REPLACER REPLACING COW DUNG IN BIOGAS PLANTS

- Worldwide, it is a standard practice to use Cow dung alone or in combination of other substrates like Human excreta, Poultry Litter, Kitchen Waste, Municipal Waste, Agro Waste etc.
- Cow dung, coming from a rumen animal is known to contain the native microbial flora that aids in faster biogas production.
- It has also been reported severally that cow dung is a very good starter for poor producing feedstock.
- The hydraulic retention time for cow dung is 40 days and gas production starts at the 5th day.
- Maximum gas is produced at the 26th day which is 0.0263 m3.
- The standard value of gas production yield from cow dung is considered as 0.037m3/kg.
- Among fermentative organisms, ***Bacteroides succinogens***, ***Butyrivibrio fibrisolvens***, ***Clostridium cellobioparum, Ruminococcus albus*** and ***Clostridium sp.*** were predominant.
- Ramasamy et al. observed that a clear differentiation existed in the type of cellulolytic bacterial distribution in rumen and biogas digester.
- Whereas in rumen, ***Ruminococcus sp.*** alone accounted for 60 percent of the total population, in the biogas digester the predominant species belonged to the genera ***Bacteroides*** and ***Clostridium*** rather than the genus ***Ruminococcus***.
- Later Ramasamy reported that ***Ruminococcus flavefaciens, Eubacterium cellulosolvens, Clostridium cellulosolvens, Clostridium cellulovorans, Clostridium thermocellum, Bacteroides cellulosolvens*** and ***Acetivibrio cellulolyticus*** were some of the other predominant fermentative bacteria present in cattle dung-fed digesters.
- However, of late, Animal sheds are maintained away from normal human inhabitation and Biogas plants in these areas are challenged by non proximity to cow dung.
- Hence the need arises for an artificial product to mimic this cow dung.

TYPICAL CHEMICAL COMPOSITION OF CATTLE MANURE:

All on Dry matter basis			
Dry matter, %	26.6	Gross energy, Mcal/kg	4.61
Crude protein, %	11.9	Iron, ppm	612
Crude fiber, %	50.9	Copper, ppm	12
NFE, %	31.6	Nickel, ppm	6
Ether extract, %	0.2	Cadmium, ppm	0.76
Ash, %	5.4	Lead, ppm	1
Calcium, %	0.63	Mercury, ppm.	0.07
Phosphorus, %	0.17		

Now our REPLACER contains:

1. Cow dung extract 50%
2. Soil Extract 10%
3. Azolla extract 5%
4. Trace Minerals
5. Trace Vitamins
6. pH Buffers
7. Protein hydrolysates
8. Sodium Acetate
9. Oxygen liberators
10. Carbon dioxide Generators
11. Organic acids

1 Kg of REPLACER can replace 20 Kg Wet Cow Dung

SPECIAL PRECAUTIONS

- This product uses sterile inputs and as such free from beneficial/pathogenic microbes.
- This is an analog of Cow dung.
- This is intended to benefit the end users where cow dung is scarce.

FOR BETTER RESULTS:

- Conventional biogas digesters require 10 kg of cattle waste to produce an equivalent quantity of biogas.
- Addition of rice husk soaked in water at 20 per cent level to this product increases the gas production by 20%.

BASED ON A CONVENTIONAL 6 m^3 digester

PARAMETER	Cow Dung	Replacer
Volume of biogas produced per day by the 6 m^3 digester	3.5 m^3/day	3.5 m^3/day
Weight of Slurry fed per day:	100 kg/day	100 kg/day
Weight of wet manure (assumed to be 50% of slurry by weight):	50 kg/day	2.5 Kg/day
Number of cattle required to produce 50 kg of manure daily:	50/(4.5 × 0.60) = 18.5 or 19 Cattle (assuming 60% of dung is collected)	0
Number of households whose cattle will be involved:	19/2.5 = 7.6 households	0
Assumed calorific value of biogas:	20 MJ/m3 [3-5]	20 MJ/m3 [3-5]
Joules produced by digester per day:	70 MJ/day	70 MJ/day
Joules available per household per day:	9.211 MJ/day or 9,211 kJ/day	depends on total households and their requirements