Late Reverend Father Shri.MaskujiBirujiBurungaleShikshanSanstha, ShegaonR.No. F-422.

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Out. No. SDMBSC/NAAC/IQAC/AQAR/2023-24/ **Date:-22-03-2024**

DECLARATION

The Mechanism to deal with internal examination related grievances is transparent, time- bound and efficientduring year 2023-2024.

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Internal evaluation is crucial part for student evaluation as per SGBA University Amravati guidelines. Various internal evaluation modes are used like Written-Test, Practical Examination, MultipleChoice Question (MCQ), Online Exam, Quiz Competition, AssignmentsSubmission, Projects Reports, Seminars Presentation, GroupDiscussion, Survey Methods, Study Tour, Industrial Visits andField Visits are the modes of conducting internal assessments.Transparency in internal evaluation is ensured by displaying marksand performance of the students on the departmental notice board.If any grievance, arise with same issue then students concern tothe subject teachers for the corrections. If the student is notsatisfied, the matter is placed before the Head of Department.Grievances associated with the internal examination are taken upimmediately and resolved it given deadline which is less thanone week. However, such an occasion rarely arises and most of thestudents are satisfied with the transparency and efficiency of theinternal assessment as is evident from their feedback.

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INTERNAL ASSESSMENT
SESSION—2023-24

Shri. Dnyaneshwar Maskuji Burungale Science & Art's College, Shegaon

B.Sc. Part THREE (Semester - V) UNIT TEST

ENVIRONMENTAL SCIENCE

Time: 1 Hour] (2023-24) [Max. Marks: 30

N.B:- *All questions are compulsory & Q. No.1 carries 6 marks While each of the remaining 2 questions Carries12 marks.*

1. (A) Fill in the blanks: **2**

a) Coarse or bulk particles are removed by Screening
b) Biomedical waste is hazardous type of waste
c) Charcoal acts as a Adsorbent
d) Autoclaving is a process is use for sterlization

(B) Select proper answer from the given alternatives: **2**

e) Biological process of water treatment
a) Sedimentation b) filtration
c) Trickling filter d) none of this

f) Biodegradable waste is dispose by
a) Sanitary landfills b) composting
c) Incineration d) none of this

g) Alum use in the process
a) Flocculation b) coagulation
c) Skimming d) None of these

h) Incineration process causes the pollution
a) Air b) Water
c) Land d) Noise

(C) Answer the following in one sentence: **2**

i) Define sludge
j) Define biomedical Waste

2. k) Explain coagulation and flocculation process 3
l) Explain classification of biomedical waste 3
m) Explain adsorption and demineralization process 3
n) Explain Pit type method 3

OR

o) Explain UASB 3
p) Explain Composting Method 3
q) Explain oil and grease removal and sedimentation process 3
r) Explain storage of biomedical waste in different color Bag 3

3. s) Discuss trickling filter with well labeled diagram 6
t) Explain Incineration Process and its Importance 6

OR

u) Describe activated sludge process 6
v) Explain sanitary land fill method of hazardous waste disposal. 6

Best of Luck

(c) → The aee oxygen oxidation of organic matter by accumpaled absoeption is called as Sludge.

(j) → Dischaed unreacted biomedical waste into environmented is peobabited peactice is known as biomedical waste.

Q2

(m) Adsoeption and demineralization peocess many kindly used foe abseebed peocess.

- The adsoeption they can utilized by the detmineralization with the include the air contact.
- The peocess may be can not be Adsoebtion the hazaedoes waste and medical waste peocess.
- The biomedical and other other waste adsoeption with the demineralization Peocess.
- They can be Produced feom the sludge actived and other adsoeption method utilizated by the Considered.
- They can be ul-peocess is can be waste water and biomedical waste peocess.

Adsoeption & demineralization peocess is the waste water and other peoccess utilized by the thise peocess. Process utilized these peocess is ie can be adsoeption and demineralization process

(c) → The are oxygen oxidation of organic matter by accumPaled
absorption is called as Sludge.

(j) → Dischaed unreacted biomedical waste into environmented is
probabiled practice is known as biomedical waste.

Q2

(m) Adsorption and demineralization process many kindly used for
absorbed process.

- The adsorption they can utilized by the detmineralization
with the include the air contact.
- The process may be can not be Adsorbtion the hazardous
waste and medical waste process.
- The biomedical and other other waste adsorption with
the demineralization Process.
- They can be Produced from the sludge actived and other
adsorption method utilizated by the Considered.
- They can be ut-process is can be waste water and
biomedical waste process.

Adsorption & demineralization process is the waste water, and
other process utilized by the this process. Process utilized their process is
be can be adsorption and demineralization process

SHRI DNYANESHWAR MASKUJI BURUNGALE SCIENCE & ARTS COLLEGE, SHEGAON
ANSWER BOOK

(c) → The are oxygen oxidation of organic matter by accumpated absorption is called as Sludge.

(j) → Dischaed unreacted biomedical waste into environmented is probabited practice is known as biomedical waste.

Q2

(m) Adsorption and demineralization process many kindly used for absorbed process.

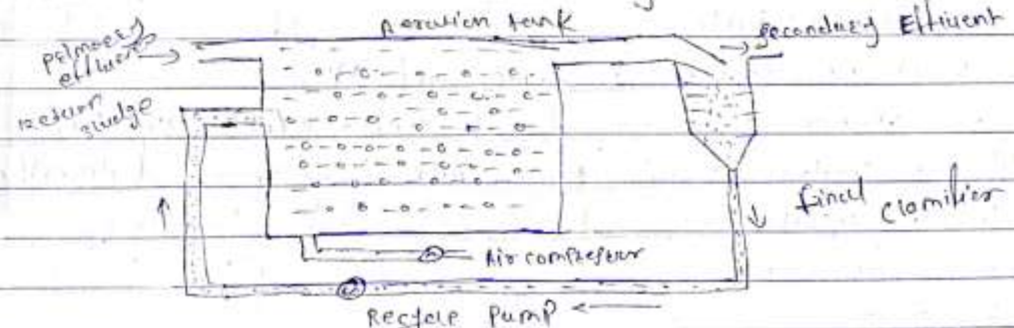
- The adsorption they can utilized by the detmineralization with the include the air contact.
- The process may be can not be Adsorbtion the hazardous waste and medical waste process.
- The biomedical and other other waste adsorption with the demineralization Process.
- They can be Produced from the sludge actived and other adsorption method utilizated by the Considered.
- They can be ul-process is can be waste water and biomedical waste process.

Adsorption & demineralization process is the waste water and other process utilized by the thise process.
be can be adsorption and demineralization process utilized these process is

3 ⇒

(4) Activated sludge Process

- They are the oxidation of organic matter is accompanied biorption.
- flocculation process and there-fore give a maximum efficiency (85-90%.)
- In the Activated sludge process continous aeration take place by air compressor
- The BOD nitrogen phosphorus ration in maintained a 100:5:1
- The PH 6-7 can allow the wide rang of microorganism



04

- Another Important advantage is that the settled sludge can reduce
- Aerated and added with mixed liquir suspended solid (MLSS) to act upon organic content.
- These is process is the activated sludge process.

Q.2 k ⇒ Congulation and flocculation Process.

- Anaerobic digestine is a fermentation Process by which the anaerobic microorganism convert organic matter into CO_2 and CH_4.
- For many year this technology has been considered as the best option for sewage treatment.
- It is more advantages than the aerobic treatment due to low quantity of sludge production. They are be flocculation Process following.
- lower energy consumption, biogas production better efficiency high organic loading rate.
- Anaerobic treatment is sensitive to temp. and PH.
- The natural PH optimum production of of methane (CH_4) gas but if more acid is produce it will slow down the Process of digestion
- Some of anaerobic reactor of.

1) Conventional anaerobic digester
2) Anaerobic contact reactor
3) Packed bed reactor
4) membrane bioreactor
5) UASB
6) fixed film reactor
7) Anaerobic baffled reactor
8) Anaerobic filters.

Q-2
A-(n)

→ pit type method is the biogass method Process.

- They can be utilized by the considered the biogas process. Pit mens the biogas and other than gas process thise include by the biggass.
- Gobar gas produced gas and these used the human daily life process used the utilized the daily life produced.
- Thise gas mean the oxidation Pond and waste material produced the gas.
- They can be biggas is pit process our home down and old culture use thise process.
- They can be many actived sludge process thise proceded the biogas production. thise is called as pit method.
- Pit method is the considered the biogas produced and they can used most Popular.
- They utilized the considered may be the thise process it is called as pit type method.
- They can be used for biogas these process it is known as pit type method.

Q.3

(V)

→ The sanitary fill method of hazardous waste disposal and Radioactive sources.

- Radioactive waste come from number of sources,
- The majority of waste originates from the nuclear fuel cycle and nuclear weapons reprocessing
- The other sources included medical and industrial waste as well as naturally occuring radioactive material (NORM) that can be concentrated as result of the processing consumption of coal,
- Oil and gas and some minerals as discussed below
- waste from the front end nuclear fuel cycle usually alfa - emitting waste extraction uranium often contains radium & decay product.
- uranium dioxide (UO_2) conc. from mining is not very radioactive.
- only or so times ~~greater~~ radioactive to as the granite used used in buildings.
- It is refined from enrichment to increase the U-235 ⊥ content from 0.7% to about 4.4% (LEU)
- The main by product enrichement is depend uranium (DU)
- The sanitary and land fill method originate from method.
- The hazardous wast may be considered the waste material considered the these process.
- The sanitary and radioactive sludge process is the hazardous waste disposal.

(Q.2)

⇒ (I) ~~[illegible]~~ biomedical waste disposal is following classification.

- Discharge untreated biomedical waste int the evs is Prohibited Practice
- According to the ("main depaement of environment protection")
- It is define biomedical waste as all material that mainy contain human contain Pathogen hazardous conc.
- Including sponges, surgical gloves, masks, dressing, capillary tube, and include inceneration steam sterilization and chemical decomtamination.

① Inceration

- Incenration destroy harmful microorganism and toxic substance often contained in biomedical waste.
- Medical waste incineration are a major contributor of dioxin Pollution to the environment

② Steam sterilization:

- Steam sterilization process of biomedical waste to high presure saturated steam at minimum temp. 248 degree F for at least 20 min. befor disposal.

Seminr

"Biogass"

In partial fulfillment of requirements for the degree of

Bachelor of Science

SubmittedBy

"Ku. Divya Shailendrasingh Rajput"

Underthe Guidanceof

Dr. R. B. Barabde

Departmentof Environmental Science

Shri Dnyaneshwar Maskuji Burungale Science & Arts

College,Shegaon-444203,Dist-Buldana(M.S.)

AcademicSession: 2023-2024

Shri Dnyaneshwar Maskuji Burungale Science and Art's
College Shegaon,Dist. Buldana-444203

DEPARTMENT OF ENVIRONMENTAL SCIENCE

CERTIFICATE

This is to certify that ***Ku. Divya Shailendrasingh Rajput*** *of B.Sc.III*[rd] *emester V satisfactory complete the given Seminar work on* ***"Biogas"*** *in the subject nvironmental Science during session 2023-2024 as prescribed by Sant Gadge Baba nravati University, Amravati.*

Date of Submission:- 01|11|2023

Barabde

Subject Teacher
Dr. R. B. Barabde

Head of Department
Dr. D. L. Bhade

Acknowledgement

Department of Environmental Science give me opportunity to performing such activity. This activity helps me to improve my subject views. I have deepest sense of gratitude towards my guide **Dr. R. B. Barabde** for his valuable guidance and keen interest constructive criticism and constant inspiration throughout the Project work.

I feel equally indebted towards respected Principal **Dr. R. E. Khadsan,** Shri. Dnyaneshwar Maskuji Burungale Science and Art's College Shegaon for his significant support and co-operation to success of this Project work.

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I also express my sincere thanks to **Prof. P. L. Gawande** for their supporting helps.

I also express my gratitude to all teaching and non-teaching staff and library staff for their cooperation.

I also thank to my colleagues and friends for their supportive help to completion of this Project work.

My words fail to express my feelings in respect of my below parent who are providing constant encouragement and blessings.

Place:-

Date:- 2/11/23

Signature of student

D. S. Rajput

Index

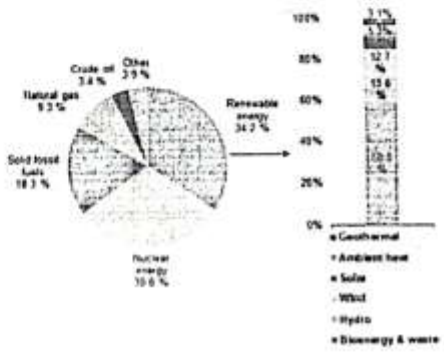
Biogas as a source of energy.

1. Introduction

The mankind has relied on different sources of energy during its economic development throughout the centuries. Whereas coal has been the main energy source in the nineteenth century, oil was in twentieth one. The possible scenarios for remediation of greenhouse effect due to carbon dioxide released by energy production and industry are rendered to minimization of emissions and its recycling. The latter is accomplished by the production of energy sources and chemicals of practical importance from carbon dioxide.

The emission minimization consists in two approaches: replacement of the fossil fuels by renewable ones (solar, wind energies, biomass, etc.) or improvement of energy efficiency in all human activities in different ways. The distribution of energy sources for the European Union for the year 2016 is shown in Figure 1. One can see that the share of renewables is bigger than the powerful nuclear energy with a leading role in energy production. The biggest part (more than 60%) of the renewable energy sources is assigned to the biomass and waste utilization.

Production of primary energy, EU-27, 2018
(% of total, based on tonnes of oil equivalent)



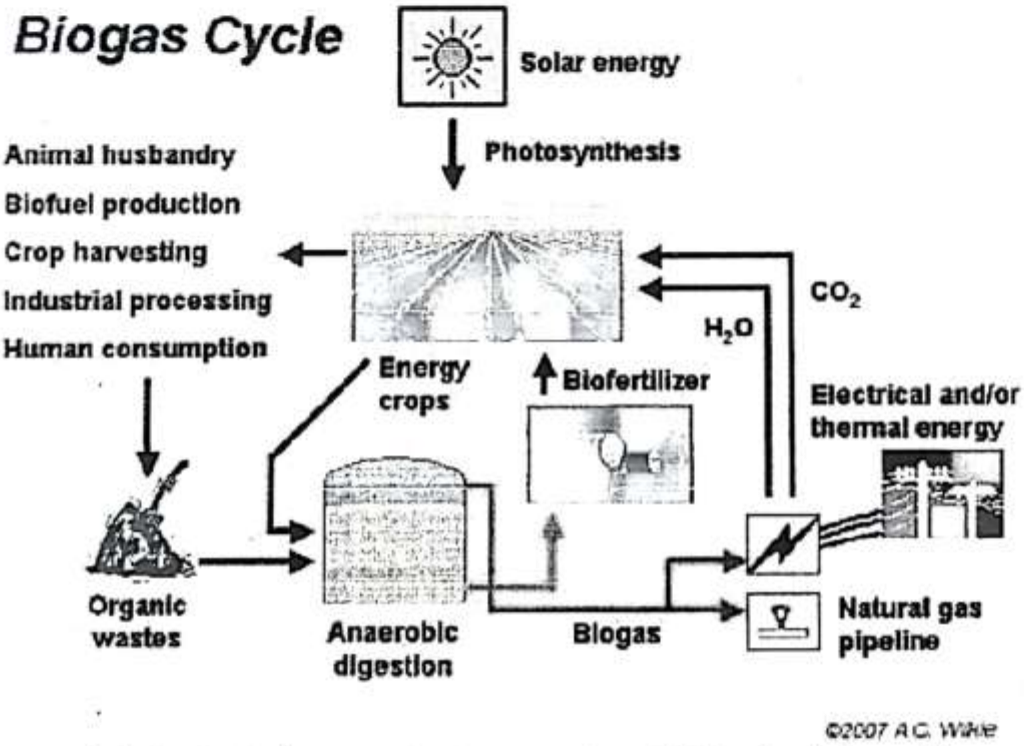
One of the ways to cope with the problem of carbon dioxide emissions is to close the carbon cycle using renewable fuels from presently grown biomass, by recycling the released carbon dioxide by the present vegetation by photosynthesis. This is the philosophy of biomass utilization as energy source. The most spread biofuels in the present period are biogas, produced by anaerobic digestion of organic waste, bioethanol, produced from cereals and/or lignocellulosic residues and biodiesel, produced by trans-esterification of lipids with methanol or ethanol.

In this review, we shall concentrate ourselves to the application of biogas as renewable energy source and also as a feedstock for the production of chemicals and other fuels.

2. Biogas production

Biogas is produced by anaerobic digestion of organic matter of natural origin [2, 3, 4]. The main advantage of this process consists in the combined environmental and energy effect.

Biogas consists mainly of methane, carbon dioxide, and traces of hydrogen sulfide and mercaptanes, as well as residual amounts of oxygen and nitrogen. Small amounts of ethane and hydrogen are possible too. Biogas is obtained by anaerobic digestion of organic waste of biologic origin. The most exploited



ones are of agricultural origin (manure, poultry litter, hay, and straw) [5], from food industry, stillage from ethanol production [6], landfill gas, activated sludge from wastewater treatment plants, etc. One of the simplest and the mostly spread flow sheets for biogas production and utilization is shown in Figure 2

Illustration of biogas cycle, formation, and applications. Scheme taken from [7].

The main fuel in the scheme, shown in Figure 2, is biogas, utilized for energy (thermal one and electricity) or fuel for transport. The carbon dioxide released after combustion is absorbed by the vegetation by photosynthesis, thus closing the carbon cycle. The residual sludge from the digester is rich of organic nitrogen, and therefore, it is suitable for fertilizing the soil.

In the past, biogas has been widely spread as an energy source in the households in the countries of Africa and Asia. Although quite primitive as design, the anaerobic digesters have solved the problems with autonomous energy supply for many households in India, Pakistan, Indo-China, etc.

Later, biogas became very important and essential share as energy source for the countries in Western Europe and Northern America. Besides heating, biogas is now more frequently used for the production of electricity and transport fuel in many municipalities. It is already added to the pipelines for natural gas distribution of household purposes.

A new trend in biogas production and utilization is the so-called biorefinery concept. This concept not only presumes the use of renewable biomass as energy source but also combines it with the production of chemicals, such as plastics, solvents, and synthetic fuels [8]. An example for this is the Danish Bioethanol Concept presented by Zafar [9]. It comprises the ethanol production from lignocellulosic biomass with biogas production of the stillage and cellulose waste. The residual cellulose waste is additionally recycled after wet-oxidation for additional conversion into biogas. A detailed review on biogas applications is published recently by Sawyerr et al. [10].

3. **Some construction of unaerobic digesters.**

3.1 variety of anaerobic digesters for biogas production is very broad: from the very primitive pits to most sophisticated bioreactors, such as the floating drum reactor, the upflow anaerobic sludge blanket (UASB) reactor [11, 12, 13], and multistage bioreactor with separated compartments [14, 15]. The choice for anaerobic digester depends on the origin of substrate, and the intermediates are converted during the consecutive steps of hydrolysis, acidification, acetogenesis, and final methanation. In case an accumulation of fatty acids takes place, the reactor with separated compartments is preferable. The most exploited digester for biogas production from domestic waste, activated sludge, and manure is the UASB reactor.

3.2 Substrates for biogas

3.3 The mostly used substrates for biogas production are the manure from cattle, pigs, and poultry litter. This application competes with the traditional use of manure for soil fertilization. When the amounts of manure prevail the demand for fertilization, biogas production is welcome because double problem is solved: on the one hand, the waste is destroyed and removed, and on the other hand, renewable energy is produced saving money and contributing for carbon cycle closing. That is why attention is paid to the utilization of cattle dung, lignocellulose waste, waste from food and beverage processing, activated sludge from wastewater treatment plants, and household solid waste with landfill gas use. The waste treatment is associated with energy production and reduction of the energy demand of the main enterprise.

2.2.1 Biogas from glycerol

Crude glycerol is the main residue from biodiesel production. The amount of this waste product is about 10% from the produced fuel. The poor quality of this glycerol, containing water, potassium hydroxide, and some methanol makes it non-suitable for market purposes even after purification. One alternative utilization of this residual glycerol is in its direct conversion into biogas, thus supplying the biodiesel plant with energy simultaneously. However, as a very simple and digestible substrate, glycerol yields large amounts of organic acids as intermediates, leading to strong inhibition of methanogenic bacteria [16, 17, 18]: That is why glycerol must be used as substrate for biogas production very cautiously with the addition of small amounts, thus making this process with little practical use. It is reported, however, that small additions of glycerol to other basic substrates, i.e. manure, can boost biogas production, as reported by Robra et al. [19] and Astals et al. [20].

3.1 Biogas for heating

Traditional biogas contains approximately 60% (vol.) methane, almost 40% carbon dioxide, small amounts of ethane and hydrogen (less than 0.5% together), hydrogen sulfide and mercaptanes (some ppm), humidity, and traces of oxygen. Its net energy capacity is ca. 24 MJ/nm3 at methane content of 60% (vol.). The first and most direct use of biogas is for heating purposes for maintenance of the equipment and the farm, where the animal dung is treated. The same applies for its use for domestic purposes, besides heating, e.g., cooking and lighting, as firstly used in Asian and African countries.

Another more sophisticated use of the biogas heating capacity is its utilization as heat energy in beverage and ethanol production. There the stillage remaining after distillation is recycled for biogas production. The resulting biogas is combusted for boiler heating and for energy for operation of distillation columns. Thus, the problems with the treatment of the residual stillage are solved by conversion into biogas, thus mitigating the problems with energy supply and spending. Calculations show that in some cases, stillage utilization as biogas can cover almost the whole energy demand for heating the distillation process. Besides these straightforward applications, biogas is also injected into the grid for natural gas supply for domestic use [21, 22]. For this purpose, a preliminary scrubbing of the carbon dioxide and sulfur compounds is necessary.

3.2 Biogas for electricity

Biogas is suitable for generation of electric power in combination with heat recovery. Usually the gas is combusted in engines with internal combustion coupled to turbine. The released heat (being around 60% of the utilized energy) is used for heating purposes for maintenance of the anaerobic digester or for household needs. This method is widely applied for the treatment of activated sludge, a residue from municipal wastewater treatment plants [23, 24].

High yields up to 88% in total are attained [50]. The rest of nonreacted methane is trapped in molecular sieves and recycled to the reactor [50, 53, 54]. In this way, the use of methane reaches 97% with an ethylene yield of 85% [50].

As ethylene is a basic feedstock for the mostly spread polymerizations and many value-added chemicals, it is clear that this way of biogas utilization is quite promising one.

1. Methodologies for energy demand evaluation in biogas production

The usual criteria for the feasibility of an anaerobic digestion technology are the type of digester, the operation temperature, the necessary retention time of the substrate in the reactor, the substrate acidity (the initial pH value), and the presence of certain chemicals in the inlet slurry.

However, the most important one is energy demand for the biogas formation and the energy potential of the produced biogas.

There are two typical temperature ranges for biogas production: mesophilic one (at 30–35°C) and thermophilic one (at 55–60°C). Different genera of methanogenic microorganisms are capable to accomplish the processes in those two cases. The advantages of the thermophilic regime are in the higher production rate and the lack of pathogens in the outlet slurry. However, the energy input for maintenance of this regime is higher than for the mesophilic on it

There are some methodologies for the estimation of the feasibility of biogas production [57, 58]. They all involve the demand of heat for temperature maintenance and electricity for mechanical operations (stirring, pumping, and transport) and comparison to the energy yield after anaerobic digestion.

2. Residual carbon dioxide

The main disadvantage of biomass produced fuels is the inevitable release of CO2 in the atmosphere after combustion. Therefore, big efforts are made in the recent years for remediation of this adverse effect of greenhouse gas. The best way to cope with this problem is the natural assimilation by the vegetation by photosynthesis, but it is not sufficient due to the very large emissions from industrial sources, energy production, transport, and household. That is why many other methods are proposed and studied in the recent years.

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An Project Assignment

"Production of biodiesel from algae"

In partial fulfillment of requirements for the degree

Bachelor of Science

Submitted By

Ankush Prakash Damare

Under the Guidance of

Dr. R. B. Barabde

Department of Environmental Science

Shri Dnyaneshwar Maskuji Burungale Science & Arts College, Shegaon-444203, Dist-Buldana (M.S.)

Academic Session: 2023-2024

Shri Dnyaneshwar Maskuji Burungale Science and Art's
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DEPARTMENT OF ENVIRONMENTAL SCIENCE

CERTIFICATE

This is to certify that Ms/Mr ***Ankush Prakash Damare*** *of B.Sc.- III^rd Semester - V has satisfactory complete the given Project Assignment work on* ***"Production of biodiesel from algae"*** *in the subject Environmental Science during session 2023-2024 as prescribed by Sant Gadge Baba Amravati University, Amravati.*

Date of Submission:- 1/11/2023

Subject Teacher
Dr. R. B. Barabde

Head of Department
Dr. D. L. Bhade

Acknowledgement

Department of Environmental Science give me opportunity to performing such activity. This activity helps me to improve my subject views. I have deepest sense of gratitude towards my guide **Dr. R. B. Barabde** for his valuable guidance and keen interest constructive criticism and constant inspiration throughout the Project work.

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I also thank to my colleagues and friends for their supportive help to completion of this Project work.

My words fail to express my feelings in respect of my below parent who are providing constant encouragement and blessings.

Place:- SHG

Date:- 1/11/2023

Signature of student

Index

"Production Of Biodiesel From Alage"

Introduction :-

The environmental impact of using petroleum fuels has led to a quest to find a suitable alternative fuel source. In this study, microalgae were explored as a highly potential feeds Firstly, algal oil is extracted from algal biomass by using organic solvents (n-hexan). Lipid is contained in microalgae up to 60% of their weight. Then, Biodiesel is created through a chemical reaction known as transesterification between algal oil and alcohol (methanol) with strong acid (such as $H_2SO.$) as the catalyst. The extraction - transesterification method resulted in a high biodiesel yield (10% of algal biomass) and high FAMES content (5.2% of algal biomass) Biodiesel production from microalgae was studied through experimental investigation of transesterification conditions such as reaction time, methanol to oil ration and catalyst dosage which are deemed to have main impact on reaction conversion efficiency.

Methodology :-

World faces the progressive depletion of its energetic resources mainly based on non-renewable fuels. Thus the unprecedented increase in energy consumption drives the rising petroleum fuel cost. In addition, the intensive utilization of fossil fuels has led to the increase in the generation of polluting gases released into the atmosphere, which have caused changes in the global climate. The solution to this issue depends on how the development and implementation of technologies based on alternative sources of energy will be undertaken. Through the use of renewable energetic resources, humankind can find part of the solution to their energy requirements in an environmentally friendly way.

One renewable solution is the use of solar energy in form of biomass (bioenergy). Conversion of these feedstock into biofuels is an important choice for the explosion of alternative energy sources and reduction of polluting gases. Microalgae are currently considered to be one of the most promising alternative and renewable feedstock sources for biofuel.

Materials and experiment method

Materials:-

Algae grow in most aquatic environment and need a light source, carbon dioxide, water and ganec to create biomass. The growth medium must contain essential nutrients such as sugen phosphorus, iron and sometimes silicon. In this study, algae are cultivated in pilot open pond by domestic wastewater in Shegaon City Algal have ability to treat many entaminants, but have proven to be great options when nutrients such as nitrogen (N) and phosphorus (P) need to be eliminated Biomass purity and productivity were affected by contamination with unwanted algal species and organisms that feed on algae To harvest algae from this dilute solution, algal cells in solution are usually concentrated by sedimentation: the condensed slurry is then centrifuged at 4000 rpm for 15 minutes to further remove water After centrifugation, the water content of the wet biomass was 80% Depending on the experimental design in this study, the cell pellets were wet biomass

Algal biomass contains three main components carbohydrates, protein and lipids natural oil Because the bulk of the natural oil made by microalgae is in the form of triacylglycerides (TAGS) which is the right kind of oil for producing biodiesel microalgae is the exclusive focus in the algae-to-biofuel The fatty acids attached to the TAG within the algal cells can be both short and long chain hydrocarbons. The shorter chain length acids are the idea for the creation of biodiesel, and some of the lenger ones can have other beneficial uses. For the extractiontransesterification method, Methanol, n-hexane, sulfuric acid (H-SO), sodium chloride and other chemicals were taken from environment laboratory

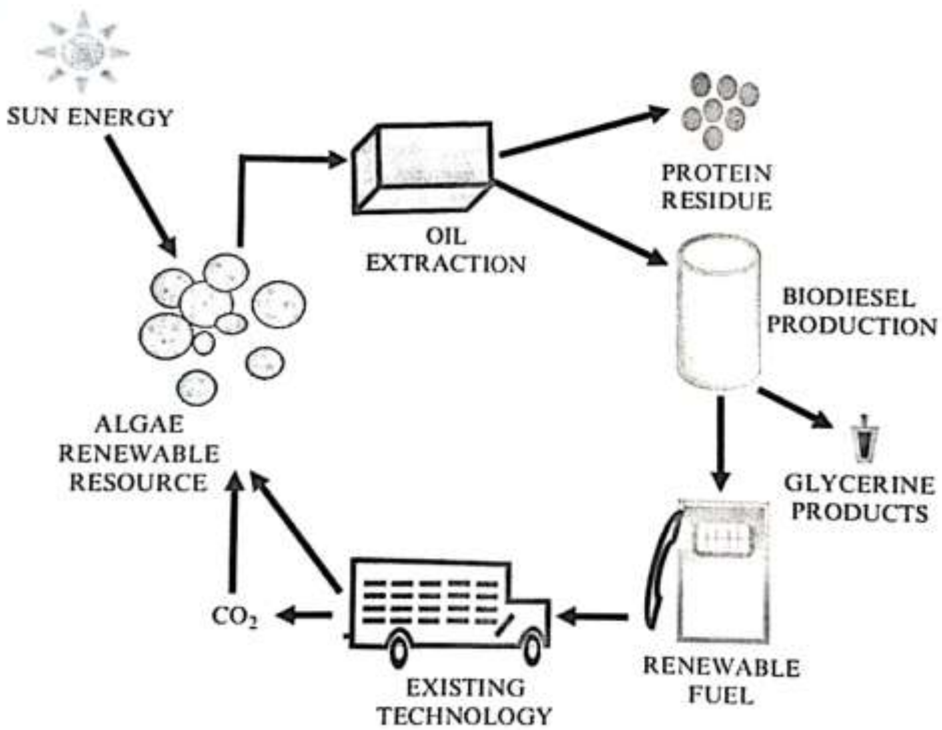
Method:-

The algal oil extraction procedure was adapted from the protocol described by Bligh and Dryer in 1959. Freeze-dried algal biomass (10 g) or wet biomass (with 10 g dry weight equivalent) was placed in the glass vial. Organic methanol were then added to the solvent n hexane glass. The mixture was blended for 5 minutes, and then transferred to centrifuge tubes After that, glass was washed twice by solvent and distilled water respectively. These mixtures also were added to the tube. The contents were then centrifuged at 4,000 rpm for 15

minutes then organic layer containing algal oil then separated algal oil was heated at 75°C for < minutes to evaporate water content. A mixture of methanol, sulfuric acid and solvent (0 becane) was added to the algal oil, and then the reaction mixture was blended for 35 minutes at a temperature of 75°C After the reaction was completed, the samples were cooled down to temperature, the crude ester layer (the upper phase) was separate from glycerol layer in separating funnel. To separate methanol the organic layer was washed two times with distilled water in separating funnel until the washings were neutral. The FAMEs layer was nied by using NaCl solution

Observation :-

The maximum biodiesel yield from the foamate produced of 97% from C. vulgaris microalgae was accomplished at a molar ratio (methanol to oil) of 1000:1, a 60 °C temperature of reaction and a 10 min time of reaction.



Conclusion:-

Is has been demonstrated that bodisel from algal biomass through the extraction

transesterification method The FAMEs yield from microalgae was found to be significantly affected by the independent effects of three factors investigated. Throughout these experiments, biodiesel of good quality can be produced from microalgae.

Reference:-

1. http://www.waste.web.id/index.php/t
2. https://www.sciencedirect.com/science/article/pii/S2590174522001076#:~:text=The%20maximum%20biodiesel%20yield%20from,10%20min%20time%20of%20reaction.