

## Application of household waste and its sustainable use in home gardens

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### Abstract

Every day we face a challenge to cope up the direct dirt and pollution of our surroundings. It is very ugly and cause serious problems in every sphere of ecosystem processes. A large number of waste materials are released from every house in our society. The wastes may be bio-degradable or non-biodegradable wastes and sometimes mixed type. After the use of packaged food items and use of some packaged food products including spices, the non-degradable items are disposed to the nearby places or to the vat. Stray dogs, cats, buffalos, cows and goats pickup these materials and consume these. Unwanted entries of such non-biodegradable items cause serious effect on such quadrupeds. Non-biodegradable wastes are sometimes collected by local people for re-sale and re-use purpose though all are seriously contaminated there in a large vat of municipal system. Biodegradable wastes are collected by the municipality from every house in everyday and dump the garbage in to the waste deposit sites. Without proper management the unwanted entry of garbage cause hap of garbage and disseminate pollutants nearby lands, rivers, canals and human habitats nearby. These wastes make various types of pollution and make the surroundings polluted. We can make people aware about use of their own household wastes generated by them every day. Reduce, reuse, recycle are the processes to minimize the waste output. In this communication, case study of some household wastes was done. Study revealed that the household wastes may be applied to home gardens and kitchen gardens in a very concise manner to cultivate crops in a fruitful way for better management of their wastes.

**S**olid waste is the major problem for today's society worldwide. There are several types of solid waste; one of them is kitchen waste generated everyday in our kitchen either during preparation of food and after the serving of food. Different types of kitchen wastes are generated from vegetables and fruit peels and

scraps, egg shells, rotten vegetables, tea bags after use and tea after preparation, grass cuttings, leaf cuttings, shaded leaves and remaining of foods. Rahman and Ali<sup>4</sup> argued that 50% to 60 % of total solid generated in Bangladesh contained kitchen waste.

These wastes can be reused for making composts and organic manure for wide application in home gardens and kitchen gardens. In our major cities of India, there is lack of proper kitchen waste disposal management. As a result we can observe the nuisance of waste litters here and there beside the vats as well as spreading on footpaths or several lawns of the major roads of the capital cities or in district towns. People packed these kitchen waste materials with several non-biodegradable solid waste in plastic bags and habituated to throw these to nearby streets or sometimes to the canals, rivers, wastelands, wet lands and in ponds even near a vacate land of different kinds. They think that these wastes must be placed not in their land but others and the term used as not in my backyard (NIMBY). Though people are advised to make different packets for biodegradable and non-biodegradable waste items for better management from municipality side time to time but people ignore it. As a result foraging animals like cows, starry dogs, buffalos, goats etc. consume rotten food items, waste vegetables peels with plastics and other even glass pieces. These plastics and glass pieces are not digestible hence, making severe health hazards to these pet as well as street animals. Various disease causing pathogens virus, bacteria, fungi, as well as protozoa and worms are contaminated through this process from vat to home and everywhere. If, the chain of transmission of pathogens is going on, there will be a chance to spread serious pathogenic diseases and side by side land, air, water will be polluted. It is near to impossible to recover from the unhealthy situation if it will continue in a large scale.

Green house gases also one of the

leading air pollution factors causing huge change of the environment. Major important gasses are methane, ethane and carbon-dioxide which are regenerated from the heap of the garbage dumped in the waste disposal ground. Bogner *et al.*,<sup>1</sup> reported that unmanaged waste may add up to 3.5% emission of green house gasses due to anthropogenic causes like dumping wastes in dumping ground.

As population is increasing day by day throughout the world and urbanization is the prior goal of us the major challenge for municipal corporations to collect, recycle, disposal and proper treatment of household waste as well as other wastes. So, every owner of the house should take a beautiful and well organized but tricky measure to control and recycle own household biodegradable wastes produced from their own kitchen.

Organic wastes are eco-friendly as it has its no toxic effect like chemical fertilizers. Kitchen waste made organic manure has organic carbon, enough nitrogen, phosphorous, potassium, and sulphur but sometimes it contains some heavy metals like lead, chromium, cadmium etc. due to applications of chemical fertilizers and pesticides in field. To get pure and fresh vegetables it is important to start own home garden or container garden using own house hold kitchen waste. Not only the organic manure other components may be used like AM fungal inocula as well as vermicompost (using Red wiggler worm i.e. *Eisenia fetida*). Separate use of container garden, vermin-compost and AMF inocula (mycorrhizal inocula) or mixed culture may be a boon for making green and clean society as well as to grow fresh and pure vegetables. In this study

author took container garden and AMF inocula for better production. The present paper reflects some productive measures to manage their kitchen wastes to prepare manures and to grow beautiful home gardens.

*Aims and Objectives :*

The present research article focuses on the following objective to qualify its aims. These are-

1. To identify various kitchen wastes.
2. To quantify the biodegradable kitchen waste.
3. Different methods of kitchen waste management.
4. Method to prepare compost, organic manure.
5. Home garden preparation.
6. Proper techniques to apply waste for plant yield.

Samples of kitchen wastes were collected from different nuclear families round the month and wet biomass was measured separately through spring balance. Standardization on complete decomposition and finally preparation of manure was established using local techniques in a homemade pit. Ten (10) container gardens were prepared to conduct the study. *Mentha*, *Capsicum*, bitter gourd, onion, sweet potato, tomato plants were potted separately as well as in mixed way to know the productivity through the applications of kitchen waste made organic manure. Three pits were prepared. Each pit size was 5ft x 3ft x 2ft (length x breadth x height) to facilitate decomposition of kitchen biodegradable waste. After one month the organised manure was

taken from the pits and sun dried in open place though some literature argued time required for the process may be 30 to 40 days<sup>3</sup>. After drying the manure, it was sieved and kept in a separate container for use. Similarly AM fungal inocula were prepared and kept separately using local forest soil with standard method<sup>2</sup>. A miniature pit like structure was made by using small plastic jars with perforated side walls fitted with tight cap. Another big plastic tub was taken with local forest soil as AM inocula. At the centre of the plastic tub, perforated plastic jars was placed in such a manner that all perforations should be covered and remain under the soil level. At the bottom of the perforated jar one perforation was made and fitted with a rubber tube to encourage the leachate to flow through this path. In this way a model was prepared and according to this model actual application was done. Central pot was filled with raw waste and the outside the central pot previously prepared local AMF spore containing soil was used to fill the container. Fish and meat remnants, rind of lemons, bones and wood materials were discarded during composting. In container garden, in addition to these above mentioned waste products, garlic and onion peels were not used. To make kitchen garden complete auto fitted water capillary like weeks were used to avoid daily watering. Instead of using instant kitchen wastes, prepared manures were used for better yield.

The survey data on 20 families for 30 days study showed different amount of raw biodegradable kitchen wastes production of varied amount (Table-1). The mean wet biomass of Kitchen waste production per day

Table-1. Wet bio-degradable kitchen waste obtained from a nuclear family in Midnapore town per month basis under 20 families.

	Number of members per family on 20 families survey																			
Family members	4	3	3	4	3	4	3	2	3	2	4	4	3	5	6	2	1	3	2	2
Mean	570	541	602	598	542	704	589	450	501	402	804	809	681	991	1002	304	280	640	362	380
Kitchen	Total members =63																			
Waste	Per day release of kitchen waste (wet)=11732g																			
Production	Hence, per head released kitchen waste =11732/63=186.22g/day																			
Per day	Total population of India: 1,380,004,385																			
(in g)	So, Approximate Kitchen waste production per day from India is =256,987,483,250.8g =256,987 metric ton per day.																			

per family was depicted in the table 1. In this table it is argued that approximately per head released kitchen waste is 186.22g/day. If, we calculate the same kind of waste on the basis of data in Indian scenario, it may be approximate 256,987,483,250.8g/day *i.e.* 256,987 metric ton per day.

The present study showed better yield in vegetable crop production viz. pomegranate, *Capsicum*, *Mentha*, bitter gourd, onion, sweet potato, tomato and coriander. Not only were the production healthy plants also recorded after application of organic manure. Direct kitchen waste use was not recommended as several insects attack the debris as well as crop plants. So, processed organic manure is recommended.

From the above study it can be concluded that-

- Kitchen gardens as well as container gardens may be constructed in every house of municipal areas for better use of kitchen waste to make a healthy, clean and green environment.

- Local AM fungal soil is a good source for mass bio-fertilizers production and in the preparation of kitchen garden starter soil.
- Unprocessed kitchen waste should not be used as it is not good for manure or organic fertilizers. Various insects and pathogenic micro-organisms may come in direct contact of plants and affect it. So, auto-container garden is good for small space and small house to use daily kitchen waste for better yield.
- Applications of processed kitchen waste-made organic manure is recommended for use in every house for better growth of the plants and make the environment more healthy and clean.

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use the organic manure in kitchen garden. I thank to the local people who helped me to get seedlings before going to start container garden.

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