INVESTIGATION ON RECYCLING FOODWASTE OF HOUSEHOLD AND HOSTELS AT B.I.T.SINDRI CAMPUS

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ABSTRACT-

To produce energy from food waste is one of the renewable sources in the present scenario. Various experiments have been carried out throughout the world but very less in the eastern part. In these part these food waste are dumped openly in the open space which causes diseases. These food wastes have great potential to produce energy. The present research work focuses on the production of the gases the food waste accumulated at B.I.T.Sindri campus. The most effective food waste management is avoidance and minimization of food waste To collect food waste and recycle them into useful resources are the signification of this project through which effective solid waste management can be achieved. This project work analyses the characteristics of the food wastes and compare the production of gases in two different stages such as thermophilic and mesophilic digestion of food wastes. It also investigates the optimization of the gas production.

(*key words- recycle, reuse, waste management*)

Introduction: According to the report "Monitoring of Solid Waste in Hong Kong:- waste statistics far 2011 published by environment protection department (EPD) around 9000 tonnes of municipal solid waste as disposed of at landfills everyday and domestic food waste takes up more than 2500 tonnes. For the rapid decomposition against the waste material are stabilize. The conversion process are conservative in nature which generate a stable digestate termed as bio fertilizer kitchen waste consists of uncooked and cooked solid food wastes rejected from the kitchen of houses, restaurants, hotel, messes of Hostels of B.I.T. sindri. These food waste have high organic content with high nutritive value for the microbes which can utilize the organic materials as nutrients and in return reduce the waste to biogas and digestate.

To encourage the source separation, collection and recycling of food waste from house hold the environment and conservation fund (ECF) has launched a scheme known as food waste Recycling Project in Housing Estates.

Methodology: To assist the project identification of a suitable site foe installing the food waste treatment facility within the housing estate of campus of B.I.T. sindri selected. To provide profound and technical address to potential applicants or government department who participate in on safe food waste separation, collection and recycling pilot programme during planning and implementation stages.

Conducting evaluation of performance, effectiveness and outcomes of the food waste recycling product.

Source separation and collection of food waste:

Source of food waste: Food waste refers to all food that being discarded before during and after its processing all organic waste produced in daily life including left over food, such as rice, meat, vegetables etc, secondly uncooked food such as wastes of vegetables, unwanted food such as withared vegetables, peels of fruits and expired food such as bread, biscuits etc.

Nature of food waste: Food waste contains large proportions of organic matters, including carbohydrates, proteins, cellulose and hemicelluloses. It generally contains 85% of waste. It easily decays, generates odour and attract pests. It smells easily and causes nuisance even being kept in household for a short period of time. Therefore food waste should be transferred to collection point every day.

Source separation of food waste: Source separation of food waste is very important for the recycling of food waste. Improper source separation will affect the equally of compost or damage of food waste composting machine . Therefore residents should not put food waste that is larger the 50mm (such as bones of chicken, goat, cow) to the food waste container. These large food waste can be crushed by bone crusher into smaller pieces or disposal of as usual household waste

Principle Of Food Waste Composting:

Composting is a process that organic matters are converted to humus matters which are beneficial to plants. It makes use of fermentation and microbial bio degradation under modern composting technology basically employs aerobic composting due to more through decomposition, shorts operating cycle and less odour generated. It can be divided into four stages.

1. **Mesophilic stage:** Fungi and bacteria start to decompose organic matter while heat is generated in the process and temperature of the compost is raised. They grow and reproduce by the nutrients released from the process and multiply significantly when temperature exceed 40 degree centigrade the thermophilic stage starts.
2. **Thermophilic Stage:** At this stage temperature of the compost can exceed 60 degree centigrade large molecules such as sugar, starch, fat and protein will be decomposed under high temperature. As ammonia will generate during the decomposition of protein. PH value gets increased to become alkaline.

Bio Energy From Food: All food energy starts out as plant life the first trophic (nutritional) level. It may be eaten directly or pass through several additional level of the food chain before being eaten by man or large animals. Food produced on land is generally eaten in the first or

second from trophic level, first for vegetables and grown (green plant growth) and second from animals which in turn have lived and grown on green plant food including hay, grain and so on. On the other hand seafood is generally eaten in the third or fourth trophic levels involving an enormous energy loss from the energy initially fixed in plant life by photosynthesis.

The energy value of different items of food are given in table.Annual production of agricultural residues and by products:

Agricultural residues and by product	**Approx quantity million tonnes/year**
Crop Residues	
• Cereal	196.8
• Pulses	14.4
• Oilseeds	5.8
• Plantation Crop	34.4
• Fibre Crop	17.4
• Fruits	3.3
• Vegetables	1.2
Agro Industrial By Product	
• Rice husk	18.00
• Jute Mill Waste	0.5
• Cotton Dust	0.3
• Sugarcane Bagasse	5.3
• Saw Dust	2.0

Small Digester: The food wastes is mixed to a slurry of the proper consistency in mixing tank. It flows down the inlet pipe about 3.7 feet3/day, of 1/40 of the digester capacity. A similar amount of spent slurry is removed each day through exit channel. Thus average dwell time is 40 days well in excess of the digestion time of 10 to 20 days. The gas is being collected under the gas holder. A simple bell cover counter weighted by weight K to results is slightly above atmospheric pressure. About 100 feet3 bio gas as produced daily and drawn off through gas locks.

Mechanism Inside The Digester: The bacteria that work in digestion are rather demanding in their requirement separate organism decompose cellulose, protein and fats into soluble compound. This requires most of the digestion time. At second stage acid bacteria connects these compound to organic acids which are quickly converted by the third stage methane bacteria into methane gas. The second stage duration is short so that overall PH is less to 7 or neural. If it

becomes too acidic buffering with time is required. All of these bacteria function without oxygen but require nitrogen. The presence of any oxygen would degrade the process with too much nitrogen low C/N ratio. Ammonia may be toxic to the bacteria and production falls off with too little N2 high C/N ratio the process is limited by N2 availability to support the bacteria. The C/N ratio is 18 and C/N ratio is required 30 by weigh for optimum production.

Conclusion: It is clear that biomass offers ample opportunities to be used as vast renewable source for production for energy in many ways since conventional form of energy generated and supply has limited.

- A proper and proportionate use of the biomass would not only minimum the resource conflict but would also reduce the competition for production of fuel and fertilizer.
- The various aspects of biomass use is to be considered to arise at a given level of energy production and efficiency under the alternate crop system.
- Small digestion are economical for use with collected waste may work out to be economical.

The biomass option will help to avoid bleakest aspects of over population and will become a major pillar in the foundation of our future civilization.

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