**Short Communication**

**Bhusawal Municipal Council (Maharashtra, India) Sewage Water And Solid Waste (Bio-Degradable) To Power Generation, Bio-Manure (Organic Fertilizer) And Treated Water**

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**Abstract:** This report deals with Sewage water and solid waste of Bhusawal municipal council to power generation, bio-manure and treated water. This concept consist of anaerobic digestion process of sewage sludge (which is generated after water treatment process of sewage water) and bio-degradable solid waste which generates Bio-gas and Bio-manure. Bio-gas is used for power generation and Bio-manure is used as agriculture fertilizer. Total mixture of sewage sludge and bio-degradable solid waste remaining after anaerobic digestion process which is organic in nature is applied to land as soil amendment and fertilizers. After complete process remaining 80% of water is treated water which is used again for Industrial or agricultural purpose. Bhusawal Municipal Council Of Population 2,02,000(approximately) Which has requirement of 25 MLD(million litres per day) of water daily. So sewage water generated is 22 MLD(85-90% of required water daily), Total solid waste generated is 68 MT/day, Wet solid waste is 41 MT/day, Paper waste is 4.42 MT/day, Wood waste is 4.01 MT/day. It is giving output of electricity generation of 5,000 KWe/day, Sewage water to treated water of 18 MLD and digested sludge used as Bio-manure is 5,000 kg/day. Currently this sewage water is added to Tapi River daily and solid waste is dumped near khedi village.

**Keywords:** Sewage water, solid waste, Power generation, Bio-manure, treated water, anaerobic digestion, sewage sludge, bio-degradable, agriculture fertilizer
Introduction

Energy is all around us; we make use of it, harness it, change it—it is an aspect of everyday life. This factsheet covers municipal solid waste and sewage water to power generation, agriculture fertilizer and treated water—sources and carrier, the global energy system, water management and agriculture growth, re-use options in the Resource Recovery and Safe Reuse (RRR) sector. The Mission is to develop products which can harness the waste energy from existing municipal products in order to maximize efficiency and to reduce the energy demand load on environment, to make water management and production of agriculture fertilizer. The concept is based on recovery of green energy, recovery of water and production of agriculture fertilizer which would be available in sewage water and solid waste form in the municipal Council. Anaerobic digestion (AD) is technology for sewage sludge and bio-degradable solid waste treatment and which allows generation of Biogas and Bio-manure from the same process. During AD, microorganisms break down the organic matter contained in the slurry and convert it into biogas, a mixture of mainly methane and carbon dioxide, which can be used for “power generation and agriculture fertilizer production.” At the same time, the slurry is stabilized and its dry matter content is reduced. The benefits of AD of slurry are widely recognized. The slurry contains the particles removed from the wastewater and bio-degradable solid waste, which are rich in nutrients and organic matter, leaving the water treated for its release into nature.

Materials & Methods

Bio-gas production in Anaerobic digestion process plant.

- Below Figure indicates the Sewage water and bio-degradable solid waste to Biogas generation, Bio-manure and Treated water.
Screening:-Screening is most important process in Biogas production in waste water treatment plants, otherwise coarse materials that may be harmful to pumps and stirring systems.

Primary Settler:-Primary settler is used for production of raw sludge which is also called primary sludge and it is produced by gravitational sedimentation in primary settler. It has high content of organic matter and easily degradable.

Biological Reactor:-In biological treatment of waste water secondary sludge is produced. It has smaller degradable fraction than primary sludge and thus lower biogas yield.

Sewage sludge Preparation :- The sewage sludge resulting from primary and Secondary water treatment is gathered for Anaerobic Digestion.

Anaerobic digestion process :- The sewage sludge and bio-degradable solid waste is pumped into the anaerobic digester Continuously stirred in tank reactors where digestions take place, usually at 35 to 40 deg. cel. Temperature. During retention time of around 28 to 30 days, microorganism breaks down part of organic matter that is contained in the slurry and produce biogas.

Digested Slurry(Bio-manure) :- When the digested slurry is further used in agriculture, composting of the slurry may be carried out gaining further fertilizing value with this process which has high nitrogen-phosphorous concentration.

Treated Waste water :- Treated water is treated in nature, so it can be used for Industrial or Agricultural purpose.

Detailing of digested slurry(Bio-manure) as soil amendment and fertilizers

Digested slurry consist of Organic matter (70-75%), Phosphorus(2-3%) and Nitrogen (1- 2%) which is lot of beneficial for farming purpose.

Organic Matter-
1) Organic Matter plays a large role in the environment.
2) The Organic Matter content of soil affects nutrient retention, water holding capacity and soils ability to provide nutrients for Plant growth.

Phosphorus-
Phosphorus is an essential element for plant growth and its input has long been recognized as necessary to maintain profitable crop production. Phosphorus inputs can also increase the biological productivity of surface waters.

Nitrogen-
Nitrogen is so vital because it is a major component of Chlorophyll, the compound by which plants use sunlight energy to produce sugars from water and carbon dioxide.

**Result**

Project Implementation Planning

1) My project consist of Bhusawal Municipal Council sewage water and Bio-degradable solid waste to power generation, solid amendment and fertilizer (Bio-manure), treated water.

2) Total Population Of Bhusawal Municipal Council=2,02,000 (Approximately).


Bhusawal Municipal Council Sewage Water details

1) The requirement of domestic water of Bhusawal Town=25 MLD.

2) Sewage water of Bhusawal Town=85-90% of required domestic water.

3) Average flow rate of sewage waste-water=22 MLD.

4) Currently this water is added to Tapi river without any process.
# NABL Accredited Laboratory

**Certificate No.- T-2955(C)**

## Certificate of Analysis

### TEST REPORT

- **Customer Name & Address:** MR. PRAVIN BHAGWAT KHACHANE, Plot no-26, Ganesh Colony, Jalgaon Road, Tal-Bhuwani, Dist-Jalgaon
- **Description of Sample:** SEWAGE WATER OF BHUSAVAL NAGAR PARISHAD
- **Date of Sampling:** 18/05/2018
- **Locaton of Performance:** In-Lab

### Chemical & Bacterial Analysis:

#### A. Chemical Test:

<table>
<thead>
<tr>
<th>SR. NO.</th>
<th>Test</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BOD (Bio-chemical oxygen demand)</td>
<td>400</td>
<td>mg/L</td>
</tr>
<tr>
<td>2</td>
<td>COD (Chemical oxygen demand)</td>
<td>650</td>
<td>mg/L</td>
</tr>
<tr>
<td>3</td>
<td>TSS (Total suspended solids)</td>
<td>400</td>
<td>mg/L</td>
</tr>
<tr>
<td>4</td>
<td>VSS (Volatile suspended solids)</td>
<td>270</td>
<td>mg/L</td>
</tr>
<tr>
<td>5</td>
<td>pH</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>SO4</td>
<td>85</td>
<td>mg/L</td>
</tr>
</tbody>
</table>

_Food Test Lab_  
_Chemist In charge_

**Conditions of reporting:** 1) Above result pertain only to the sample tested. 2) This report, in full or part, shall not be published, advertised, used for any legal action, unless prior permission has been secured. 3) Samples will be retained by us for specified period. In case of non-refundable items, unless specific instructions to the contrary are received. 4) Sampling was not done by ATR Ltd. 5) All subject to Jalgaon Jurisdiction Only.
Bhusawal Municipal Council solid waste details

1) Solid waste generated of Bhusawal Municipal council=68 MT/day.
2) Currently this solid waste is dumped near khedi village without any process.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Solid waste generated of Bhusawal Municipal Council</th>
<th>Unit (MT/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The total solid waste generated of Bhusawal Town</td>
<td>68</td>
</tr>
<tr>
<td>2</td>
<td>The wet solid waste generated of Bhusawal Town (Approximate)</td>
<td>41</td>
</tr>
<tr>
<td>3</td>
<td>The solid waste generated from plastic waste of Bhusawal Town (Approximate)</td>
<td>6.87</td>
</tr>
<tr>
<td>4</td>
<td>The solid waste generated from Paper Waste(Approximate)</td>
<td>4.42</td>
</tr>
<tr>
<td>5</td>
<td>The solid waste generated from Leather waste(Approximate)</td>
<td>0.09</td>
</tr>
<tr>
<td>6</td>
<td>The solid waste generated from Wood waste(Approximate)</td>
<td>4.01</td>
</tr>
<tr>
<td>7</td>
<td>The solid waste generated from inert material(Approximate)</td>
<td>11.61</td>
</tr>
</tbody>
</table>
**Output**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Particulars</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sewage Water To Treated Water</td>
<td>18 MLD (million litres per day)</td>
</tr>
<tr>
<td>2</td>
<td>Power Generated From Biogas</td>
<td>5,000 kwe/day</td>
</tr>
<tr>
<td>3</td>
<td>Organic Fertilizer Generated as Bio-manure</td>
<td>5,000 kg/day</td>
</tr>
</tbody>
</table>

**Conclusion**

Combine process of sewage water and Biodegradable solid waste reduces the cost of project because if we implement combine, space required will be less, cost of Anaerobic digester, cost of power plant process, cost of bio-manure generation process will also reduces.

- Sewage water and solid waste of Bhusawal municipal council to power generation, agriculture fertilizer and treated water offers great social, economic and environmental benefits in terms of energy saving by minimizing electricity bill of municipal council, reducing CO2, NOx, SOx emissions into the environment and thus reducing carbon footprint of the existing equipments.
- By installing this technology in energy recovery area the Bhusawal Municipal can generate additional power output in terms of electrical energy. Energy recovery is an immediate need of Nation to cope up with energy crises and rising fuel cost.
- In order to make our country energy efficient and for its sustainable growth, it is very necessary to develop in-house technology to recover the energy which is being wasted to the environment.
- Biomanure is used as fertilizers/soil conditioners for food, vegetable crop, horticultural plants and pasture which can be available in less cost from this project for farmers of Jalgaon District.
- Treated water is purified in nature, so it is used for Industrial or agriculture purpose in bhusawal town, So water management is also possible in this project, which is very big need of our nation.

This project will give about 70 to 80 peoples of Bhusawal city regular employment.
References


6) NABL Accredited laboratory sewage water testing report.