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A Human Waste Which Recycle into a Most Important Useful Product

Ankita Dey*
Haldia Institute of Technology, West Bengal, India

Review Article

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***For Correspondence**

Ankita Dey, B-Tech (Biotechnology) Haldia Institute of Technology, West Bengal, India.

E-mail: ankitadey47@yahoo.com

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ABSTRACT

The objective of this study was to guage the results of continuous applications of additional body waste on plant and soil for continuous cultivation and it's seen and discovered that continuous cultivation with high body waste application had a control on soil EC increase and soil pH scale decrease. These results advised that soil management to take care of these parameters ought to be any thought-about for long-run apply scale even in controlled bodywaste application and low EC soil.Human piddle have conjointly some additional edges because it share some of stem cells. Human piddle is additionally useful for the expansion of microalgae which is able to be helpful for the production of biofuel.

INTRODUCTION

Human body consists of 70% water. Human have a basic need of food, shelter, clothes. As the humans (Homo sapiens) intake food it goes from the mouth through the alimentary cannel it gets processed, the useful materials and the components gets absorbed in the body and the rest of the waste materials are excreted out in form of water and feces. Human waste are of no use to the human directly but when the human excreta are recycled and the reused it becomes the most wanted and the most important material for the human beings.

MAJOR NUTRIENT PRESENT IN HUMAN WASTE

(Kirchmann and Petterson,1995; Jonsson et al. 2000) has observed that, in domestic wastewater, human urine fraction contains the major plants nutrients, with approximately 80% of the nitrogen (N), 55% of the phosphorus (P) and 60 % of the potassium (K). As the artificial fertilizers which are applied on the soil to improve the crop efficiency, those fertilizers are very costly and that affects the soil. As these fertilizers are artificially made with chemicals when this chemical is applied on the soil it gives short term benefit but in the long time it will destroy the efficiency of the soil. So the ancient time methods are being used where the ancient people collect the human and animal waste and use it as a manure to improve the crop productivity.

COLLECTION OF HUMAN WASTE

There are many different ways in which human waste can be collected, treated and disposed or reused, depending on the sanitation system that is in place, eg. starting with the type of toilet that is being used (Figure 1).

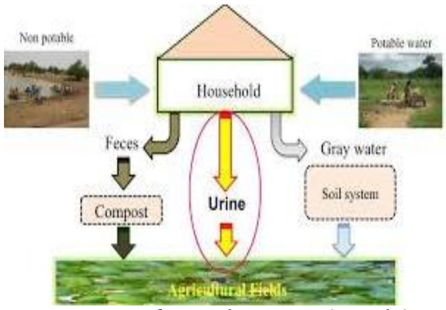

Figure 1: collection of human waste from places and applying on the agricultural field.

As different places in the world have different situations and condition about all the sanitation discharge. In the developing countries people have open defecation as due to the lack of other options where the human waste is deposited in the environment. Others can use flush toilets where the human waste is mixed with water, transported and send to sewage treatment plants [1-4].

Fossil fuels are formed by natural processes such as anaerobic decomposition of buried dead organisms (like forest, human, animals etc.). Containing energy originating in ancient photosynthesis. The age of the organisms and their resulting fossil fuels is typically result of millions of years, and sometimes exceeds 650 million years. Fossil fuels contain high percentages of carbon and include petroleum, coal, and natural gas. Other derivatives are kerosene and propane. Fossil fuel ranges from volatile to non-volatile materials. Volatile materials having low C: H ratio and the non-volatile material are composed of pure carbon like anthracite coal [5,6].

As from the years back, fossil fuel are used as a basic material for producing energy like electricity, transportation (in trains) etc. by the different forms of fossil fuel. Serious environmental problems have been caused by excessive use of fossil fuels, especially in the automotive sector. Climate change, deterioration of the ozone layer and acid rain are some of the consequences thereof. And beside the environmental problems there have been over use of fossil fuels which lead to the depletion of the fossil fuel .As the creation of fossil fuel takes millions of years but the use of them makes them to get depleted soon. As it takes long years to be made so it should be preserved and should be used in the correct form and should not be misused [7,8].

ALTERNATIVE TO THE FOSSIL FUELS

As an alternative to the fossil fuel it is found that the extraction of the biofuel from the microalgae can also serve as a fuel to generate electricity and can help in the transportation purpose. (Kanjana Tuantet, et al. 2014) has observed that urine can be a base and a nutrient material for the microalgae production. Urine is a typically sterile liquid excreta of the body secreted by the kidneys through a process called urination and excreted through the urethra [9-12]. Urine is an aqueous solution having more than 95% of water. Other constituents present in urine include urea, chloride, sodium, potassium, creatinine and other dissolved ions, and inorganic and organic compounds. As urine is a human waste product and recycling and reusing will not bring any type of destruction in the flora and fauna and will not perish the fossil fuel resource. So in the need to seek for new sources of energy more respectful with the environment, scientists have focused their attention on biofuels. Among them, biodiesel produced from microalgae has emerged as a promising alternative to the fossil fuel [12-23]. Microalgae has a High growth rate, high capacity for lipid accumulation, CO2 absorption capacity and ease of cultivation both outdoor tanks (raceway) as in closed reactors (photo bioreactor) are some of the advantages exhibited by microalgae [24-30].

However, despite of the excellent properties exhibited by the microalgae, the price of algal biodiesel is not yet sufficiently competitive and not yet started to be in our daily use. Several consecutive stages such as algal culture, harvesting, dewatering, oil extraction and transesterification are necessary for obtaining this biofuel [30-36].The laboratory extraction is being done, but due to the cost factor it is not started in our daily use. The optimization of these stages is being investigated by researchers with the aim of achieving large-scale biodiesel production at a reasonable price. High costs are derived from biomass harvesting stage, around 20-30% of overall production costs of biodiesel .Different microalgae harvesting technologies have been studied by several authors: flocculation, gravity sedimentation, flotation, filtration or pH induced. Soxhlet apparatus are the most prominent apparatus which are commonly used for the extraction of the biofuels. The efficiency of these techniques depends largely on the solvent or solvent mixture used. Acetone, hexane, chloroform, methanol and a mixture of chloroform-methanol are most often used. Similar oil extraction yields can be obtained by microwave and ultrasound methods. (Bishop WM, et al. 2012) observed that if the microalgae are grown in the artificial medium by the use of chemicals the cost will be much more as compared to the experiment when it is grown in the natural substrate .The main components required for the growth of microalgae are nitrogen, phosphorus, carbon, sunlight, and aeration which have to be provided to the algal culture for their survival [10,12].

One of the natural substrate which is commonly used for the growth of micro algae is human urine a microalga was grown on non-diluted human urine. The human urine satisfies the basic nutrients need of the microalgae.

Kanjana Tuantet, et al 2014 in his experiment he has observed by taking the type of micro algae which was Chlorella sorokiniana it was grown and cultured. The essential components which are required for the growth of this species were determined from different types of human urine (fresh, hydrolyzed, male and female). In the Batch experimental results using micro titer plates showed that both fresh and synthetic urine supported rapid growth of this species, provided additional trace elements (Cu, Fe, Mn, and Zn) were added .When using hydrolyzed urine instead of fresh urine, additional magnesium had to be added as it precipitates during hydrolysis of urea. It was observed by him that the efficiency of the growth of the microalgae in artificial medium was less as compared to that in the natural medium. It was demonstrated that concentrated urine is a rich and good nutrient source for the production of microalgae, its application for a large-scale economical and sustainable microalgae production for biochemical, biofuels and bio fertilizers can be done feasibly.

At first all the urine are collected and the pH and components are checked by different methods the additional components needed by the micro algal growth is to be added in it. The next step is addition of the microalgae. After few days when the micro algae grows totally in the urine culture and the density of the algal culture is at the most, and a point comes when more growth of the algal cell can affect the quality of the algal culture. At that point all the algal culture are filtered from the remaining water parts are removed and eliminated the resulted semi dried micro algal culture are kept to be 100% dried. They are let to be dried in the sunlight. After they get dried they become a solid dried and become a fine plate like structure. The final structure is then send to the grinder and then grinding process is being done as the grinder process is being done. The resulted fine microalgae culture is send to the soxhlet apparatus where the final biofuel can be formed. The resultant biofuel is then processed and can be further used as petroleum [37,38].

OTHER USES OF MICRO ALGAE

The micro algae can be used as a protein supplement; the species like Spirulina are extensively used as a protein supplements the human (Figure 2). As in the developing countries many people do not get the proper diet and suffers by malnutrition. To avoid these situation the tablets and capsules are formed by the processing the microalgae. These should be taken in proper amount as required by the individual according to the age. It has also been seen that there is no side effect found after using the micro algae as a protein supplement (Figure 3).

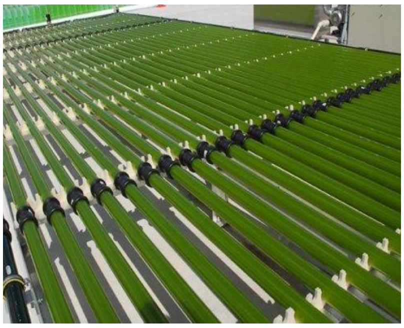

Figure 2: Fully growth microalgae in the urine culture.

Figure 3: Tablets of Spirulina which is taken by the humans as a food supplement.

Microalgae can also be used as a biofuel that also have the capacity and the potential to produce electricity. Years back the fossil fuels are used to produce electricity and that was supply to the home, industries etc. The biofuel generated from the micro algae also have the potential to generated electricity which can be transferred to the home, industries, factories and other places [39,40].

There are other uses of urine; it has been observed that the urine have the potential to create new tissue as it has found by the experiment that the urine contains some amount of stem cells (Jeevani T 2011). These stem cells have the property to create new tissue. In any case if a human gets affected by any type of mutation which can result to form tumor. That tumor can be removed by operation and can be replaced by the tissue which is created by the stem cells of the urine [40-45].

CONCLUSION

Fossils are non-renewable natural resource which is finishing day by day due to the excessive use. Replacement of these resources takes thousands of days. The benefits we get by the consumption of the fossil fuel has become a part and parcel of our daily life .The burning of coal and generating electricity which used in our daily use and many more uses are there. Due to the overuse by us our next generation will be deprived of all the benefits from the fossil fuel. So alternatives are invented so it can reduce the consumption of fossils. As observed after the collection of the urine the microalgae are grown and cultured in it. After that it is cultured, filtered, dried and send to the soxhlet apparatus for the final extraction of the biofuel from the microalgae. Not only in the production of biofuel. The extracted microalgae (Spirulina platensis) can also be used as a protein supplement for the human. It is also seen that urine has many more advantages like production of the stem cells which can help to cure tumour and first and second stage of cancer. As the stem cells are known to be the meristematic tissue which have the property to grown in any kind of cells/tissue.

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