



Extraction Of Different Bio-Fuels From Different Wastes

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Abstract

Conversion of waste biomass into bio-diesel and bio-gas presents combined advantages of waste to value conversion and alternative fuel generation. It is generally found that the world's dependence on fossil fuels had negative implications, such as a decline in oil supply, a drop in air quality, an increase in global temperature, and weather change. Biofuel production is one of the best options for minimizing the quantity of conventional fuel used. Synthesis of fermentable sugars from the biomass fractions, namely cellulose, hemicellulose, and lignin, is a challenging process. Bioethanol, identified as a sustainable solution to fossil fuels, has gained significant attention.

This paper presents theoretical and practical methods for process improvement, as well as a brief review of the characteristics of bio-fuel production and limitations by using various pre-treatment techniques with wastes such as vegetables, fruits and field bio-mass to bio-diesel production using microbe in anaerobic process. Bioethanol has a variety of applications, including petrol blending, solvent use, and distillery sectors.

The main objective of this paper is to analyse perspectives of manufacturing bio-fuel, reduce the waste and provide a pollution-free environment for women. The collected various waste such as kitchen, field and animal excreta as reference are crushed and kept in different vessels by using yeast for fermentation and yield checked in different days.

Key Words: Bio-waste, Kitchen waste, Field waste, Animal excreta, bio-diesel, Bio-gas

1.1 INTRODUCTION

The generation of bioenergy and bioproducts from biowaste streams has stimulated global interest in achieving a cutting-edge circular economy for human health which significantly increases the production of sustainable bioproducts and bioenergy. Limiting dependency on fossil-fuel assets and reducing the biowaste pollution are two of the major challenges confronting contemporary society [1,2]. As a biowaste, including kitchen bio-waste, paper waste, horticulture, forestry, and agriculture waste are viewed as the most capable renewable resources, as they are generally accessible to the mankind and enable us to avoid the strife associated with the use of consumable crops [3].

The development of bio-products from these has been uneven across the world, as it depends not only on the availability of feedstocks but also on policies that encourage its production and use. In the current paper use of

crop waste, kitchen waste and animals' excreta are the major issues to the locality because of the improper decomposition [4]. Bio-fuel production from biomass, especially waste biomass, and the use as fuel can reduce fossil fuel consumption and ameliorate the hidden costs of burning fossil fuels such as its environmental impact [5]. However, bioethanol production suffers from several limitations such as being energy-intensive and generating a sizeable amount of waste, temperature and amount of yeast used for fermentation [6-12].

This paper briefly describes the aspects related to bio-fuel both bio-gas and bio-diesel production and focuses on both theoretical and practical approaches for process improvements. Several green emerging distillation techniques, anaerobic process, heat integrated techniques, are shown to be energy-saving alternatives to the conventional distillation processes. Besides, a number of valuable components, such as manure and bioactive compounds have been recently isolated from the waste materials of bioethanol plants through various environmentally friendly valorisation methods. These emerging distillation and extraction techniques can be integrated to evolve a greener bio-fuel production process in the future from the kitchen fruits and vegetable wastes, fields wastes and animal excreta.

2.1 Experimental

Materials used

Collection of the different bio-waste such as kitchen fruits and vegetable wastes, fields wastes and animal excreta from the native village of Himachal Pradesh India.

Chemicals used

Normal water for making slurry, *Saccharomyces cerevisiae* yeast for fermentation process.

2.2 Methodology

2.2a Production of Bio-gas and Bio-diesel in a single line procedure

Collection and crushing of collected bio-waste by using manual grinder. Different crushed materials are used to make the slurry in to two different containers along with yeast *Saccharomyces cerevisiae* and another third container of animal excreta as a reference sample fitted with tyre tube to check the production of bio-gas and bio-diesel is collected by using distillation method from the bio-waste for a fortnight to month as shown in the Figure 1.



Figure 1: shows the production of bio-gas from different materials and different seasons

2.3b Calculation the weight of gas and Bio-diesel production

$$Wt\% = \frac{W_f - W_i}{W_i} \times 100$$

W_i = Initial weight of tyre tube

W_f = Final weight after production of gas, $Wt\%$ = weight percentage of Bio-gas

3.1 Results and Discussion

Table 1 shows the production of bio-gas production from different kitchen waste, field waste and animal excreta slurry

S. No.	Days	Kitchen Waste (Wt%)	Field Waste (Wt%)	Animal Excreta (Wt%)
1.	4 TH	00	0.2	0.3
2.	7 TH	0.3	0.4	0.6
3.	8 TH	0.4	0.4	0.7
4.	9 TH	0.4	0.5	0.7
5.	12 TH	0.9	0.8	1.0
6.	15 TH	1.2	1.0	2.0
7.	20 TH	1.5	1.2	2.5
8.	25 TH	1.6	1.3	2.8
9.	30 TH	1.9	1.4	2.9
10.	35 TH	1.9	1.4	3.0
11.	40 TH	1.9	1.4	3.0

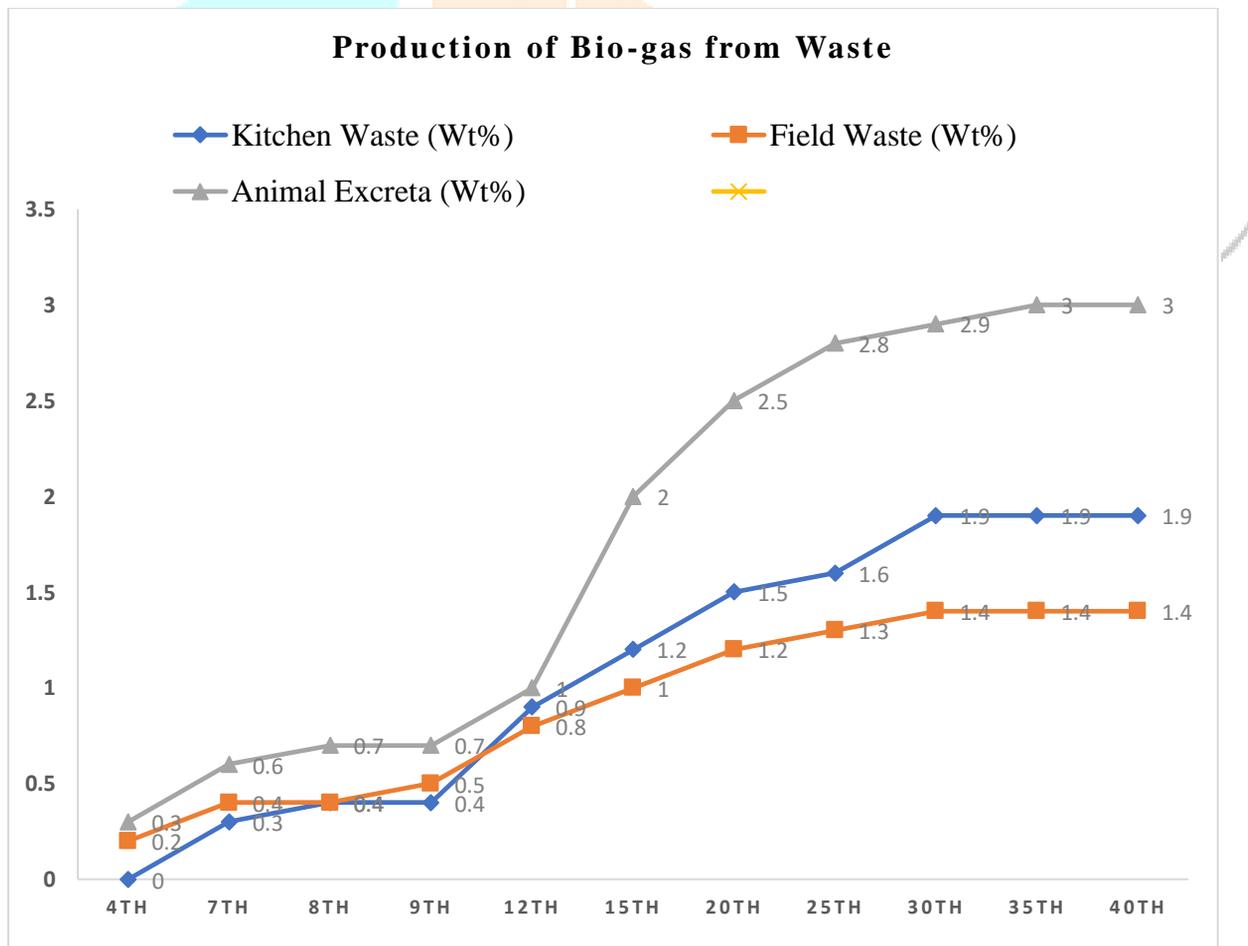


Figure 1: shows the production of bio-gas production from different kitchen waste, field waste and animal excreta slurry

Table 2 shows the production of Bio-Diesel from different waste per kilogram by distillation process

S. No.	Days	Kitchen Waste (ml)	Field Waste (ml)	Animal Excreta (ml)
1.	20	2±0.2	1.5±0.1	1.8±0.1
2.	40	3.2±0.1	2.1±0.3	2.0±0.3

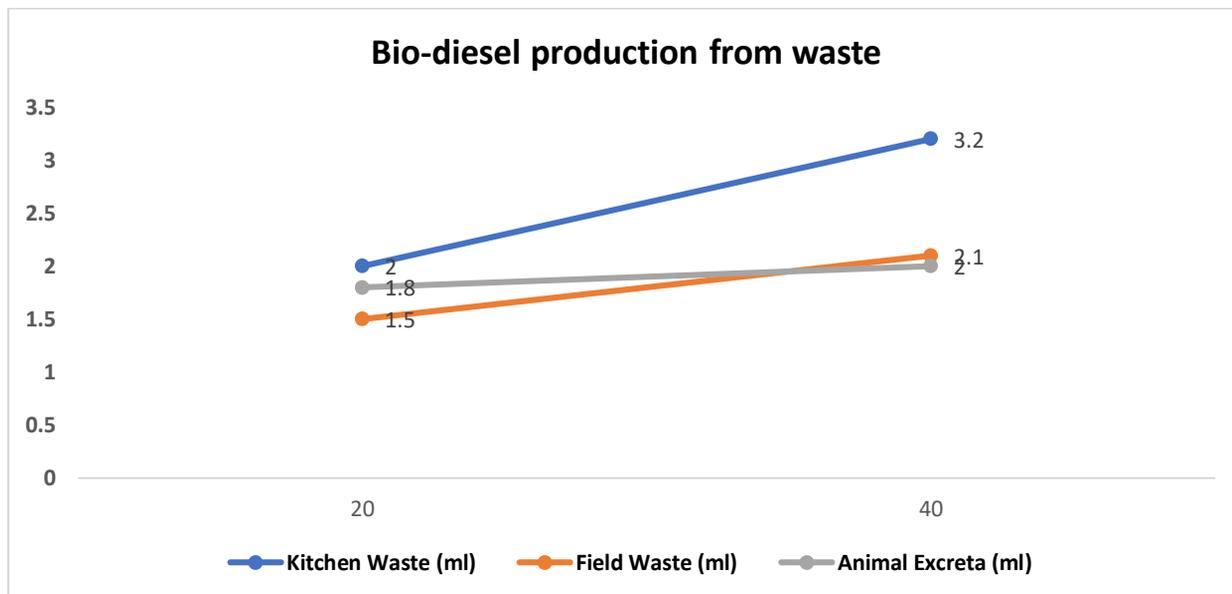


Figure 2: shows the production of Bio-Diesel from different waste per kilogram by distillation process

It is found in the **Table 1** that the production in case of animal excreta is higher than the field and kitchen waste. The increase in the production in the excreta is may be due the presence of different methanogen in the it. It is also found that the dark coloured bottles and the higher temperature help to produce more gas than the sun light exposed samples which is represented in the **Figure 1**. This is due to that in the presence of sun light algae grow and the process get interrupted. Same observation observed in the production of bio-diesel by fermentation in which **Table 2** shows that the formation of bio-diesel in case of kitchen is more than the field waste and animal excreta shown in the **Figure 2** and **Figure 3**.

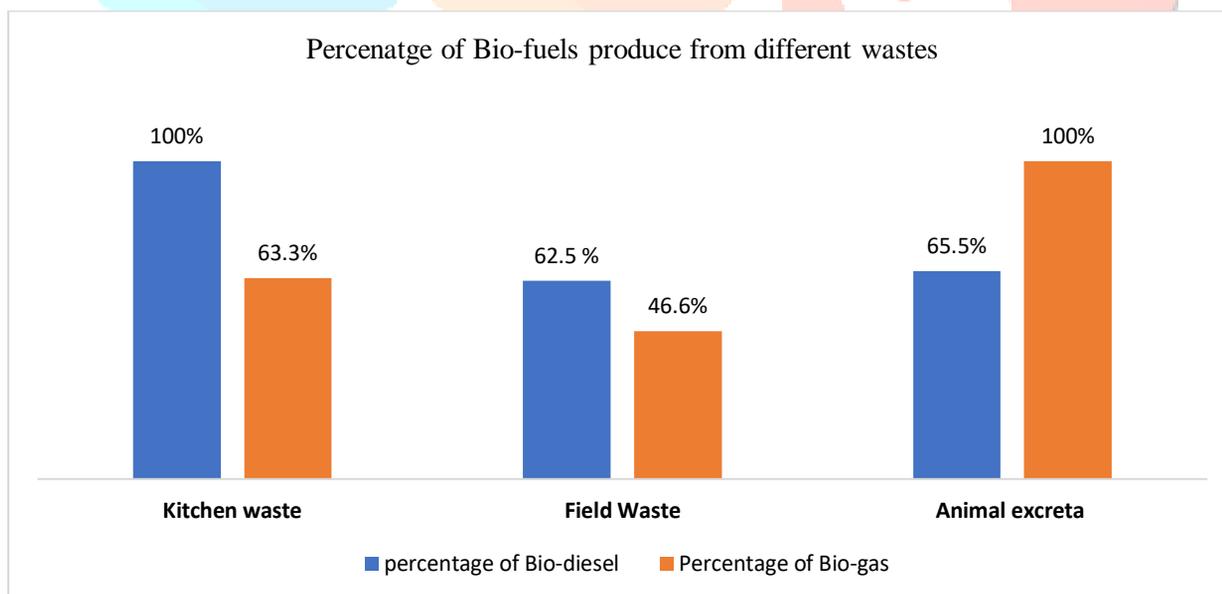


Figure 3: shoes the percentage of bio-fuel production of different waste with respect to each other

4.1 CONCLUSION

The biowaste biorefinery concept has gained significant attention in recent years as a viable alternative bioproducts and bioenergy refinery that utilises biowastes to create high-value bioproducts. Bio-diesel and bio-gas production from different wastes through a two-stage process was improved by at 25°C to 37 °C and by adding *S. cerevisiae* in excess. The highest bio-diesel yield was in case of kitchen waste than the field and animal excreta but the production of bio-gas increased in case of animal excreta than kitchen and field waste which is 63.3% in case of kitchen waste, 46.6% in field waste than 100% in animal excreta. Whereas, bio-diesel inn animal excreta were 65.6%, field is 62.5% and 100% in kitchen waste. This shows that from the waste's different existing gaps in the field of bioethanol were identified and the future directions are mainly focussed on developing different methods to overcome the use of petroleum-based products.

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