

CHAPTER -7

**ANALYSIS OF SOLID REMANTS AND
ITS EVALUATION AS ORGANIC
MANURE**

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The effluent from the biogas unit constitutes good quality manure free from weed seeds, foul smell and pathogens. It holds value both as soil conditioner and organic fertilizer. It contains a full range of plant nutrients in the digester slurry as nitrogen (N), phosphorous (P_2O_5) and potash (K_2O).

The fertilizer benefit has been claimed to reduce economic spending both for the farmers and for the nation. The content (in absolute term) of nutrients and minerals in the manure will not change to any great extent due to the fermentation process. Compared to farmyard manure, N_2 , K and P found will be formed in the effluent in forms that one more easily absorbed by plants conversion of amino acids and proteins to ammonia and soluble ammonium compounds take place. Organic material, in the form of dead bacteria will also be produced.

The affluent has been composed and there after be used where soil conditioning and fertilizer is needed. The compost will be designed and managed properly ensure that a high degree of the minerals and nutrients can be preserved.

A number of experiments have been carried out in order to find out the value of the fertilizer. The results from these tests indicate that the effluent from a biogas digester is at least as good a fertilizer as the farmyard manure and chemical fertilizers.

This manure is acknowledged as a valuable soil conditioner and fertilizer in rural areas.

If well managed the effluent could actually prove to be more profitable for the farmer than the gas.

It has been observed that depending upon the input material used the sludge contains elements like nitrogen, phosphorous, potassium and also several trace elements may be present in the slurry like bromium, calcium, copper, iron, manganese, zinc etc.

From the above study it becomes necessary to evaluate the presence of the element like carbon, nitrogen, phosphorous for the manure. Several experiments done for chemical analysis of manure of kitchen waste (dust form) in the central laboratory of West Bengal Pollution Control Board, kolkata and obtained the following results as shown in table no. 7.1

Table No. 7.1 Chemical analysis of manure

Elements	Value		
	(Sample no. 1)	(Sample no.2)	(Sample no. 3)
Carbon (%)	45.92	43.85	44.25
Nitrogen (mg/Kg)	1281.00	1210.00	1250.00
Phosphorous (mg/Kg)	61.26	58.54	60.30

From the above results it reveals that the manure can be used as a good fertilizer because of its high value of nitrogen and phosphorous contents.

Fertilizer value of the manure from biogas plant equivalent to chemical fertilizer is mentioned in the following table no. 7.2

Table No. 7.2 Fertilizer value of manure (N, P, K) to other chemical fertilizers

N, P and K in Biogas manure	Other chemical fertilizer
1 Kg. N ₂	2.2 Kg Urea
1 Kg. P ₂ O ₅	6.3 Kg. Super phosphate
1 Kg. K ₂ O	1.7 Kg. muriate of potash

Source: Nijaguna, B.T., Biogas Technology, New Age International (P) Ltd. New Delhi, p41

Apart from its use as a soil conditioner and organic fertilizer, the slurry after digestion can be used as a feed for fish in the ponds/lake.

An ideal feed for Singhi and Magur and a breathing catfish.

After the solids are removed from the sludge, the remaining liquid that contains nutrients and trace materials is considered to be good promoter of algae. Chlorella a single allowed high protein algae could be harvested with the liquid portion of the sludge. This chlorella can be used as animal feed to replace soybean soil meal or protein supplement. Recently, Spirullina is also being cultivated in the supernatant liquid.