

Bio-Energy Programme



Waste to Energy



Biotech

*Reaching the unreachable
to protect our environment*



A. Saji Das

Day to day increase in population increases the generation of waste in the universe. Dumping of waste without proper treatment creates a dangerous situation including that of ecological imbalance. The immediate aftereffect will be the outbreak of epidemic diseases. Accumulation of waste also creates severe long term environmental problems like climatic change and global warming. Now it is high time that we open our eyes to ensure scientific treatment and disposal of waste without causing any harm to the atmosphere. Otherwise the lives of the people of the next generation on the planet earth, would be affected very adversely.

What should be our attitude in handling waste? The problems caused by waste can be reduced considerably through early and speedy treatment. A better solution for that, is to treat the waste at source itself. Different types of waste have to be collected in different bins for treatment. This helps in sorting out the waste for identifying each type for proper treatment and disposal. A civic sense has to be evolved to collect waste and to dispose it off. Biomethanisation technology is the most suitable one to treat bio degradable waste and to generate bio energy with out creating environmental problems.

BIOTECH through its research and development has developed different model plants to generate cooking gas and also electricity from bio waste and wastewater generated from private houses and public institutions. Invention of technology for producing cooking gas from kitchen waste (1998), Installation of more than 12,000 domestic plants in different locations within State and installation of Kerala's 1st 'Waste to Electricity Plant' (2004) and Kerala's first Integrated Waste Management System (2006) are quite a few of the milestones of BIOTECH. With the slogan "Bio Energy from Bio Waste" BIOTECH is proceeding ahead by participating in the Waste to Energy campaign successfully.

A. Sajidas
Director



Biotech at a Glance

BIOTECH was started in 1994 though the idea was conceived much earlier during the eighties. BIOTECH focuses attention on research, development, production of Renewable Energy, especially Bio Energy Programmes with the active co-operation of other government and non-governmental organizations, especially local bodies.

BIOTECH has received several awards. More than 15 inventions have been added to the credit of BIOTECH related with waste to energy programmes.

BIOTECH has developed different models of waste treatment plants suitable for use under different geographical conditions.

BIOTECH do implement projects suitable to treat bio waste at the domestic level and public institutions like Hospitals, Hostels, Convents, Slaughter Houses etc. BIOTECH also provides eligible subsidy for waste to energy projects.

BIOTECH implements programmes through out the State in association with Local Bodies.

BIOTECH renders consultancy services for the preparation of projects, feasibility study, site visit, project implementation, awareness programme, exhibitions, seminars and symposium and for demonstrations related with waste treatment.

There are opportunities for the unemployed especially youths for getting training and jobs under the programme of BIOTECH.

Domestic Bio Waste Treatment

Using Bio-methanisation technology all domestic Bio waste including wastewater can be treated hygienically and Bio Gas produced, a very good cooking fuel. This help to prevent the tendency to throw the waste materials on roads and in public places. Generation of cooking gas at house hold level helps to overcome fuel crises to a great extent.

BIOTECH in association with the local bodies implement decentralized domestic waste treatment programme. Anybody can install domestic Bio waste treatment plants with a minimum investment. Local bodies take much interest to provide financial assistance for domestic programmes in addition to the BIOTECH subsidy. This helps the local bodies to save permanently the huge recurring expenses they have to incur for the collection and transportation of domestic waste to a centralized plant.

The research wing of BIOTECH has developed Nine different fixed and portable models of domestic plants to meet the requirement of all category of beneficiaries.

TECHNOLOGY :- The easily degradable waste material mixed with wastewater from the kitchen is fed into the plant through the inlet chamber of the plant. This waste is converted into cooking gas with the help of a special type of Anaerobic bacteria. The main component in the gas produced is methane which is a non-conventional source of energy.

The space required for a domestic plant (1 Cum) is One square Meter. Time required for the installation is 4 Hours. The gas generated from the waste of a 5 member family is sufficient to work a single burner stove for 2 Hrs. every day.



Electricity from waste

Electricity can be generated by treating the waste generated in public institutions like Markets, Slaughter Houses, Hospitals etc. The waste is converted into biogas by anaerobic digestion. The gas can be utilized for power generation. This power can be utilized to meet in-house requirement of the treatment plant and for local electrification like street lighting.

With the technical guidance of BIOTECH, several local bodies have utilized the waste to electricity projects in the state. All these plants are functioning very well. The waste is collected in different bins at source itself. So there is no need of sorting of the waste in the treatment plant. BIOTECH imparts proper training to the local merchants / operators selected for the operation and maintenance of the plant. Kerala's 1st 'Waste to Electricity Project' was implemented by BIOTECH in the Pathanapuram Grama Panchayat of the Quilon District during 2003-04.

WORKING OF A " WASTE TO ELECTRICITY PLANT "

The waste collected in separate bins are passed through a pre-digester to accelerate the fermentation process and then it is fed through its inlet chamber to main digester. Special group of anaerobic bacteria converts this waste into biogas and slurry. This slurry is a good manure for plants. The biogas produced is collected in the gas collector. After proper filtration it is fed to the generator for power generation. The power is distributed to different locations with the help of a properly designed control panel.

The water content in the treated slurry is filtered and it is reused for the regular operation of the plant. So there is no chance of misuse of treated water by BIOTECH plants. The Solid residue can be collected and used as bio manure.

PARTS OF A PLANT

Pre-digesters, Digesters, Gas Collectors, Gas scrubbers, Gas Filter, Generator, Slurry Recycling Unit, Control Panel



Integrated Waste Treatment

(BIOTECH Model)

To protect the public health and hygienic atmosphere, the solid waste and wastewater has to be treated simultaneously. The plants installed for the treatment at the Fish Markets and Slaughter Houses waste, will not be suitable for treatment of slow degradable materials like dry / green leaves and vegetable waste having more fibre content and other plant parts. But the plant which can treat all the above mentioned materials, will not be suitable for treating blood and waste water generated.

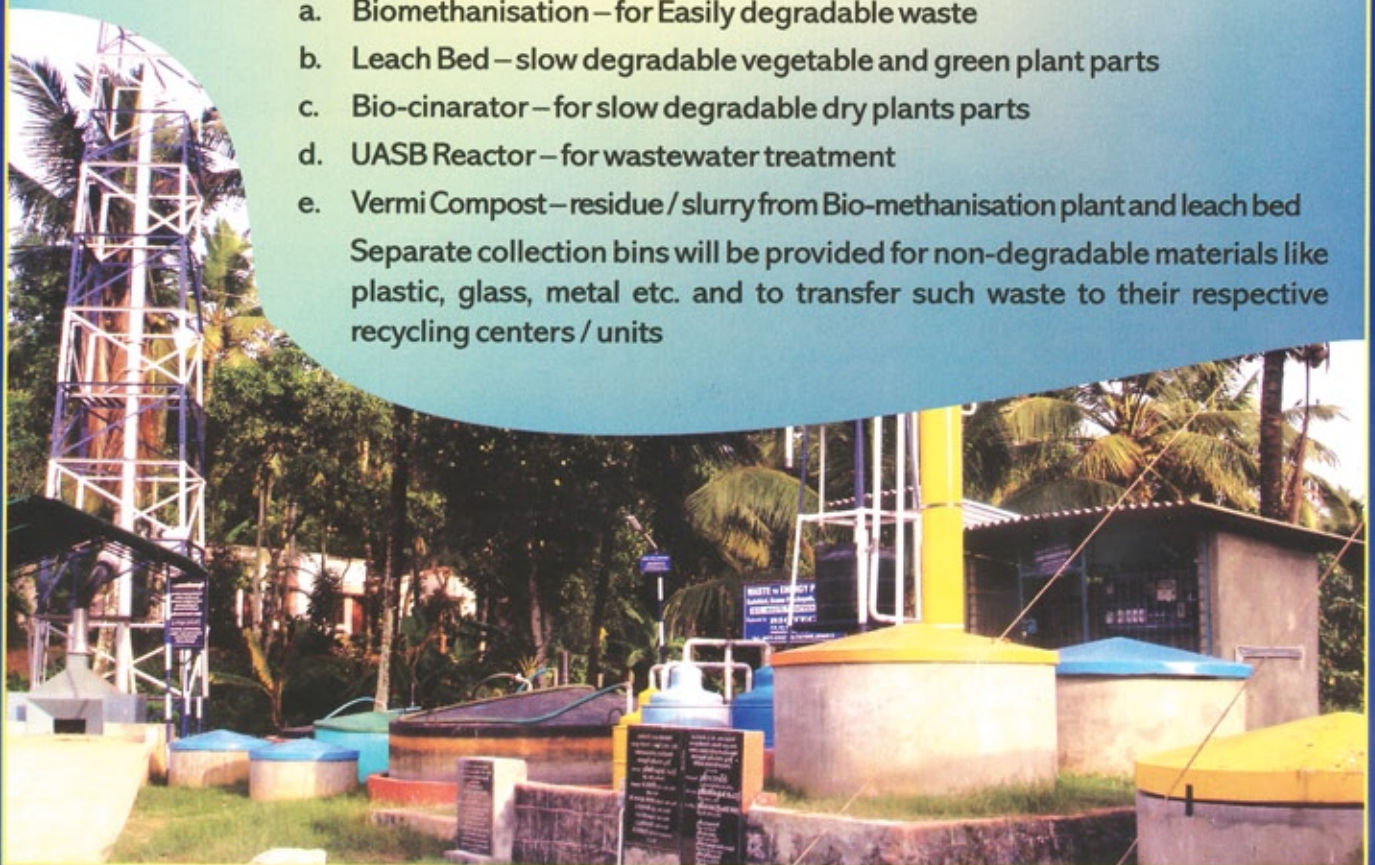
In the centralized treatment plants huge quantity of non-treated waste will accumulate every day due to the application of single treatment technology. Therefore appropriate technology has to be devised to treat each type of waste materials generated in different conditions with different structure.

The BIOTECH Model Integrated Plant is designed for treating all types of solid and liquid waste including the blood collected at source, from the slaughter houses on the same day with least environmental contamination including odour.

In BIOTECH plant Different technologies are adopted to treat different types of waste depending upon their structure. Five different technologies have been incorporated to make eco-friendly waste disposal a great success.

TECHNOLOGIES

- a. Biomethanisation – for Easily degradable waste
 - b. Leach Bed – slow degradable vegetable and green plant parts
 - c. Bio-cinarator – for slow degradable dry plants parts
 - d. UASB Reactor – for wastewater treatment
 - e. Vermi Compost – residue / slurry from Bio-methanisation plant and leach bed
- Separate collection bins will be provided for non-degradable materials like plastic, glass, metal etc. and to transfer such waste to their respective recycling centers / units



Kerala's First Integrated Waste Treatment and Power Generation Project

(Kadakkal Grama Panchayat, Kollam Dist)

All public offices including the Grama Panchayat office are located very near to Kadakkal Town. A very large public market and slaughterhouse are also functioning near the Town. Very large quantities of waste accumulate in the market including waste from the town and slaughter house. Stray dogs' fighting for bones is a usual sight in the town center. Blood and wastewater from the slaughterhouse also spread in and around the slaughterhouse.

To overcome this menace the Grama Panchayat authorities approached BIOTECH and discussed the situation. After a feasibility study BIOTECH prepared a viable project and installed an integrated waste treatment system in Kadakkal Market. This plant has the capacity to treat 1 tone of solid waste and 500 liters of animal blood and waste water every day.

Through Bio-methanisation 3 KVA electricity is being generated regularly. After meeting the in house requirement, the balance power is utilized for providing lights to the children's park, the Fire Station and Market, using 120 CF lamps.

There are special arrangements to treat blood and wastewater from the slaughterhouse. The treated water is re-used for cleaning the slaughterhouse the next day. This helps to curtail the use of fresh water considerably for regular use. Many local body authorities from different parts of the State visited the plant to study the feasibility of implementing this project in their area also. In the new setup of the Kadakkal project, nobody can find any non treated or separated or accumulated waste in and around the plant area. All types of waste generated there are being treated the same day.



Important Invention of Biotech



Cooking gas from Domestic Waste (1998)



Biogas Filling System (2000)



Portable Domestic Waste Treatment Plant (2000)



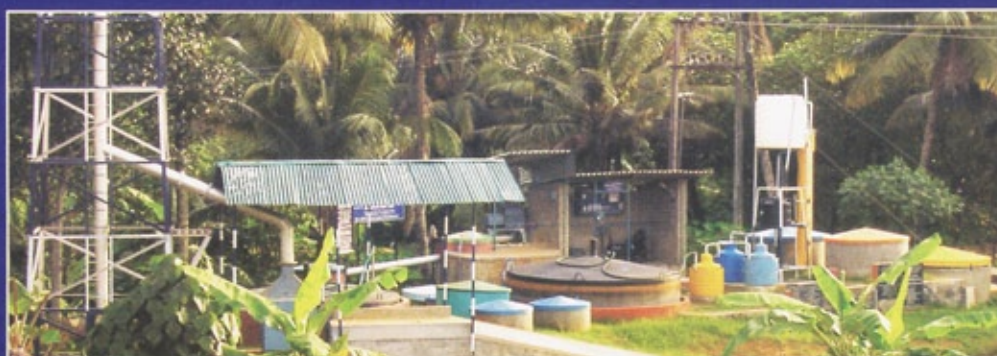
Pre-Conditioner for Institutional Plants (2003)



Biocinartator - using Bio gas as fuel for the treatment of slow degradable dry Bio waste (2005)



Gas Scrubber (2002)



Integrated Bio Waste Treatment Electricity Generation Project in Kadakkal Market, Kollam District, Kerala (2006)

For more details



BIOTECH

CENTRE FOR DEVELOPMENT OF BIO GAS TECHNOLOGY AND OTHER - NON CONVENTIONAL ENERGY SOURCES

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