

# Efficient Methods of Dairy Waste Management and Their By Products as Agriculture Inputs

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**Abstract** - Dairy Waste Management is the need of the time. Waste management is all about how to dispose of all the thing you don't want on the farms. Composting is a sustainable waste management practice that converts a large volume of accumulated organic waste into usable product. When organic waste are broken down by microorganisms in heat generating process, waste volume is almost reduced by 50%, many harmful organisms including pathogens and weed seeds are destroyed and useful, potentially marketable product is produced. In a dairy operation, the majority of organic waste will likely be manure combined with spoiled hay and feed, and animal bedding. Adding compost to soil increases organic matter content. This, in turn, increases the population and diversity of the beneficial of the microorganisms and earthworms in the soil and therefore improving many soil characteristics and allows for the slow release of the nutrients for crop use in subsequent years.

**Index Terms** – Dairy Waste Management, Digestion, Bio-Reactor, Methane, Deena-bandhu.

## I. INTRODUCTION

Dairy industry is among the the largest part polluting of the food industries in regard to its large water consumption. Dairy is one of the major industry causing water pollution. Considering the increased milks demand, the dairy industry in India is expected to grow rapidly and have the waste generation and related environmental problems are also assumed increased importance. Poorly treated wastewater with high level of pollutants caused by poor design, operation or treatment systems creates most important environmental problems when discharged to the surface land or water. Various operations in a dairy industries may include pasteurization, cream, cheese, milk powder, etc. The dairy industry handles large volumes of milk and the major waste material from processing is the water. The water removed from the milk can contain considerable amounts of organic milk products and minerals. In addition cleaning of plant, results in caustic waste water.

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Biogas Plant is most efficient method of treatment of dairy waste. Biogas refers to a mixture of unusual gases produced by the breakdown of organic matter in the absence of oxygen. Biogas is produced by anaerobic digestion with methanogen or anaerobic organisms, which digest material inside a closed system, or fermentation of biodegradable materials. This closed system is called an anaerobic digester, bio digester or a bioreactor. Biogas is primarily methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>), moisture and siloxanes. The gases methane, hydrogen, and carbon monoxide (CO) can be combust or oxidized with oxygen. This energy release allow biogases to be used as a fuel; it can be used for any heating purpose, such as cooking. It can also be used in a gas engine to convert the power in the gas into electricity and heat. Thus we can use the Dairy wastes as source of Energy.

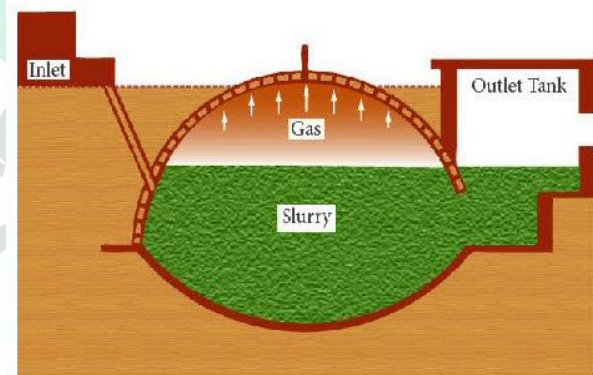


FIG: Deena-Bandhu Model

## II. LITERATURE REVIEW

Dr. Hitesh Jani (2003)

Global Warming is being proving a biggest hazard to the universe. Therefore, the scientist all over the world is working different ways to control the threat. At this same time at Gujarat Ayurvedic University stated that cow dung from foreign cattle's are proving more dangerous to for the depletion of the Ozone layer. Many people were astonished by this statement and many made fun of it. As per acquired information due to foreign cattle's the Ozone layer is depleting, but the Indian cattle are not responsible for this. The further research on this article was handed to Dr. Hitesh Jani, has proved this statement.

### III. METHODOLOGY

Analysis of the Sources of Dairy Waste:

India is country very rich in cattle population. Cattles Excreta can be used as a raw material of Biogas. The simple data collection of number of cattle animals in India:

TABLE I  
Number of cattle's in India (In Lacs)

S.R.	Animals	2003	2007	2012
1	Cow	185.2	199.1	190.1
2	Buffalo	97.9	105.3	108.7
3	Goat	61.5	71.6	65.1
4	Sheep	124.4	140.5	135.2
Total		469.0	516.6	499.1

Impacts of Unprocessed Dairy Effluents on:

Soil- cow dung in soil also enhances the physical and chemical properties by increasing its fertility (by adding nutrients), moisture absorbing capacity and more. If used in clay soil where water logging is problem cow dung increases the porosity of soil

Negative effects on soil: Uneven distribution from surface spreading and injection. With surface spreading the unevenness may result in reduction in herbage yield and quality. With injection it has been observed that concentrations of nitrogen, nitrate and phosphorus in the herbage decrease with increase in distance from the injection slit.

Environment- A cow on average releases 70 to 120 kg of Methane per year. Methane is a green house gas like carbon dioxide (CO<sub>2</sub>). But the negative effect on the climate of Methane is 23 times higher than CO<sub>2</sub>. Therefore the release of about 100 kg of Methane per year for each cow is equivalent to about 2300 kg CO<sub>2</sub> per year. Lets compare this value of 2300 kg of CO<sub>2</sub>: The same amount of CO<sub>2</sub> is generated by burning 1000 liters of petrol. With a car using 8 liters of petrol per 100 kms, you could drive 12500 kms per year. World wide, there are about 1.5 billion cows and bulls. All ruminants on the world emit about 2 billion metric tonnes of CO<sub>2</sub> – equivalent per year. In addition, clearing of tropical forests and rein forests to get more grazing land and farm land is responsible for an extra 2.8 billion metric tonnes of CO<sub>2</sub> emission per year! We cannot deny that farming has a major impact on global warming. Since farming is basically serving the consumers demand for food, we should look at our nourishment. With increase prosperity, people are consuming more meat and dairy products every year. Global meat production meets more than double from 229 million tonnes in 1999/2001 to 465 million tonnes in 2050, while milk output is set to climb from 580 to 1043 million tonnes.

### IV. OBJECTIVES OF BIOGAS PLANT

- Production of Methane (CH<sub>4</sub>), which can be used for cooking and many household purposes.
- Reduces Soil as well as Water Pollution.
- Generation of Organic Fertilizers.
- Simple Technique to create a new source of energy.

### RESULT

Sr. No.	Feed Stock	Litre /kg of dry matter	% Methane content
1.	Dung	350*	60
2.	Night-soil	400	65
3.	Poultry manure	440	65
4.	Dry leaf	450	44
5.	Sugar cane Trash	750	45
6.	Maize straw	800	46
7.	Straw Powder	930	46

### CONCLUSIONS

- We are going to dispose the Dairy waste. Instead of dumping it off, we may use it in the Biogas Reactor. The reactor will decompose the waste introduced in it.
- We will get Biogas as a source of energy.
- Waste generation is now no more a problem, as waste is disposed and digested for producing a new source of Energy.
- Cleanliness will be maintained in the area near the dairy products processing factory.
- Also, the stream flow nearby will be protected from being polluted by the effluents of the waste product of the industry.

### REFERENCES

1. Dioha I. J., C.H. Ikeme, T. Nafi'u, N. I. Soba and Yusuf M.B.S., September 2013, "Effect of carbon to nitrogen ratio on biogas production", International Research Journal of Natural Sciences, Vol. 1 No. 3, pp.1 -10.
2. Dr.Hitesh jani, D. S. (2014). multi purpose energy resources. multi purpose energy resources .
3. Mrs. Bharati Sunil Shete and Dr. N.P. Shinkar (2017) ,Anaerobic Digestion of Dairy Industry Waste Water – Biogas.
4. Kassaveti,I.S. (2008). Dairy Waste Management:Treatment Methods and Potential Uses of Treated Waste. Dairy Waste Management:Treatment Methods and Potential Uses of Treated Waste , 60.
5. Ranjeeta Wadhvani, L. K. (2005). Waste management in dairy industry. Waste management in dairy industry .
6. Sorathia Harilal S., Dr. Pravin P. Rathod, Arvind S. Sorathiya, "Bio-gas generation and factors affecting the bio-gas generation – a review study" International Journal of Advanced Engineering Technology E-ISSN 09763945, IJAET/Vol.III/ Issue III/July-Sept, 2012/72-78.
7. Uttarini Pathak, P. D. (December 2015). Treatment of Wastewater from a Dairy Industry. Treatment of Wastewater from a Dairy Industry .