide. Consequently, landfills account for more than 20 percent of all methane emissions. Recovering and recycling food waste diverts organic materials from landfills thus reducing these emissions. The use of recycled food waste as compost improves soil health and structure; increases drought resistance; and reduces the need for supplemental water, fertilizers, and pesticides.

C. *Community Benefits*

For every 2,000 pounds of food and organic waste collected from your business, you will receive a 40-pound compost credit which can be donated to a local farmer or community garden or redeemed by your business. This reduces the need for commercially produced fertilizers and the transportation needed to bring them to the Charleston region.

D. Health and Sanitation Benefits

Another benefit of food waste composting for your business is improved sanitation, public safety, and health. Food waste dumped in standard trash cans.

VI. CONCLUSION

In conclusion, it is clear that maize is a very important crop in today's farming industry. Many different varieties, systems and techniques have been developed which makes the topic a very interesting one to research. The quality of the maize that is now being produced is clearly very high which makes its cultivation particularly attractive for farmers, as the returns are desirable, especially when maize is used as a feed supplement for dairy and beef herds. The development of the maize proved to be a very worthwhile task as the development of the crop forms a very large part of maize production. I also really enjoyed taking part in the sowing of the maize under plastic. It was good to get involved in some of the practical activities while processing this project as it allowed me to experience some of the things that I was writing about. Personally, I found to be particularly helpful as I was able to obtain a lot of information, which I could then use as part of my study on it. In the present study, the environmental friendly and low cost hydro-based operating strategy applied in the bioreactor for turning and aeration of the composting materials is suitable for inducing aerobic and potential decomposition especially during the early stage of composting. The vermincompost developed was found to have high value of nutrients.

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