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# Groundnut shell and Composite Mixture of weeds-A Good Feedstock Material for Bio-gas Production

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Cow dung has hitherto been employed as a feedstock material for biogas generation. Among the wases, groundunt shell and composite mixture of vegetable wastes incorporated along with cowdung and old slurry in the proportion of 1:2:2 (V/V) gave 1634 as 1000 CC/day over a period of 12 weeks. The relative distribution of various microbial population distributed in the biodigested specimens is discussed.

The dwindling sources of fossil fuels has necessitated the need to look out for alternative resources of renewable sources of energy. The biogas generation through microbial conversion of biomass has become handy in the endeavour. The use of cow dung as a feedstock material for biogas generation is widely prevalent in rural areas. The various types of wastes such as crop residues, weed plants, wastes emanating from various processing industries fruit and canning factories etc, could profitably be utilised as an alternate feedstock for biogas generation. They often pose a threat to human environment. An attempt has been made in the present study to find out the usefulness of groundnut shell and composite mixture of weeds as an alternative supplement though not as a substitute to cowdung which is hitherto been employed as a potential source of raw material for biogas generation. (Sathianathan, 1975; Anonymous, 1977).

## MATERIAL AND METHODS

The groundnut shell and composite mixture of vegetable wastes employed in this study were obtained from the local matket. The cow dung was collected from the dairy farm of Tamil Nadu Agricultural University and the biodigested slurry from the well established biogas plants maintained at the Farm Machinery workshop premises. The groundunt shell and the composite vegetable wastes were chopped into small bits of 1 to 2 cm length and incorporated along with cow duog and old slurry in the proportion of 2:2:1 (V/V) after thorough mixing with equal quantity of water. The experiment was allowed to run as a batch type, lab-scale digesters and the gas output was measured daily over a period of twelve weeks by the water displacement method The biodigested slurry specimens were collected and screened for their microbiological properties following standard methods.

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## RESULTS AND DISCUSSION

The groundnut shell incorporated along with cow dung and old slurry in the proportion of 1:2:2 (V/V) recorded on an average over a period of 12 weeks/the maximum gas output of 1634 cc/day compared to composite mixture of wastes incorporated treatment of 1000 CC/day. (Vide Table 1). The control treatment without these wastes however recorded only 972 CC/day. Similar results were obtained in the experiments carried out at ludhiana centre, Punjab (unpublished data; personal communication) lend support to the above findings. The relative distribution of Bacteria, coliforms, fecal streptococci, methanogenic and cellulolytic bacterial populations was also studied. The occurrence of maximum of 37.0x10⁴/g. of methanogenic bacteria in the groundnut shell incorporated treatment is worth to mention among the biodigested slurry specimens examined from various trearments (vide Table 2). From the trend of the data obtained, it is evident that groundnut shell, if blended properly along with cow dung and old slurry could offer a promising substrate to be used as a supplement for biogas generation. The recycling of vegetable wastes, though not eucouraging might, to some extent, help in warding off the sanitation problems faced by mankind.

### REFERENCES

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Table 1 Effect of Incorporation of Various wates on biogass Production

| Treatment | Production (V/V) | Average gas production over 12 weeks (CC/day) | % of increase over control |
|---|---|---|---|
| CD : OS : GS | "2:2:1 | 1634 | 68.11 |
| CD : OS : Os | 2:0:1 | 1301 | 33.85 |
| CD : OS : CVW | 2:2:1 | 1000 | 3 |
| CD : OS : CVW | 2:0:1 | 906 | — |
| Control (CD : OS) | 2:2:0 | 972 | — |

GS : Groundnut shell CVW = Composite vegetable wastes.

Table 2 Effect of Incorporation of Wastes on the Distrbution of Microbial Pupulation

| Treatments | Proportion (V/V) | MICROBIAL POPULATION (Expressed per gram on oven dry basis | | | | |
|---|---|---|---|---|---|---|
| | | Bacteria (X $10^8$) | Cellulolytic bacteria (X $10^4$) | Methanogenic bacteria (X $10^4$) | Coliforms (X $10^4$) | Fecal Streptococci (X $10^3$) |
| CD : OS : : GS | 2:2:1 | 181 | 48 | 37 | 460 | 75 |
| CD : OS : GS | 2:0:1 | 147 | 48 | 17 | 180 | 44 |
| CD : OS : CVW | 2:2:1 | 64 | 21 | 13 | 180 | 11 |
| CD : OS : CVW | 2:0:1 | 42 | 17 | 10 | 12 | 11 |
| Control (CD : OS) | 2:2:0 | 128 | 14 | 8 | 180 | 7 |

GS = Grouudnut shell CVW = Composite Vegetables wastes.