



DAIRY WASTE MANAGEMENT (WASTE TO GOLD: SOURCE WASTE MANAGEMENT)

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ABSTRACT

Dairy waste is considered as specific type of waste, being biodegradable in nature and having considerable traditional importance as holy resource, capable of curing no. of diseases including cancer. However, in modern digital world with no time for management of unwanted resources combined with competition in field of productivity, this resource remains unutilized and is often drained to get rid of by the dairy farmers leading to unhealthy scenes, odor pollution & therefore public nuisance. Further, discharge in water bodies can lead to water pollution and eutrophication.

It is a established fact since old times that there is no better and cost effective fertilizer than cow dung & urine. This paper highlights that cattle dung and cattle urine, if managed scientifically can be used as biofertilizers / bio-pesticide and various available technologies in use. The paper also highlights that this resource needs to be tapped in a scientific and environmental friendly manner to prevent environmental pollution.

Key Words: Dairy waste, biogas, organic manure, Fermentation, Panchgavya.

INTRODUCTION

Ecologically sound & economically viable technological solutions are being promoted across the country to handle various types of bio-wastes to achieve targets of “Zero waste” & maximum recovery of materials. Further, when it is the issue of dairy waste, which is itself world’s best organic fertilizer, only awareness among dairy owners combined with strict implementation by concerned local bodies is required to prevent this valuable resource ending up in drains and leading to odor pollution/ water pollution.

According to the Union Government’s department of animal husbandry, dairying and fisheries, “Cattle urine is also a powerful natural pesticide and, if used properly, can save human beings from the harmful effects of pesticide residues.”

Case studies in India

Farmers in Guntur district are using fermented cow urine mixed with neem leaves extract as organic pesticide. The Gir breed of cows from Gujarat is preferred for this purpose, as it is believed that its milk and urine have more medicinal and insecticidal properties respectively. One cow can cover at least 25 acres of land (Reddy, 2014a).

AP Biodiversity Board Chairman Dr R. Hampaiah explained: “A farmer is benefited two ways by using this combination of neem leaf oil and cow urine. The neem oil acts as the organic pesticide and cow urine serves as the urea supplement.” It reduces the cost for the farmers, he said (Reddy, 2014b).

In 2016, Sikkim became India’s first fully organic State where cow dung and urine are being used for farming purposes. Organic cultivation does not involve the use of chemical pesticides and fertilisers and thus helps maintain a harmonious balance among the various complex ecosystems. Also, it has improved the quality of the soil which further improves the standards of the crops produced there. Within 1.24 million tonnes of organic production in the country around 80,000 million is supplied by Sikkim alone (Kumar, 2017a).

Organic nutrients can be obtained from the fermentation of cow urine thereby enhancing soil fertility. In addition, it can be turned into liquid fertiliser as a pesticide for crops. Liquid manure from cow urine is very easy and does not take long and is good for plants compared with artificial fertiliser. The materials used to make liquid fertiliser are also easily available and relatively low cost as per Indian council of Agriculture Research (Kumar, 2017b).

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Fig. a: Canal filled with cow dung

- Being organic in nature, cow dung when enters water bodies BOD value of water can rise drastically leading to slow death of water bodies due to eutrophication.
- Contribution to global warming due to emission of greenhouse gases from decomposition of dung lying in open.
- Odour pollution, unaesthetic view & loss of precious resource, when washed into the drains.

So, it is important to manage this resource in scientific manner without causing damage to vital components of environment and save human life.

Scientific Management of dairy waste

The over-dependence on fossil fuels as primary energy source has led to myriads of problems such as global climatic change, environmental degradation and various human health problems. Global warming caused by energy generation from fossil fuel has accelerated the deployment of re-newable fuels such as biogas. Biogas is one of the renewable and sustainable alternative resources that significantly reduce green-house-gas emission compared to the emission of landfill gas to the atmosphere (Raj et al., 2014a).

Management of precious dairy waste can be done by using very simple technologies and in a very cost effective manner depending upon the number of cattle heads, space and budget.

As such, various techniques for management of cattle dung and cattle urine within dairy premises are briefed as under:

1. *Management of cattle dung & cattle urine by installation of Biomethanation / Biogas plant:*

Dairies with more than 5 cattle head should opt for Biogas plant. Biogas is produced by the anaerobic digestion or fermentation of such biodegradable materials as biomass, manure, sewage, municipal waste, green waste, plant material and crops. Biogas is also generated by converting cow manure via anaerobic digestion into methane biogas. One cow can produce enough manure in one day to generate three kilowatt hours of electricity whereas only 2.4 kilowatt hours of electricity is needed to power one hundred watt light bulb per one day (Raj et al., 2014b). It also has the advantage of contributing to the solution of environmental problems, because it substitutes fossil fuels.

Biogas plant undoubtedly provides wonderful solution for dung as well as urine management. User can opt for converting both waste items into methane gas for cooking purpose alongwith manure or can avail the benefit of free electricity generation from dung.



Fig.b: Biogas plant model (Sintex)

Biogas plant of Sintex company (Fig. b) has been designed to be installed easily within a day or two with minimum utilization of space and easy to operate mechanism. The plant occupies minimum space and is also cost effective.

2. *Fermentation of cattle dung / cattle urine:*

Dairies with five or less than five no. of cattle head can opt for fermentation of dairy waste.

i. Fermentation using effective microbes

Nutrient rich bio-fertilizer can be obtained by digestion of both cattle dung and urine in a plastic tank / cemented pit with the help of effective microbes. Use of bio-fertilizer on regular basis provides all essential nutrients to soil besides promoting growth of useful microbes in soil and also acts as bio-pesticide.



Fig. c: Fermentation tanks with dairy farm waste.

On an average, two tons of dairy waste can be converted into biofertilizer with 20 litre of prepared effective microbes solution.

ii Fermentation to make Panchgavya or Panchkavya

An old traditional and unique product made with cow waste along with other natural ingredients is being revived the product has revolutionized & revitalized organic agriculture in Tamil Nadu. Besides boon for agriculture, product is used to fight against all diseases if taken orally by human beings and animals including cattle.

Recommended methodology for making 20 lt. of Panchgavya

Ingredients:

Fresh cow dung-----5 kg

Cow urine-----3 lt.

Cow milk-----2 lt.

Cow curd-----2 lt.

Cow ghee-----1/2 kg

Sugarcane juice-----3 lt. or Pure jiggery dissolved in 3 lt. of water

Tender Coconut water-----3 lt.

Banana-----12 no.

Toddy or grape juice-----2 lt.or (100 gm yeast & 100 gm jiggery in 2 lt. water, add after 30 minutes)

Put fresh dung and ghee in the container & mix thoroughly twice a day for three days.

Add other ingredients on 4th day & stir twice daily for 15 days.

Things to remember:

- ✓ Use only wide mouth mud pot, concrete tank / plastic cans.
- ✓ Should be kept in shade & covered with wire mesh / plastic lid.
- ✓ Panchgavya ready after 15th day.
- ✓ Contains all essential macro & micro nutrients like Nitrogen, Phosphorous & Potassium.
- ✓ 3% solution, i.e., 3 lt. of Panchgavya in 100 lt. of water is ideal for all crops.

It is the only single organic input which can act as a growth promoter & immunity booster (Natrajan, 2008).

Conclusion: It is well established that managing dairy waste is neither an expensive task nor it is cumbersome. Only thing required is strict directions from concerned local bodies with whom dairies are registered and promotion of city compost as under Solid waste management Rules, 2016 by Department of fertilizers / Ministry of Agriculture. Krishi Vigyan kendras can play an effective role in creating awareness among dairy farmers to adopt source waste management of precious dairy waste. The management of dairy waste will not only prevent possible environmental pollution but also benefit farmers on the contrary.

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