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TO STUDY ON LANDFILL SITE WITH PROCESS OF SLURRY AND BIO COMPRESSED NATURAL GAS

Shashank P N, Sai Shreyas,Tejas V,Yashwanth D V

Dayananda Sagar College of Engineering,Civil Enfineering,Banglore,Karnataka-560078

A B S T R A C T

This text bears the cost of a case take a gander at to situate out CNG execution in Bellahalli Bangalore north region . Civil strong waste (MSW) landfills are the 0.33-greatest wellspring of human-related methane emanations. Landfills are essential for the legitimate removal of strong waste. They decrease how much waste that makes it into the climate, help to save you affliction transmission, and hold bunches smooth. Landfills envelop risks for general wellbeing got from surface or groundwater pollution via leachate, the dissemination of obfuscate into the more extensive environmental factors and lacking on-page reusing sports. Landfill fuel comprise basically of methane and CO2 (carbon dioxide), both basic ozone harming substances. Landfill sites make a commitment 20% of the worldwide anthropogenic methane emanation. The gases methane, hydrogen, and carbon monoxide (CO) from slurry of landfills can be combusted or oxidized with oxygen. This energy discharge allows in biogas to be utilized as a gas; it very well may be utilized in gas cells and for any warming explanation, comprehensive of cooking. it can moreover be used in a gas motor to change the power inside the gas into strength and warmth.

Keywords*: Natural Gas, Landfill, Waste, environmental, decompose, etc…..*

1. INTRODUCTION

Natural wastes additionally generate massive quantities of methane as they decompose. Methane is a powerful greenhouse gasoline that traps warmth in the surroundings extra successfully than carbon dioxide. Given equal quantities of methane and carbon dioxide, methane will take in 86 times extra warmth in twenty years than carbon dioxide. To lessen greenhouse fuel emissions and the hazard of pollution to waterways, organic waste can be removed and used to supply biogas, a renewable source of power. whilst displacing fossil fuels, biogas creates similarly emission discounts, once in a while ensuing in carbon negative systems. Biogas is produced after natural materials (plant and animal merchandise) are broken down by way of bacteria in an oxygen-unfastened environment, a process referred to as anaerobic digestion. Biogas systems use anaerobic digestion to recycle those organic materials, turning them into biogas, which includes each power (gasoline), and valuable soil products (beverages and solids). Anaerobic digestion already takes place in nature, landfills, and a few cattle manure management systems, however may be optimized, controlled, and contained the usage of an anaerobic digester. Biogas contains roughly 50-70 percentage methane, 30-forty percentage carbon dioxide, and hint amounts of other gases. The liquid and stable digested fabric, referred to as digestate, is frequently used as a soil change. A few natural wastes are greater hard to interrupt down in a digester than others. Food waste, fats, oils, and greases are the easiest natural wastes to interrupt down, while cattle waste has a tendency to be the maximum tough. Blending a couple of wastes inside the identical digester, referred to as co-digestion, can assist boom biogas yields. Biogas can also be upgraded into bio methane, also called renewable natural gasoline or RNG, and injected into herbal gas pipelines or used as an automobile fuel.

2. OBJECTIVES

- To concentrate on geographical area of landfill site and impact on ground water.
- To assess the operation and process for the formation of slurry by using strong waste.
- To access the process of compressed natural gas (CNG) through slurry.

3. METHADOLOGY

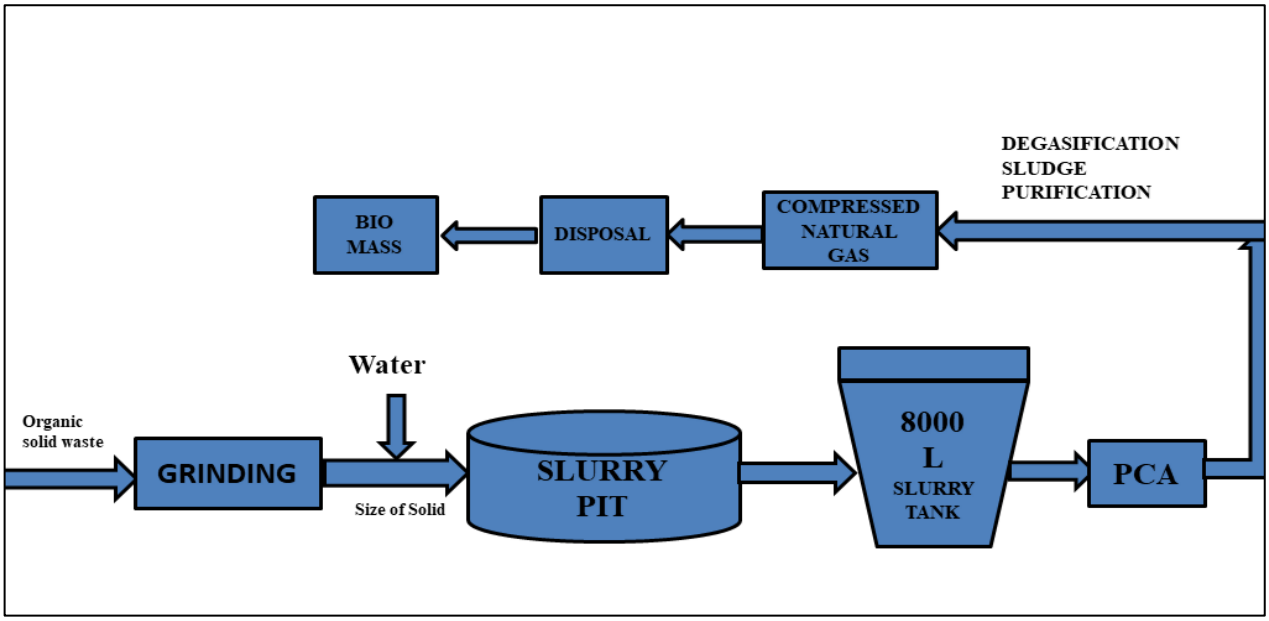


Figure 1- Block Diagram -Slurry Management

Instead of escaping into the air, LFG will be captured, converted, and used as a renewable energy resource. Mistreatment LFG helps to cut back odour's and different hazards related to LFG emissions, and prevents alkane from migrating into the atmosphere and conducive to native smogginess and world temperature change. Additionally, LFG energy comes generate revenue and make jobs within the community and on the far side. Landfills area unit the third largest supply of human-related alkane emissions within the u.s. Landfills contain identical anaerobic bacterium gift in a very sterilizer that break down organic materials to supply biogas, during this case lowland gas (LFG). rather than permitting LFG to flee into the atmosphere, it will be collected and used as energy. Currently, LFG comes throughout the u. s. generate regarding seventeen billion kilowatt-hours of electricity and deliver ninety eight billion isometric feet of LFG to fossil fuel pipelines or on to end-users annually. For reference, the typical U.S. target 2015 used regarding ten,812 kilowatt-hours of electricity per annum. Manage the spinned words as you want.

Landfilling of municipal waste could be a major issue of the waste management system in Europe. The generated leachate should be fitly treated before being discharged into the surroundings. Technologies meant for leachate treatments are often classified as follows (i) biological strategies, (ii) chemical and physical strategies. Here were view in short the most processes presently used for the Landfill leachates treatments.

Generalities on biological strategies

Biological treatment processes-Regardless of the kind of wastewaters, the biological treatment method consists in dominant the atmosphere needed for optimum growth of the microorganisms concerned. The microorganisms are accustomed convert the mixture, dissolved carbines element organic matter and inorganic element like N, P, S, K, Ca and Mg into cell tissue or/and into the varied gases. Most biological treatment processes are created from complicated reticular, mixed biological populations tailored to removal of individual pollutants. once coming up with or analysing a biological treatment method, the engineer ought to think in terms of Associate in Nursing system or community, and not in terms of a 'black box' that contains mysterious microorganisms (Metcalf and Eddy 1991). The management relationships parameters like cell duration (sludge age),food-microorganism magnitude relation (F/M), hydraulic retention time (HRT), sludge volume index (SVI), etc. permit to assess operating conditions of biological system. The principal organic process bestowed below (activated sludge and biological filter) has been best-known quite well and is with success applied for domestic sewer water. However, for industrial effluents or leachate, the traditional approach for treatment needs some modifications. Depending on the sewer water and also the standards that they have to meet, totally different method style and/or operational control parameters should be thought-about. Initially the laboratory scale approach is required. Rotating biological contactors The rotating biological contactor is Associate in Nursing example of biological filter (attached growth) technology. It consists of circular plastic discs mounted centrally on a standard horizontal shaft. These discs are close to four-hundredth submerged in a tank containing sewer water and are slowly turned by either a mechanical or a compressed gas drive. Microorganisms from the sewer water adhere to the plastic disc surfaces and, among 1–4 weeks from start-up, kind a biofilm move from one to two millimetre in thickness. This biological growth assimilates organics from the sewer water passing over the surface of the disc and is chargeable for most of the treatment which happens. once the disc rotates out of the sewer water, the biofilm becomes exposed to air and is ventilated, thereby maintaining aerobic conditions. once reaching a critical thickness, parts of the biofilm slough off the discs. The disc rotation serves several functions, as well as providing contact between the biomass and sewer water, cutting off of excess biomass, mix of the mixed liquor, and aeration of the sewer water. for several case Associate in Nursing optimum rotation speed is of regarding two revolutions per minute for a three m diameter disc. However, taking in to account power necessities (increasing exponentially with will increase of in media velocity) a motility speed of 1.5–2.0 revolutions per minute is taken into account a sensible higher rate limit to use, even once commercialism high strength water(Bishop and Kinner 1986).Aerobic activated sludge. The principle of activated sludge is that in a very reactor a community of microorganisms is consistently furnished organic matter and O. The microorganisms consume the organic matter and rework it by suggests that of aerobic metabolism, part into new microbe biomass and part into greenhouse gas, water and minerals. The flow of the water brings a couple of constant wash-out of the microorganisms from the reactor to the settler. Here, the microorganisms, which grow in flocs and have non inheritable a density ample to decant, are maintained so removed with the underflow. a part of this sludge is then recycled to supply biomass to treat the new incoming. the excess quantity is discharged

To take a glance at intends to learn the complete process of the installed operating machine, from conversion of wet waste to slurry and later on producing

1) Phase 1:- collection of municipal wastes.

2) Phase 2:- Conversion of wet waste to slurry.

3) Phase 3 :- remodeling of slurry to garage tanks .

4) Phase 4:- series of raw gas and conversion to compressed natural gasoline.'

5) Phase 5:- Addition od substrate to the slurry storage tank.

6) Phase 6:- Collection of Raw Production in Slurry Storage Tank

7) Phase 7:- Conversion of Raw Gas of Bio Compressed natural gas

Phase 1 :- the gathering of both moist waste areas of strength for and from each house and waste feasible sites are collected. here the waste is generated into moist and dry waste and the wet waste is taken to the slurry processing point. As in line with the daily overview cycle six tracks each convey 800 kg s of weight waste is recorded.

Phase 2 :- here the waste is taken care of to the grinding gadget and is grinded in this sort of manner that waste slurry is shaped . in the course of the feeding of wet waste to the grinding framework wastes which are lesser than (15mm) are pushed out of the grinder. cycle 200 turns take place in line with minute. about four bunches of moist waste is grinded consistently. as the profits is fashioned and doesn't a great deal amount of water content material here the water is fit week by week ones and liquefied. For each one kg of moist waste one liter is extracted.

Phase 3:- The gathered profits is then transferred to the garage tanks close to the pits, which may be totally about six tanks which are established that can safeguard straightforwardly to 8000 L capacity. here are approximately 6000 to 7000 L of slurry is filled inside the garage tank and made it to go through anaerobic decomposition for 30 days. here inside the garage tank because of anaerobic decomposition gases are produced. about which 65% of methane fuel is produced interior and relaxation 35% is sulfur, moisture content , co2 and other gases.

Phase 4:- natural fuel is accrued inside the bins is shipped off the fuel purifier, the visitor sanitized via putting off CO2, sulfur, moisture content various gases to supply compressed natural fuel(CNG) which is later on collected in the CNG tanks and later used for various purposes. about 80-90kg of CNG is produced normal. In term of three-four hours.

Phase 5:- In this stage, the substrate is added to the slurry tank, where the bio-chemical reactions take place. Where bacteria such as Escherchia coli, Bacillus cereus and Lactobacillus are present which biologically react with methanogenic bacteria present in the slurry which initiates increase in production of methane gas.

Phase 6:- The raw gases from the storage tank are collected in the gas collection balloons. Here, methane, CO2, Sulphur, moisture content and other gases are present. From here these gases are sent to the gas purification tanks.

Phase 7:- The raw gas collected in the containers is sent to the gas purifier, the gas is purified by eliminating CO2, Sulphur , moisture content and other gases to produce compressed natural gas (CNG) which is later collected in the CNG tanks and later used to cooking purposes in nearby restaurants near by.

Up to 80-90 kgs of CNG is produced per day (meter cube)

Totally 3-4 hours of complete processing time is taken.

$CH_4+2O_2 \rightarrow CO_2+2H_2O$.

Future developments:

The slurry and water ratio can be changed so as to boom the slurry volume

- Different bacteria's may be brought with a purpose to boom the methane production price.

Sustainable goals:

- Fossil fuels from renewable assets.
- Inexperienced house gases are not allowed into the environment due to processed wastes.
- Carbon sequestration
- CNG is less expensive than LPG .

4. RESULT

Water sample test around landfills:

SL. NO	PARAMETERS	Sample1	Sample2	Sample3	Sample4	Sample5
1	pH	8.73	7.43	7.60	7.79	8.00
2	Turbidity	1.40	1.60	1.80	1.20	1.30
3	EC	440	530	460	440	320
4	TDS	320	345	370	385	310
5	HCO3	332	324	384	360	340
6	Cl	74	78	120	116	110
7	TH	400	320	380	310	300
8	Ca	75.35	73.75	62.52	144	144.29
9	Mg	73.87	79.70	39.95	58.30	48.60
10	Na	79.20	99.20	65.60	86.40	79.20
11	K	6.2	6.2	9.8	6.8	8.8
12	F	0.03	0.12	0.05	0.53	0.11
13	SO4	94	80	90	139	170
14	NO	3.5	4.5	7.5	5.5	8.0
15	Fe	0.26	0.20	0.54	0.52	0.18

Bellahalli is situated in the Bangalore urban district of Karnataka, with a size of the area being 14.31 square kilometer.Around 2400 tons of garbage is being dumped everyday in Bellahalli. Some 300 compactors per day are being sent from different parts of the city to the quarry, each carrying nearly 8 tons of trash.

* LATTITUDES AND LONGITUDES:-

13.1005° N , 77.6427° E

* WATER BODIES :-

Sampignehalli Lake, Kalkere Lake, Kogilu Kere

* POPULATION:-

- Male Population: 6809
- Female Population: 6162

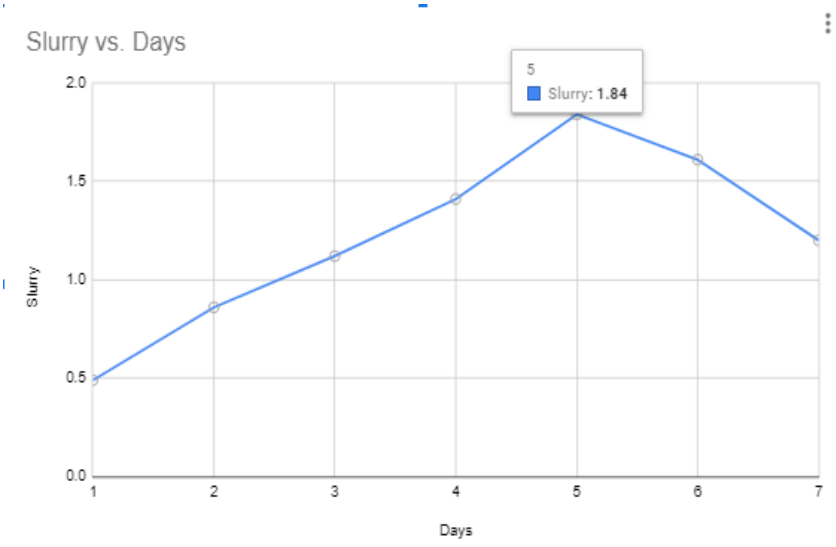
* Nearest airport & distance

* Nearest Railway Station & Distance

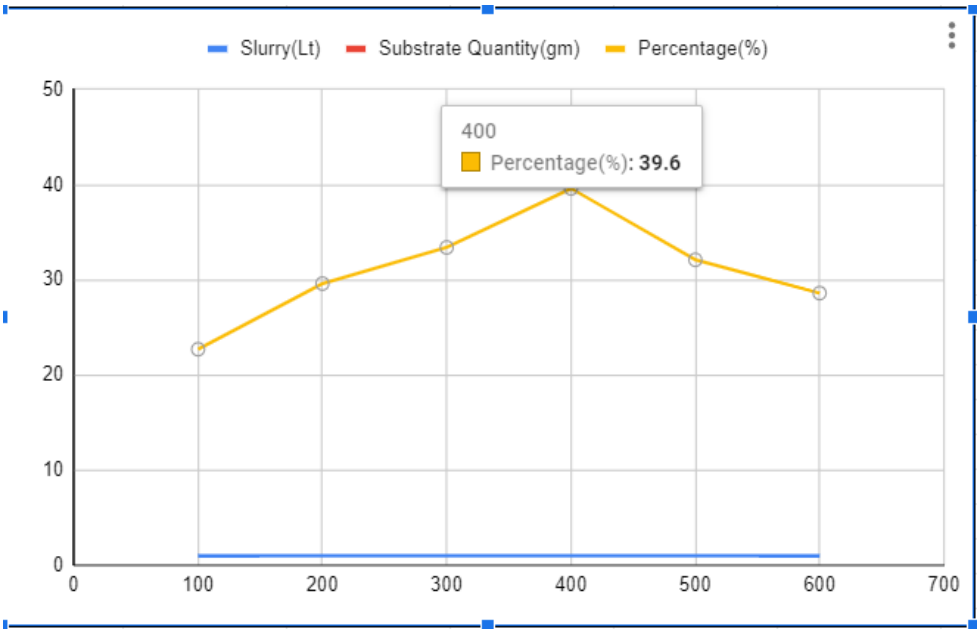
AMOUNT OF METHANE GAS PRODUCED (only slurry)

Slurry quantity : 1 ltr

Days	Percentage of methane produced (%)
1	**0.49**
2	**0.86**
3	**1.12**
4	**1.41**
5	**1.84**
6	**1.61**
7	**1.2**

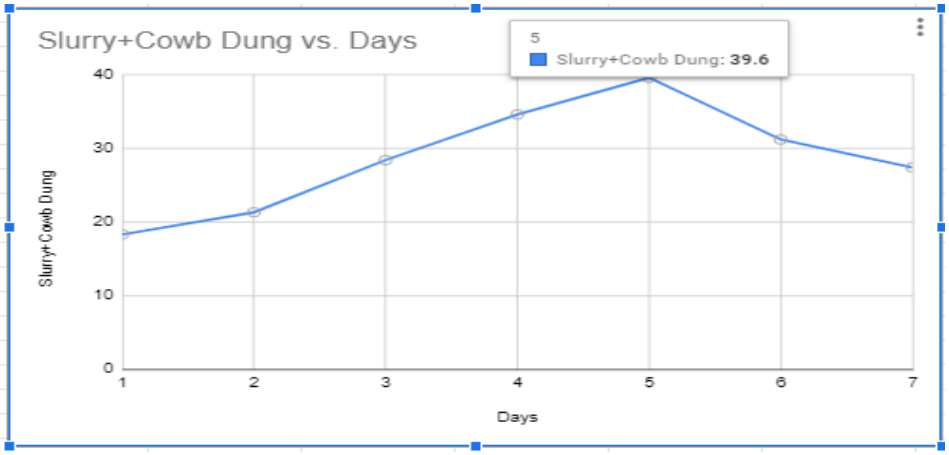


AMOUNT OF SUBSTRATE ADDED TO THE SLURRY



Slurry(Lt)	Substrate Quantity(gms)	Percentage of methane gas produced (%)
1	100	22.7
1	200	29.6
1	300	33.4
1	400	39.6
1	500	32.1
1	600	28.6

AMOUNT OF METHANE GAS PRODUCED BY ADDING SUBSTRATE



Days	Percentage of methane gas produced (%)
1	18.3
2	21.3
3	28.4
4	34.6
5	**39.6**
6	31.2
7	27.4

5. CONCLUSION

In the EU countries the matter of leachate treatment has been existed for a few time currently, however a universal answer has not been found. Technologies meant for leachate treatment will be classified as follows (i) biological ways (ii) chemical and physical ways. However, so as to meet strict quality standards for direct discharge of leachate into the surface water, a development of integrated ways of treatment, i.e. a mixture of chemical, physical and biological steps, area unit needed. During many years, conventional biological treatments and classical physico-chemical methods are being considered as the most appropriate technologies for manipulation and management of high strength effluents like landfill leachates. When, treating young leachate, biological techniques can yield a reasonable 3 treatment performance with respect to COD, NH -N and heavy metals. When treating stabilized (less biodegradable) leachate, physico-chemical treatments have been found to be suitable as a refining step for biologically treated leachate, in order to remove organic refractory substances. The integrated chemical–physical–biological processes (whatever the order) ameliorates the drawbacks of individual processes contributing to a higher efficacity of the overall treatment. In the recent

years, with the continuous hardening of the discharge standards in most countries and the ageing of landfill sites with more and more stabilized leachates, conventional treatments (biological or physico-chemical) are not sufficient anymore to reach the level of purification needed to fully reduce the During a few years, typical biological treatments and classical physico-chemical ways ar being thought-about because the most applicable technologies for manipulation and management of high strength effluents like lowland leachates. When, treating young leachate, biological techniques will yield an inexpensive 3 treatment performance with regard to COD, NH –N and significant metals. once treating stable (less biodegradable) leachate, physico-chemical treatments

have been found to be appropriate as a refinement step for biologically treated leachate, so as to get rid of organic refractory substances. The integrated chemical–physical–biological processes (whatever the order) ameliorates the drawbacks of individual processes contributory to a better efficacity of the overall treatment.

In the recent years, with the continual hardening of the discharge standards in most countries and therefore the

ageing of lowland sites with a lot of and a lot of stable leachates, typical treatments (biological or physico-chemical) don't seem to be sufficient any longer to succeed in the level of purification required to completely scale back level of purification required to totally cut back the negative impact of lowland leachates on the

environment. It implies that new treatment alternatives species should be projected. Therefore, within the last twenty years, simpler treatments supported membrane technology has emerged as a viable treatment alternative to obey and unfinished water quality regulations in most countries.

According to the testing reports the amount of methane gas produce with slurry is 1.84% when compared to the methane production when substrate is added to the slurry and made to undergo unaerobic decomposition the amount of methane produced was 39.4%. And bacterias like Escherchia coli, Bacilus cereus and Lactobacillus was found which acted as a catalyst in more production of methane.

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