

## Lecture No. 32

### Utilization and Enrichment of Slurry

#### Biodigested Slurry Densification

Farmyard manure is the traditional source of organic manure and is, most readily available to the farmers. About half of the **813 million** tones of cattle dung produced annually in India is being used as fuel. To avoid the use of cowdung for the fuel and manurial purpose the gober gas plant was introduced in which dung is fermented to yield a combustion gas and the residue passed through the gober gas plant is a manure rich in nutrients.

The composition of the sludge produced by anaerobic digestion is determined by the composition of the raw material fed to the biogas plant. The efficient slurry consists of soluble substances such as phosphate, ammonium and its salts, potassium salts and some trace elements absorbed on the organic matter or exchanged by absorption with humic acid.

Undecomposed organic residues such as lignin and small amount of under-composed cellulose and hemi cellulose, humus like substances formed by digestion of lignin protein, polysaccharides etc.

Anaerobic digestion of organic waste conserves nutrients needed for crop production. The only materials removed from the system are the gases generated, mostly methane, carbon-di-oxide and hydrogen sulphide.

#### Analytical data of the organic manures is as follows:

	N%	P%	K%	Fe ppm	Mn ppm	Zn ppm	Uu ppm
Biogas slurry	1.60	1.40	1.20	4200	550	150	52
FYM	1.00	0.62	0.80	5700	490	100	45
Compost	1.30	1.00	1.00	4000	530	120	50

The anaerobic digestion of organic wastes such as human excreta, cattle dung, crop residues, etc. produces manures of better quality than that is produced aerobically (conventional composting) as losses of plant nutrients and organic matter during digestion are least. Physically also, digested manure when dried is more finely divided and is easily mixed with the soil. The sludge/biogas slurry emits no offensive odors and does not attract flies or rodents. The weed seeds which are generally found in farm yard manure are completely destroyed due to anaerobic digestion.

It has also been observed that crops manured with digested slurry stand up to long drought much better than those grown with other organic manures.

## **Enrichment of digested slurry**

The dried slurry would still have low plant nutrient content and would need to be applied in large amounts to obtain differences in crop yields.

An effective method of treating such manure is to enrich them with fertilizer nitrogen and with phosphatic fertilizers, to obtain concentrated organomineral fertilizers which could be applied in comparatively small quantity. The dry slurry can also be used to replace dolomite as filler in granulated N.P.K. fertilizer mixture when dolomite is replaced by an organic matter like dried slurry not only its fertilizer value increase but the residue helps to build up soil structure. The common fertilizers which are generally used for enrichment are

- 1) Urea for nitrogen 2.5 kg per 25 kg of slurry
- 2) Superphosphate 5 kg per 25 kg of slurry
- 3) Rock phosphate 5 kg per 25 kg of slurry

Application of biogas slurry therefore seems to afford a very good means of satisfying the needs of the plants for readily available nutrients and this can be made use of with advantage by all users or biogas plants.

## **Pelletiser**

A pelletiser has been fabricated for densification of biodigested slurry into granules rock phosphate as a source of enrichment and coir waste as a source of binding material. The pelletiser consists of two units (i) pellets extruder and (ii) gyrotary shaker. Enriched biodigested slurry of optimum consistency is fed into the hopper of the pellet extruder and the feed material is extruded by helical screw through spout and made into thick noodles. The noodles are cut into small equal pieces and made into spherical pellets in a gyrotary shaker. The spherical pellets can be applied through a granular applicator. The cost of the pelletiser is RS.15,000/-.