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COMBATING CLIMATE CHANGE EFFECTS: A CASE STUDY OF CONVERTING KITCHEN WASTE TO BLACK GOLD

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ABSTRACT:
Climate change is the global phenomenon of climate transformation characterised by the changes in the usual climate of the planet that are especially caused by human activities. As a result of unbalancing the weather of Earth, the sustainability of the planet's ecosystems is under threat and so, the future of the humankind and the stability of the global economy. The impacts of climate change include warming temperatures, changes in precipitation, increase in the frequency or intensity of extreme weather events and rising sea levels. These impacts threaten our health by affecting the food we eat, the water we drink, the air we breathe and the weather we experience. To combat effects of climate change on environment, raising individual awareness and responsibilities are very important. The present study explores the efforts of individual students to learn segregation of waste at home and use kitchen waste to make compost fertilizer. About 30 students, along with their families enthusiastically took up the task of home composting and turning kitchen waste into rich compost or black gold. This has not only enthused students with confidence to do positive handprint action towards environment but also reduced hundreds of kilograms of kitchen waste from reaching the landfills. Future action demands making of a Green Brigade of students who can take this initiative further.

Key-words: Home composting, Kitchen waste, Waste segregation Handprint action.

RATIONALE:

Pollution is everywhere- our air is polluted, our water is polluted and so is our soil....our land. Every city, town and village has rising mountains of landfills. It is seen that everyday a family of four generates ~~e~~an average 3 Kg of Kitchen waste. This kitchen waste is sent to city's landfills. The landfills not only cause land pollution but the harmful green house gases like methane which are emitted, cause air pollution and lead to climate change, causing diseases and deaths. If each one of us does home composting, that would stop, on an average, 3 kg of waste/family/day going to the landfills. Home composting, converting the kitchen wet waste into compost or 'Black Gold', not only benefits the environment but is also beneficial to our garden. It is a Hand-print action. Organic matter on decomposing gets transformed into soil like particles which is called compost. Municipal solid waste (MSW) compost is increasingly used in agriculture as a soil conditioner but also as a fertilizer. The main concern is loading the soil with metals that can result in increased metal content of crops. Furthermore, in some cases, metals and excess nutrients can move through the soil profile into groundwater. Municipal solid waste compost has also been reported to have high salt concentrations, which can inhibit plant growth and negatively affect soil structure [3]. By definition composting is an aerobic process that

needs air for the breakdown of organic matter. Compost has several benefits. It enriches soil; helps retain moisture and suppress plant diseases and pests. It also reduces the need for chemical fertilizers. It encourages the production of beneficial bacteria and fungi that break down organic matter to create humus, a rich, dark, nutrient-filled material. When kitchen waste is used as to make the compost, that much organic matter does not reach the landfills. So, by reducing methane emissions from landfills it lowers our carbon footprint. There are lots of good reasons to compost. Save money, save resources, improve the soil and reduce ones' impact on the environment. Regardless of our reasons, composting is a win/win scenario because it is not only good for us; it is also good for the environment. Adding compost to our garden will not only fertilize, it actually feeds our soil with a diversity of nutrients and microorganisms that will improve plant growth. Chemical fertilizers on the other hand provide a quick burst of a limited number of nutrients that can wash away into our rivers and streams. Compost also increases soil stability, improves drainage and helps retain moisture. Composting has been historically promoted as both the basis of gardening and farming[4]. The composting of urban waste including the, sewage sludge, vegetable and food waste, has now emerged as an modern waste management and agricultural strategy[5].

MATERIALS AND METHODOLOGY:

Requirements

Basic materials needed for are Kitchen waste, Garden soil, Dry Waste, bin /container with holes, newspaper, rod or stick. The prime need while composting at home is of plastic containers with holes. They can be old earthen pots also. Kitchen wastes are of two types; dry kitchen waste and wet kitchen waste. Wet kitchen waste is all the scraps of fruits, vegetables, grains, etc. Dry waste includes all the wrapping packaging papers, tissue papers, cleaning materials, etc. These dry wastes are further divided into recyclable (that can be recycled into another form and reused) and biodegradable (that can be decomposed). Garden soil includes any type of soil from our garden or our potting soil. It must be freshly collected to keep microbial activity unharmed. Dry wastes include all fallen dry leaves (also called brown gold) and newspapers, cards & cardboards, box (biodegradable household wastes). Set of bin should have a bottom tray, a container with broad opening, suitable lid and a stirring stick. Lid should be bigger enough to cover the bin. Stirring stick or rod should be easy to handle and easy to stir.

Methodology

There are many different types and methods of composting. They are Composting Basics, Onsite Composting, Vermicomposting, Aerated (Turned) Windrow Composting, Aerated Static Pile Composting, In-vessel Composting [2].

The present study used a combination method derived at from several existing methods by the authors. First of all, composting bin was prepared from used dust bins. Holes were made all around for aeration. A sheet of old newspaper was placed inside the bottom of the bin. Then a handful of garden soil was put so as to have some microbes. The wet kitchen waste was then added above it. Some dry leaves were also added. A collecting bottom tray and a covering lid completed the set up.

This entire set up was kept in a dry semi shade area. Every day the kitchen waste and dry layers were added in the bin until it got completely filled. Stirring the layers was regularly done on every 4th day for aeration. While the first bin got filled, a second one was

started to be used. The compost was ready by the 5th or 6th week in all the instances. After repeated trials, this simple method was shared amongst 30 enthusiastic students.

PRECAUTIONS:

There are a few precautions that a practitioner needs to understand. Compost is an organic fertilizer so dry waste like metal, glass, plastic should be kept away and given to waste collectors for separate recycling. Cooked food items must also not be added in the kitchen waste as the oil, ghee, etc. take longer to decompose. Instead they may be separately composted in another compost bin. Similarly animal wastes, dairy products, etc. should also be separately composted. Improper stirring or no stirring leads to bad odour which can be easily corrected by adding more dry matter of leaves and flowers. Sometimes, the waste may become dry and solidify- water should be sprinkled in this case to loosen the waste. Bigger peels and pieces of vegetables may be cut into smaller pieces to fasten the decomposition. Stirring can be done every day and that would speed up the composting process but the authors marked hat every 4th day lessened the burden of remembering to stir every day. Moreover the number of days did not reduce that drastically by stirring every day.

RESULTS AND CONCLUSION:

The entire process of composting took 32 days to get completed, on an average. In the beginning the kitchen waste was entirely recognisable. After some days, as the decomposition process started, it was partially recognisable. On the 32nd day the compost was completely ready. The kitchen waste was now 'black gold'- soil like! During the process, more often than not, a brown coloured liquid oozed out and collected in the bottom tray. This is called 'Compost tea'. This is very nutrient rich. It can be used by diluting with water in 1:10 ratio and given to plants. The compost that is ready in 25-35 days can be used as a soil conditioner, ie, spreading on the surface of the soil in the pots or on the surface of flower beds. It was observed that freshly made compost, if mixed with the soil, may cause the danger of root rot. Compost tea was diluted and used during watering the plants. If the ready compost is preserved for two months and allowed to mature, then there is no harm in mixing with the soil.

DISCUSSION AND WAY FORWARD:

The Black Gold or the homemade compost is used as soil conditioner. It is totally different from Bio fertilizers. This is used to maintain growth with nutrient level and prevent our plants from mal nutrition. Out of the first 30 students, 100% have started home composting. About 350 people have later been contacted during several webinars and one-on-one talks and instructed for composting. Of them, 60-70 have already started making home compost. So much so, that one or two enthusiasts have started composting in their air-condition offices. Initially, there is a fear of bad odour or failure but gradually the sight of rich black soil-like compost fills one with pride and satisfaction.

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REFERENCES:

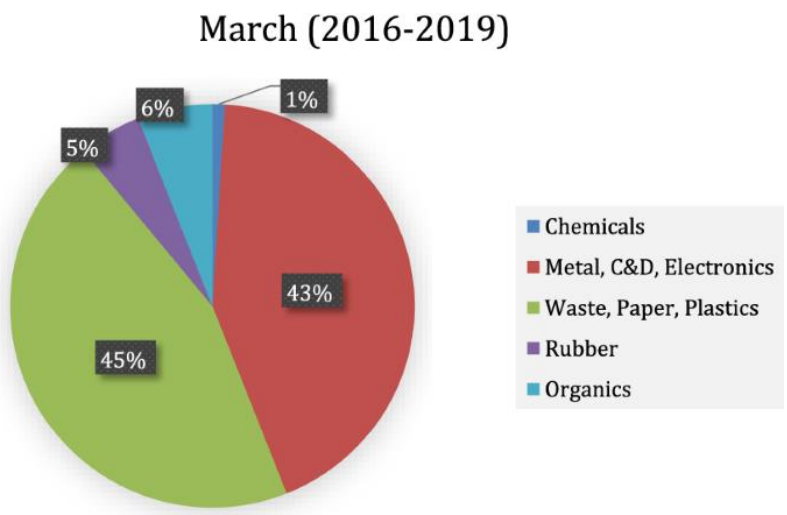
Coronavirus pandemic (COVID-19) and its natural environmental impacts P. F. Rupani, M. Nilashi, R. A. Abumalloh, S. Asadi, S. Samad & S. Wang *International Journal of Environmental Science and Technology*

EPA United States Environmental Protection Agency

J.C. Hargreaves[a] M.S. Adl[a] P.R. Warman[b] a: Department of Biology, Dalhousie University, 1355 Oxford St., Halifax, NS B3H 4J1, Canada b: Coastal Bio Agresearch Ltd., Boutiliers Point, NS B3Z 1V1, Canada A review of the use of omposted municipal solid waste in agriculture Agriculture, Ecosystems & Environment Volume 123, Issues 1–3, January 2008

Barton blum, Composting and the roots of sustainable agriculture, agricultural history volume 66, number 2-spring1992, agricultural history society.

An excellent review of the disposal and reuse of sewage sludge in United States is Joel A. Tarr, "From city to Farm: Urban wastes and the American farmer." Agricultural history 49/4 (1975):598-612.



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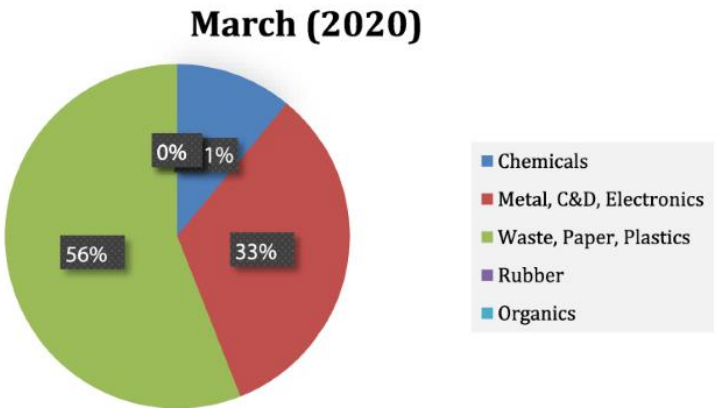


Source: [1.] *International Journal of Environmental Science and Technology*

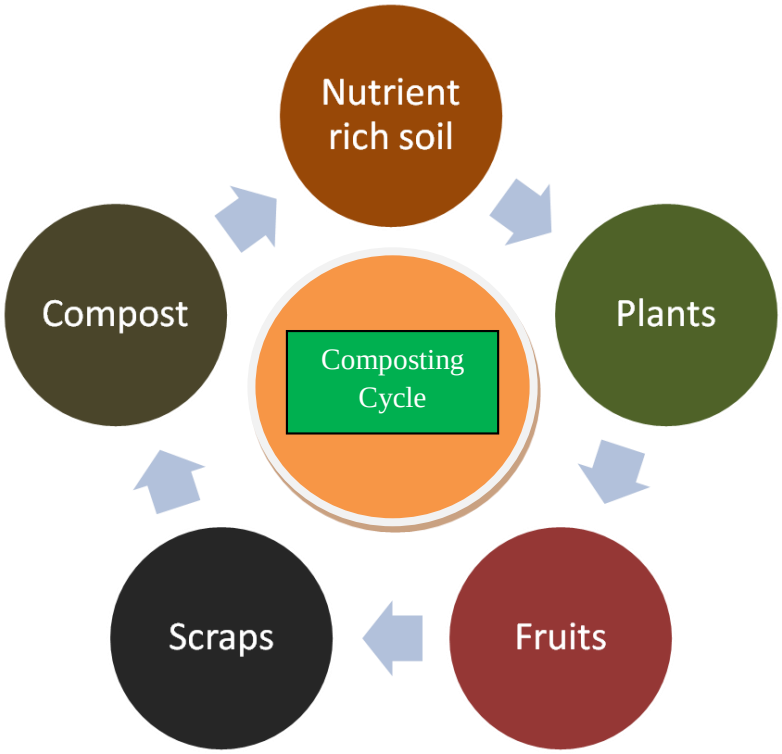
1. Get compost bin ready
↓
2. Put a newspaper at bottom
↓
3. Put handful garden soil
↓
4. Add Kitchen waste
↓
5. Add dry leaves
↓
6. Repeat steps 4 & 5 till bin is filled
↓
7. Stir regularly until compost is ready

Home composting methodology

Day 1
kitchen waste ready
for composting

Day 13
Partially decomposed
condition

Day 32- final compost
'Black Gold'


Nutrient rich soil
Plants
Fruits
Scraps
Compost
Composting Cycle