

Production of Bio-Fuel and Furniture Products using Water Hyacinth

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Abstract

This paper discuss about the production of bio fuel by using the aquatic plant which will available in the North America. In this process the it will produced the bio fuel which the renewable resources. The pretreatment process that requires the chemical will make the process a much costlier. The bio fuel from the non aquatic plant will be used for the different uses this will not produce any adverse effects to the environment or any other natural resources. The main concept of aquatic energy is to convert energy in the tropical and sub tropical region. In this it will also used to produce the luxurious furnitures and other materials. The water hyacinth can be used for the many other purposes.

Key Terms : Bio-Gas, non-renewable resources

I. INTRODUCTION

This paper speaks about the production of bio fuel from the water hyacinth. It is an invasive species which will degrade the fresh water and its living species. This aquatic plant will be listed among the worst weeds. But the cellulose and the hemicellulose content in the will be converted to the sugar which will have the high biomass energy. Some fermentation process will be made and the content in the water hyacinth will be merged with other chemical to form the bio fuel. Also the remaining materials will be used for making the furniture and some other products.

The ethanol produced from the water hyacinth can be mixed with the excretes from the animals to form the biofuel production. The ethanol will be easily produced from the water hyacinth because it will have the 20% to 50% of sugar content. Based on the sugar yield samples the bio fuel will be produced. It will also extend its future to the bio gas energy.

II. EXISTING SYSTEM

In the existing system the fuel was produced from the fossil fuels such as coal and the natural gas these are the non-renewable resources. This will now leads to the high economic rate and it will be produced on the basis of crude oil distillation unit. It is a major process and it will affect the environment cautiously. In this process regaining is the tedious

task. It will also affect the most living species. These types of fuel will also emits some adverse gas effects that will spoil all the living environment and the process of making the fuel from the crude oil and the coal will be take many steps and it will take manpower and it is tedious time consuming task.

III. PROPOSED METHODOLOGY

In this proposed system using the content in the water hyacinth the biofuel can be produced. In this process the extraction of ethanol consist many fermentation processes. The fermentation process is mainly used for the purification process. In this species that has high content of cellulose, forms the strong favorability in the bio fuel preparation. The bio fuel ethanol consists of four main processes they are pretreatment, hydrolysis, fermentation, purification. Among these the fermentation process is the major process.

IV. METHODS FOR EXTRACTION

In the extraction of ethanol from the water hyacinth the first process in pre treatment process. The objective of the pretreatment process is to open up the multi-component matrix in the cells of the water hyacinth stem structure. There are many pretreatment methods are available but among that the acid or base treatment method is efficient and it will break the steps of fore mentioned matrix and it will form the cellulose content. The final outcome of the process was the good product of the reduced content of the sugar material.

V. PRETREATMENT PROCESS

In this pretreatment process the leaves and stalks of the water hyacinth was dried in the temperature of 80° celcius about to 5 hours in the vaccum space. And then the dried stalks and leaves are powdered in the blender uniformly. In that half of the leaves are skimmed in the solution of sodium hydroxide for 48 hours. And some of the leaves and stalks are dried under sun for the period of 72 hours. Then these leaves were meant for the PH test in that it will take the two substrates the pretreated leaves and the non-pretreated leaves. In this one gram of substrate were added with the 25ml of distilled water and the value is measured with the PH meter.

PRE TREATMENT TYPE	PH VALUE
Chemical pretreated	4.9
Base pretreated	6.7

Table 1: PH value for the pretreatment of water hyacinth leaves.

VI. HYDROLYSIS PROCESS

The main process of hydrolysis is to convert the lignocelluloses into the fermentable sugar. The hydrolysis were performed using the 50 mm of citrate buffer at 50° celcius and the volumes were adjusted to require the 4% of acid treated alkali and the remaining were un treated alkali.



Fig 1: Water Hyacinth Treated for Hydrolysis

This experiment was carried out for the 60 hours. In this the samples were collected for the regular interval of time. The sugar content released from the hydrolysis content were monitored by the dinitrosalicylic method and it will be modified using the tollens test. After making this process the hydrolysate was collected in the screw capped bottle in the 4° celcius and then it will be given for the further test to make the bio fuel process.

VII.FERMENTATION PROCESS

In this fermentation process the water hyacinth powder was taken and it will be under gone through the various steps and the samples were separately analyzed by the NREL analytical chemical analysis method. It will take the solutions and separate the sugar content from the acid hydrolysis solution.



Fig 2: Fermentation Process

VIII. PURIFICATION PROCESS

This process is the final process in the biofuel manufacturing. In this process the bio mass product will be produced and from the gas the bio fuel will be produced. It will convert the bio mass into methane an aerobically. The main advantage is that it will be easily converted into the biofuel which will be the added process. This purification process is called Transesterification.

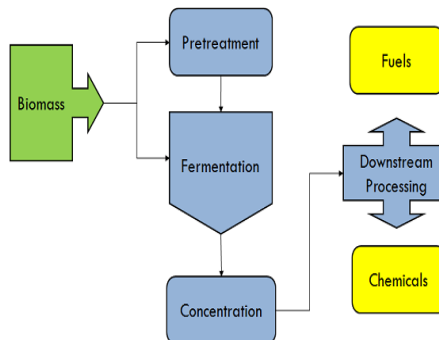


Fig 3: Production of Bio Fuel Process

Using the extra weeds in after manufacturing of bio fuel will used for the furniture production or some other house hold products. The shoots of the water hyacinth will be used to make various ornamental things and bags etc., these materials will be create many modification in the marketing field. The pulp of the water hyacinth will be used to make the paper. Which will be made after the chemical process and will be make use of the vascular fiber bundles and the bio degradable plastics products will also using this unwanted weeds.



Fig 3: Products from Water Hyacinth

The paper can be produced from the fiber of the water hyacinth. It will take the fiber from the all part of the plant except root. The plant fiber consist of cellulose which is the main constitute of cell walls. Since it is a high water content plant it will dried and added with some chemical substance and it will be mixed using the rolling mill. And it will take the pulp to make the paper.

The hydrolysis process consists of two groups chemical hydrolysis and enzymatic hydrolysis. In the chemical hydrolysis process the acids are predominantly applied to the process to

dilute the solutions. In the enzymatic hydrolysis process the bacteria will be added to the alkaline solutions for the formation of desirable ethanol products. The concentration of acid process will be operated only in the low temperature. The remaining wastage of substrates will be used for the production of furniture also the biodiesel from the pure plant will be obtained. It will also sometimes produce the electricity. In this the bio conversion of cellulose into fermentable sugar will be made by the hydrolysis process to eliminate the carbon components and the starch content.

Due to the heterogeneity of the complex structure it will break the chain formation of the enzymatic hydrolysis process and it will be observed that the cellulose structure will be increased in the sugar yield process. The increased yield of sugar content will lead to the increase in the bio fuel energy.

The water hyacinth plant is not only used for the bio fuel production its shoots, scrubs and other parts of plant will be used for the making of furniture and other ornamental products.

IX. CONCLUSION

This paper provides a solution for the bio fuel production from the extracts of water hyacinth and it will take various fermentation processes. The water hyacinth has the capability of the renewable resources. The low mass for the alcohol production and the biomass production. Also it will be concluded that water hyacinth will be used as a potential product for the bio mass energy. It will also be meant for the bio ethanol production. This water hyacinth will also be used to produce the methane gas. This worst weed will give the many advantageous effect and many good products in the producing of bio fuel. The bio mass energy production using water hyacinth will give only less investment and earn more profit. It will only take little amount of land for the production. It will also cultivate in the wasteland and unwanted water. But it will give more production and many uses.

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