

# Fueling Power Generators through Urine Electrolysis

<sup>1</sup>Bhushan P. Patil, <sup>2</sup>Keshav N. Patil, <sup>3</sup>Nilesh C. Lohar, <sup>4</sup>Rushikesh J. Kumavat

<sup>1</sup>Assistant Professor, <sup>2,3,4</sup>Final Year Students  
Department of Electrical Engineering  
RCPIT, Shirpur Maharashtra State, India

**Abstract:** In day to day life, the human population on earth produces the around 10.5 billion of water waste in the form of urine. These water waste can be used for fueling the various mechanical devices such as vehicle and turbine of power generators. This project aims to produce the gaseous hydrogen using these water waste. The solar cells starts electrolysis process in electrolysis chamber that contains the urine. The electrolysis process produces the hydrogen in gaseous form with water fumes. The water filter chamber and liquid borax chamber is used to filter the moisture present in the hydrogen. This processed hydrogen is used to ignite the steam process required for power generation.

**Keywords:** Electrolysis, Urine

## I. INTRODUCTION

In all over the world the fossil fuels like coal and petroleum are being exhausted day by day as shown in fig which make them in danger to reach end soon, so the whole world is going on the track of using new and clear resources of energy especially renewable resources like: Photovoltaic power, hydroelectric power, wind power and biomass despite that these resources still represent small percentage of energy used as shown in fig, so we still have to find other clean and low-cost resources to produce energy from. Because of the high continuous consumption of energy. Despite pee and urine are considered wastes from our body, if we could exploit them correctly in producing energy they are going to rule the world in the future. As with the help of urine which we prefer to call it the fuel of the future, we can generate electricity.

In most of the area of the world are facing the lack of supply sources. As electric power has become the lifeline in modern times, so has the quest of human beings to find out ways to generate clean power from cheap and environment-friendly resources.

In this strategies the basically input sources are nothing but the human waste water(Urine) so because of that the requirement of input are very less for generation of large output in the form of electrical power.

Rise in demand of energy and the problem of pollution with increase in population and also advancement in technology, the demand for energy is increasing at an exponential rate. The shrinking oil reserves are expected to last only 42 years. The basic of fuel availability is not the only problem; simultaneously the problem of pollution needs to be addressed. Hence mankind is looking for an alternative fuel which is available in abundance to satisfy the needs of an ever increasing population and at the same time is green enough to not pollute the environment.

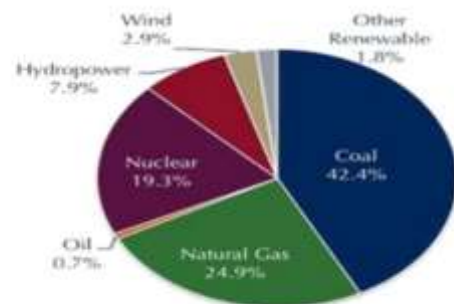


FIG. 1. Production of electricity from different Sources (Wikipedia)

Fig. Different Energy Sources

## II. OBJECTIVE OF PROJECT

To investigate the urea in urine as source of electricity from previous related work literature.

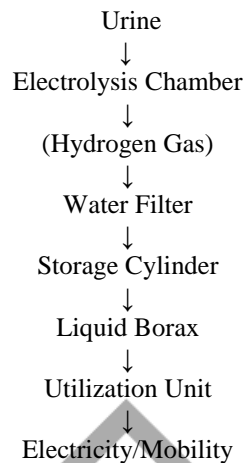
To develop a bio battery that generates electricity from urine utilizing urea as its catalyst to supply load such as lead light and small electronic equipment.

## III. DESIGN LAYOUT

The Main components as follows:

1. Electrolysis Chamber
2. Water filter

3. Gas cylinder
4. Liquid Borax
5. Utilization Unit



#### A. Electrolytic Cell

An electrolytic cell is an electrochemical cell that experience a redox reaction when electrical energy is applied. It is used for decompose chemical compounds, in a process called electrolysis. When electrical energy is added to the system, the chemical energy is increased an electrolytic cell ha three component parts: an electrolyte and two electrodes (a cathode and an anode). In this the raw urine contains urea. The chemical formula of urea is  $\text{CH}_4\text{N}_2\text{O}$ . By this electrolytic cell we can manufacture the hydrogen gas by applying the electrical energy to the electrolytic cell.

#### B. Water Filter

When the hydrogen gas is filled in the Water filter. After that the hydrogen gets purified and thus from this we can get the pure hydrogen gas.

#### C. Gas Cylinder

This purified hydrogen gas is then passed to the gas cylinder where this hydrogen gas is stored in form of liquid hydrogen under huge pressures at a very low temperature. And this given to the borax gas cylinder.

#### D. Liquid Borax Cylinder

When the hydrogen gas is passed into the liquid borax cylinder, this liquid borax cylinder removes the damp in the hydrogen gas thus this hydrogen is given to the generator.

#### E. Generator

After that the hydrogen pulled out from the liquid borax cylinder is then given to the generator. The generator uses the hydrogen gas as the fuel and it produces the electricity from this gas.

### IV. WORKING PROCEDURE

1. Urine is pour into an electrolytic cell, which will cracks the urea into small particles such as nitrogen, water, and hydrogen.
2. The hydrogen feed in water filter for purification, which will dissolves impurities and then gets pushed into the gas cylinder.
3. The gas cylinder feed hydrogen gas into a cylinder of liquid borax, the liquid borax is a material which is used to remove the contents of water present in hydrogen gas.
4. This pure hydrogen gas is given to the generator.

### V. EXPERIMENTAL RESULT

SR NO.	URINE QUANTITY IN (Liters)	OUTPUT HYDROGRN IN (gm)	OUTPUT ELECTRICAL POWER IN (WATT)
1	1	0.6	23
2	1.5	0.9	34
3	2	0.13	45

Table 5.1 Experimental Result and Analysis

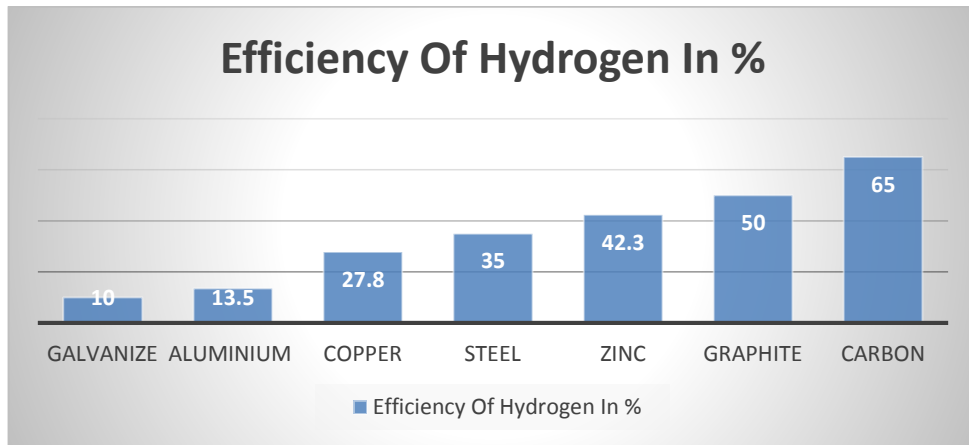


Table 5.2 Efficiency of Different Electrodes

**VI. COMPARISON WITH OTHER GENERATORS**

1. One liter of urine can produce sufficient hydrogen gas to run an electrical generator. A gasoline fuelled generator needs about seven liters of that fuel to run for the same length of time.
2. The installation cost of urine based generator is low while compared with the other type of generators.
3. It will made less pollution and it does not produce the harmful gases.

**VII. METHODOLOGY**

**Urine- the energy source**

Urine is a liquid produced by the water contains by the kidneys to remove waste products from the body. Human urine is yellowish in color and different in form in chemical composition. The human urine consists of water, with organic solutes including urea, creatinine, uric acid, and trace amounts of enzymes.

**Characteristics of Urine-**

1. Quantity: The quantity of urine averages 1600 to 2000 ml in an adult man daily. It can variable with the amount of fluid taken by that person.  
In fact it will depend on the protein metabolism value, the higher is the protein intake higher will be the urine output, the urea generated from the protein needs to be flushed out from the body. Higher is the urea generation in the body, the higher is the volume of urine to discharge it.
2. Face: The face should be clear pale amber without any deposits.
3. Specific gravity: It varies from 1.015 to 1.020 specific gravity is determined with urinomata.
4. Odour: The odour is not fragrant.
5. Reaction: The reaction of normal urine is slightly acidic with an average pH of 6.5.

**Composition of Urine-**

Urine is mainly contents of water, urea and sodium chloride. An adult taking about 100 g protein in 24 hours, the Composition of urine is likely to be as follows



Fig. Composition of Urine.

1. Water: Near about 95%
2. Solids: About 5% (urea 2% and other metabolic products 3%). Other metabolic products consists: uric acid, Creatinine, electrolytes or salts products such as sodium chloride, potassium chloride and bicarbonate. Urea is one of the last products of protein metabolism. It is produced from the delaminated amino-acid in the liver and reaches the kidneys through blood circulation (The normal blood urea level is 25-40 mg/dl). About 35 gram urea is excreted by the kidneys daily.
3. Uric Acid: The normal level of uric acid in blood is 2.5 to 6 mg/dl and about 1.5 to 2.5 gram is excreted daily in urine.
4. Creatinine: Creatinine is the metabolic waste of creating in muscle. Purine bodies, oxalates, phosphates, sulphates and urates are the other metabolic products.

### VIII. ACTUAL MODEL VIEW

Following fig. shows the actual working model of this project and it's also shows the arrangement of different equipment or parameters.



Fig. Actual Modelling of Project

### IX. ADVANTAGES

1. Low fuel cost.
2. Not produce greenhouse gases.
3. Pollution free.
4. Maintenance cost is very low.
5. It is an eco-friendly product.
6. It generates more electricity when compared to other generators by consuming less amount of fuel.

### X. DISADVANTAGES

1. The hydrogen storage is very risky.
2. The maintenance and installation are costly.
3. Before generation some external electricity is required for electrolysis process.

### XI. APPLICATIONS

1. House hold purpose.
2. In the public toilets.
3. In the cinema halls, bus-stops and railway stations.

### CONCLUSION

Now a day the power generation from diesel, petrol, coal, water decreases day by day so we need to produce electricity from other type of power plants. When compared with the other generators it is pollution less and it does not affect the environment. It produces much electricity compared with other types of power plants and mainly the waste Urea is used (it is cost less). In present generation this is the best way to produce power from this type of urine powered generator.

## FUTURE SCOPE

Since urine is produced everywhere, and a lot of it all humans alone are estimated to produce 6.4 trillion liters a year. This idea has a strong local flavor. The ability to generate energy locally could give this technology a margin against other conventional energy sources such as solar and wind that are only less in cost in certain areas.

Currently, we are making a small type of this generator and from this; we will generate energy which is sufficient for household purposes. In future we will expand this generator and we would produce a huge amount of energy, and this energy we will use for industrial and automobile applications also.

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