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A *Microcystis* and It's Current Scenario

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Abstract: A microalgae are emerging for promoting feedstock production. For, Bio-diesel and Bio-ethanol propagation due to enormous lipid content and rapid growth rate due to available various environmental conditions it'll grow in marine fresh water, various environmentally sustainable development among through diverging microalgae Microcystis has gaining attachment among attention through biodiesel and bioethanol propagation through in it. Here Microcystis algae can Conveying various form of strain and they can find selection of lipid extraction method for Biodiesel production (or) process they may challenge due to various opportunities associated with the strain of biodiesel production and bioethanol prospection.
Keywords: Biodiesel, Bioethanol, Microcystis, Microalgae, Lipid And Marine Fresh Water.

I. INTRODUCTION

The continuous consumption of fossil fuels all over the world leads to their depletion, and their role in environmental pollution and global warming have engaged the interests of researchers to utilize sustainable, economical and biofriendly energy sources in comparison to conventional petroleum fuels. Bioethanol and biodiesel is a good alternative to gasoline fuels as relatively inexpensive, easy, and environmentally friendly transport fuels. Recent trends in bioethanol and biodiesel production from renewable feedstocks Scientists are deeply interested in bioethanol and biodiesel production from renewable feedstocks nowadaysAlgae are photosynthetic organism that yields large amounts of carbohydrates which can be converted into bioethanol and biodiesel by the fermentation process. There are several environmental and economical advantages to use algae as feedstock for bioethanol and biodiesel production. Microalgae have specific characteristics like fast growth, high CO2-absorbing capability, land not cultivable, and nonedible, which are more advantageous than other feedstocks.

Now a days increasing of global energy, due to environmental pollution concerns associated with fossil fuel, consumption have been derived from vegetable oil, animal fat, and microalgae can emerge through alternative resource for biodiesel energy production. Microalgae is a basal substrate for feedstock and biodiesel production as a renewable resource due to loss of an air pollution, water pollution and combustion for light efficiency diesel through damages the reduces air pollution and greenhouse effect. Production of algae through desirable content microalgae can be accumulated upto70 to 80% of the dry work and water over attractive

Moreover, the absence of lignin in algal cell wall makes biomass pretreatment easier and pretreatment cost lower. Their simple structure and capability to strive harsh environment also preference them. There are some species of algae that bloom in fresh waters, and these are detrimental to aquatic life. It requires a large amount of carbohydrates rich biomass to enhance this technology. The sugars contents of algal biomass are the fundamental and principal requirements for the bioethanol production. Abundant carbohydrates algal biomass required for better bioethanol yield. This is why growing carbohydrates rich algae is a great solution.Almost all carbohydrates from algae are produced by photosynthesis. In order to perform effective photosynthesis algae needed a moderate amount of CO2, the desire lighting intensity, ideal temperature, and appropriate nutrients composition. Photosynthetic pigments exist in the algae cells, include phycocyanin and chlorophyll also make a major and key role in photosynthesis.

The most greenish algae can produce a lot of carbohydrates due to their high content of chlorophyll. This study investigated optimized conditions and nutrients for a higher growth rate and carbohydrate content to achieve a better quality algal biomass rich in carbohydrates for bioethanol and biodiesel production.

II. MEDIA PREPARATION

Modified BG11 medium (MF medium) with an increased amount of Dipotassium hydrogen phosphate (K2HPO4) and freshly added urea was used as a growth medium for *M. aeruginosa* culture. MF medium ingredients (BG11 modified medium) were dissolved in natural lake water. The pH of the medium was adjusted to 7.02. Trace elements were supplemented from stock solutions at 1mL/L of the MF medium. The cytokinin added in the medium was naphthalene acetic acid (NPA; 1mM).

The media was supplemented with 2mL vitamin complex (BeecomhexaYuhan Corporation) per liter of the media. Lysine, alanine, NH4OH, glucose, and aminolevulinic acid (LA) were added at final concentrations of 2.28mM, 1mM, 1mM, and 2mM, respectively. 5mL/L of the media was the volume of alanine, lysine, and LA that was added. In the same manner, 5mL NH4OH and 10mL 1mM glucose were added per liter of media to the separate flasks.

III. ALGAE CULTIVATION

By using various strategies, algae were made to grow quickly and more greenish and dense. At first, algae were cultivated at flask level and after in mini bioreactors. Light, CO2, air, and always shaking to meet all the demands. All plates were kept under 16/8 h light/dark regime with LED light. Algae were grown first in blue and red LED light of equal strength (70μmolm−2s−1)
Wavelength optimal for algae growth was determined and after finding optimal way length different intensities were checked out for optimal growth of *M. aeruginosa*. The flasks were maintained at 100rpm in a shaking incubator. This at the same time all the cultivation was kept to 25°C. To facilitate growth of *M. aeruginosa*, 50mL/L of log phase associative bacteria *Salmonella* (OD660 = 0.86) culture was added.

IV. BIOMASS PRODUCTION

The samples were taken and analyzed over time for biomass content and sugar content. The OD at 660nm was measured as a method to assess algae growth, using 2 mL of sample. Five hundred mL H2SO4 (5M) was added to the biomass and hydrolyzed for one hour, the hydrolysate was neutralized with 10M NaOH and centrifuged.
Carbohydrates contents in centrifuged algal juice were determined by previously published method for reducing sugar analysis with small modification [16]. 1 mL of sample was combined with 1 mL of dinitrosalicylic acid (DNS) solution and incubated for 10 min at 100°C in a heating block. Samples were then immediately cooled by placement in cold water and absorbance was measured at 575nm.

V. UV TREATMENT

Microcystis produces UV-protective compounds like scytonemin and mycosporine-like amino acids, which can be used in sunscreen and cosmetic products.One of the most important benefits of Microcystis algae is its capability to generate UV-protective compounds, including scytonemin and mycosporine-like amino acids. These substances have been proven to possess strong antioxidant and photoprotective qualities, making them suitable for incorporation in sunscreen and cosmetic formulations. Indeed, research has shown that extracts derived from Microcystis algae can offer significant defense against UV-induced harm, encompassing photoaging and skin cancer. Additionally, the UV-protective compounds produced by Microcystis algae have been discovered to have anti-inflammatory effects, which can assist in soothing and calming the skin. Besides its applications in UV treatment, Microcystis algae has also been recognized for a variety of other advantages and uses. It has been utilized as a natural food dye, along with being a nutritional supplement due to its abundant vitamins, minerals, and antioxidants. Microcystis algae has also been identified as having potential roles in biotechnology, including the development of biofuels, bioplastics, and various valuable substances.
Microcystis algae possesses antimicrobial and antiviral capabilities, presenting it as a possible natural solution for an array of infections and diseases. In summary, the advantages and applications of Microcystis algae are extensive and diverse, and additional research is essential to fully investigate its potential uses in areas such as UV treatment, biotechnology, and natural health..It has been reported that stress conditions increases the carbohydrates contents of algae, therefore before pretreatment *M. aeruginosa* was exposed to UV for 5 hours to create the harsh environment to increased its carbohydrates contents. The growth pattern difference was tracked, and, the morphology of UV-treated algae was examined by an image-analyzing system (Nikon, Japan).

VI. BIOMASS AND FERMENTATION

Electric flocculation dewatered *M.aeruginosa* culture quite effectively. This resulted in concentrated *M. aeruginosa* culture in water with DC electric field. Due to negative charge of microalgae cells and when electric field is applied, separation of algae from water becomes possible Then the concentrated biomass was treated with 0.05% TiO2 and 0.01% CaO and microwaved for 2 hours.For disintegration of algal cell wall components and release of internal sugar contents into external media, Cellic CTech2 (Novozymes) was utilized. Cellic CTech2 was used at a concentration of 0.02mL/L of the algae at a pH of 4.5. Biomass was maintained at 50°C for 4 hours in shaking incubator after the addition of enzyme Cellic.The biomass was further saccharified by hydrolysis with acid at high temperature. Biomass was treated with 5M H2SO4 and autoclaved at 100°C for one hour.

All of the pretreatment methods aimed at obtaining enriched algal juice containing remnant metabolites (fermentable sugars). Finally, the filtered algae juice after autoclaving was used for fermentation process substrate.

Saccharomyces cerevisiae, *Brettanomyces custersainus*, and *Pichia stipites* were the three different microorganisms used to convert the sugars of the algae juice to bioethanol. Individual and combined use of these microorganisms was used to study the efficient fermentation with maximum yield. The fermentation study of 3L volume fermenter with 1L algal substrate containing respective media for the used microorganisms. During the fermentation process, temperature was maintained at 27°C.

VII. ALGAE GROWTH RATE [CARBON DIOXIDE SEQUATATION]

Microalgae have been fastest growing can interpret the plant growth and shall be compared to terrestrial plants and allowing for preparation of high biomass production, effective for the biodiesel preparation etc., comparatively rapid growth attains up to 70% of microalgae accumulate based on lipid source of *Microcystis* algae and have proper growth rate up to 80 to 90%. Be the attractive source of biodiesel is producing comparatively to accumulation. *Microcystis* produces high amount of fuel production like bioethanol and lipofication of biodiesel.

Production can be increased by their efficiency increasing up to 80 to 90 % highly in future and reduces the vehicles carbon emission at very low; and increases the vehicle life span, etc., microalgae utilizes the carbon dioxide for their consumption of energy through photosynthesis process, reduction of greenhouse gas emission.

Microcystis has been accumulate by great potential growth for biodiesel production, due to high efficiency of biomass cultivation. It may lead to lipid metabolism through *Microcystis* algae contains the genus of fresh water cyanobacteria that can forms the high bloom in eutrophic water bodies and we can naturally grow through rain water by absorption of sunlight, shadow and white light can directly passes towards to pond water and it may grow little bit in higher than dense normal preparatory of saline water and distilled water. It may reduce the cross contamination.

Microcystis is a species of algae they can produce certain kind of toxins and non-toxins strain have been utilized for the various physical, chemical and biological applications. It includes such as biodiesel production wax production, bioethanol production and some often products like oral skin care, oral wash for hand dryness and using in some lower amount of cosmetic products preparations etc.,

VIII. RESULT

The optical density (OD) of the algae was monitored by spectrophotometer at 660nm to determine growth of M. Aeruginosa. In the case of algae, the density of the algal population in the suspension is directly proportional to the OD (optical density). Various parameters were optimized to improve the *M. Aeruginosa* growth including, temperature, light intensity, culture media type, and additional nutrients. The culture was continuously maintained in a light and CO2 supply.It was conculed by the increase in biomass and sugar content of *M. Aeruginosa* culture.

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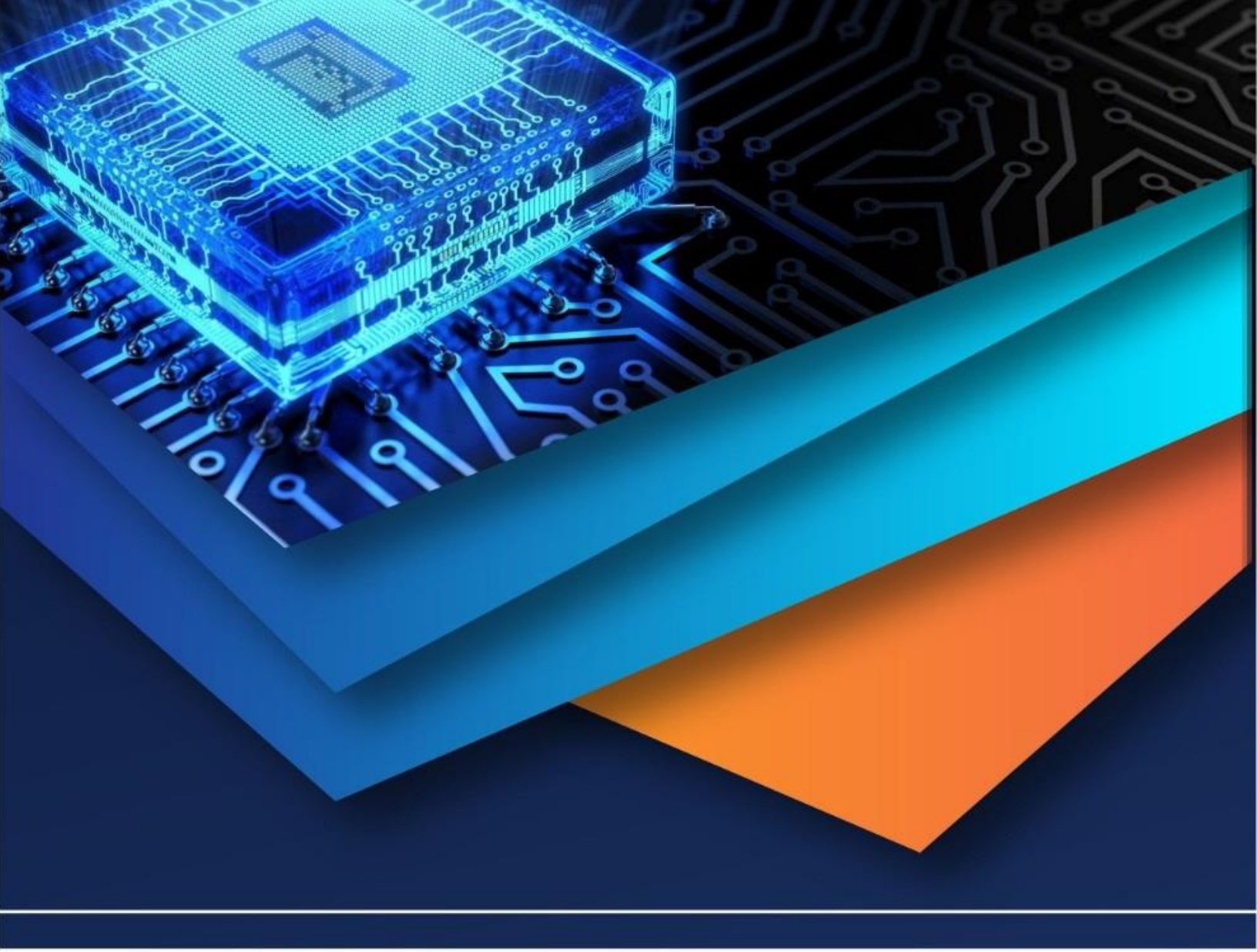

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