A Study of The Some Physicochemical Properties of Water Sample from Ngamoeyeik Creek near North Okkalapa Township and Treated with *Moringa oleifera* L. (Dant-da-lun) Seed

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Abstract

In the present work, the creek water sample was collected from sampling site of Ngamoeyeik creek near North Okkalapa Township, Yangon Region. Determination of some physicochemical properties such as pH, turbidity, total suspended solid, total dissolved solid, dissolved oxygen and conductivity of creek water sample were carried out by standard methods and low cost household water treatment by using *M.oleifera* seeds powder. *M.oleifera* seeds are non-toxic, inexpensive and natural coagulant for water treatment.

Keywords: TDS, pH, Turbidity,*M.oleifera* seeds

Introduction

Water is one of the most vital natural resources for all life of Earth. 97% of water present in Earth is sea water and 3% of fresh water. Out of this 3%, 68.5%, is trapped in glaciers and ice caps of mountains, 30.2% is present as ground water and remaining 1.3% as surface water. Surface water is fresh water from streams. Water is one of the most important compounds to the ecosystem. Better quality of water is described by its physical, chemical and biological characteristics. But, some correlation is possible among these parameters and the significant one would be useful to indicate quality of water. Due to increased human population, industrialization, use of fertilizers in agriculture and man-made activity, it is therefore necessary that the quality of drinking water should be checked at regular time interval. Due to the use of contaminated drinking water, human population suffers from a variety of water borne diseases. The most important use of water in agriculture is for irrigation, which is a key component to produce enough food. Irrigation takes up 90% of water withdrawal in some developing countries. Other uses are as a scientific standard for dinking, washing, transportation, chemical uses, heat exchange, fire extinction, recreation, water industry, industrial application and food processing. In future, even more water will be needed to produce food because the earth's population is forecast to rise to 9 billion by 2050. Water on Earth is known by different terms, depending on where it is and where it comes from. Pazundaung creek known upstream as (Ngamoeyeik creek) is a stream that empties into Yangon River. The center of Yangon is established at the confluence of Yangon River to the west, south and Ngamoeyeik creek to the east. The availability and quality of water always have played an important part in determining not only where people can live, but also their quality of life. In rural areas and undeveloped countries, people living in extreme poverty are presently drinking highly turbid and microbioligically contaminated water as they are lack of knowledge of proper drinking water treatment and they cannot also afford to use high cost of chemical coagulants. Chemical coagulants like Aluminiumsulphate (alum), $FeCl_2$ is used in Municipal drinking water treatment plant for purification process. This excessive use of chemical coagulant amount can affect human health. For example, Aluminum has also been indicated to be a causative agent in neurological diseases

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such as pre- senile dementia. To overcome chemical coagulant problems, it is necessary to increase the use of natural coagulants for drinking water treatment. Naturally occurring coagulants are usually presumed safe for human health. Some studies on natural coagulants have been carried out and various natural coagulants were produced or extracted form microorganisms, animals or plants. One of these alternatives is *Moringa oleifera* seeds. It is a native tree of the sub- Himalayan parts of North- west India, Pakistan and Afghanistan. *Moringa oleifera* is a perfect example of a so- called" multipurpose tree". Earlier studies have found *Moringa oleifera* to be non- toxic, and recommended it to use as a coagulant in developing countries. The use of *Moringa oleifera* has an added advantage over the chemical treatment of water because it is biological and has been reported as edible. According to Muyibi and Evison, 1994, hardness removal efficiency of *Moringa oleifera* was found to increase with increasing dosage. *M. oleifera* seeds act as a natural absorbent and antimicrobial agent as their seeds contain 1% active ployelectrolyte's that neutralize the negatively charged colloid in the dirty water. This protein can be therefore nontoxic nautraploypeptide for sedimentation of mineral particles and organics in the purification of drinking water. These seeds also act as antimicrobial agent against variety range of bacteria and fungi. The seed contains number of benzyl isothiocynate and benzyl glucosinolate which act as antibiotics. It is believed that the seed is an organic natural polymer.

Botanical Aspect of *Moringa oleifera* L. (Dant-da-lun)

Moringa oleifera L. is a highly valued plant, distributed in many countries of the tropics and subtropics (Figure 1.1).

Myanmar name	:	Dant-da-lun
English name	:	Drumstick
Botanical name	:	*Moringa oleifera* Lam.
Family	:	Moringaceae
Genus	:	*Moringa*
Species	:	*M. oleifera*
Part used	:	Seeds

(a) **(b)**

Figure1. *Moringaoleifera* L. (Dant-da-lun) (a) pods and (b) seeds

Materials and Methods

Sample Collection and Storage

In this research, the Ngamoeyeik river water sample was collected from North Okkalapa Township. The sample was collected in polyethylene bottles which had been washed with a detergent and rinsed with water, diluted nitric acid solution and distilled water. Sampling sites were recorded with GPS detector. The sampling sites were represented in Figure 2.

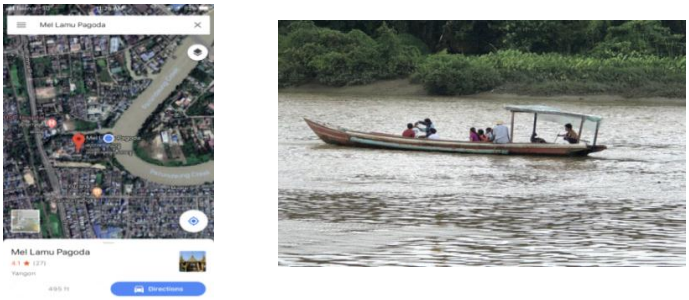

Figure 2. Satellite image and sampling sit

Determination of Some Physicochemical Properties of Ngamoeyeik River Water Sample before and after Treatment by Using *Moringa oleifera* L. (Dant-da-lun) Seeds

In this research, all chemicals were used of analytical reagent grade. In all investigations, the recommended standard methods and techniques involving both standard and modern methods were provided. Determination of some physicochemical properties of lake water sample before and after treatment with *moringa oleifera* seeds powder such as pH, turbidity, conductivity, dissolved oxygen was measured by digital meter (HANNA instrument). Total suspended solids and total dissolved solids were determined by filtration and evaporation methods. Total alkalinity and total hardness were determined by titration methods.

Treatment of Water Sample by Using *Moringa oleifera* L. (Dant-da-lun) Seeds

Good quality *Moringa oleifera* seeds are taken and removed its wings and coat from their seeds. Fine powder was prepared by using mortar and pestle and this powder was directly used as coagulant. Water is treated by adding of *Moringa oleifera* seeds powder directly. The water quality parameters were checked before and after treatment of *M. oleifera* seeds.

Effect of Different Doses on the Removal of Turbidity in Water Sample by Using *Moringa oleifera* Seeds Powder

1, 2, 3 and 4 g of *M. oleifera* seeds powder were added separately into the beakers containing 1000 mL of water samples. The mixtures in the beaker were stirred thoroughly for 1 h using glass rod. The suspension was left to stand without disturbance at 1 h and the supernatants formed were decanted and subjected to determine the turbidity. They are represented in Figure 3.

Figure 3. (a) Before treatment and (b) After treatment

Figure 4. (a) Turbidity and (b) pH, DO, Cd meter

Figure 5. *Moringa oleifera* Tree and Seeds

Aim and Objectives

Aim

The aim of this paper is to determine the some parameters and treatment of water sample from Ngamoeyeik creek from North Okkalapa Township

Objectives

To collect the water sample from Ngamoeyeik creek from North Okkalapa Township

To determine the some parameters of water analysis such as pH ,turbidity ,total suspended solid ,total dissolved solid , dissolved oxygen ,conductivity

To study the treatment of water sample by using *M.oleifera* seeds

To identify pollution hot spots in studied area

Results and Discussion

Effect of different doses on the removal of turbidity in water samples by *Moringa oleifera* seeds powder

The percent removal of turbidity of water sample is 99.503 %, 99.590 %, 99.408 %, 99.560 % respectively. The maximum reduction of turbidity was found to be 99.590 % in sample . According to the results, the effective dose of *M. oleifera* seeds powder in the removal of turbidity was found to be 2 g/L.These data are shown in Table 1.

Turbidity in creek water is caused by the presence of suspended matter such as clay, silt, finely divided organic and inorganic matter, plankton and other microscopic organisms.

Effect of Different Doses on the Removal of Turbidity in Water Sample by Using *Moringa oleifera* Seeds Powde

Table 1 Effect of Different Doses on the Removal of Turbidity in Water Samples by *M.oleifera* Seeds Powder

Doses (g/L)	Removal of turbidity (%)
1	99.417
2	99.467
3	99.257
4	99.286

Some Physicochemical Properties of River Water Sample before and after Treatment by Using *M. oleifera* Seeds Powder

In the present study, river water sample was collected from Ngamoeyeik river, North Okkalapa. The collected water sample was investigated before and after treatment with *M. oleifera* seeds powder (2 g/L dose) by standard methods as well as modern instrumental techniques. In this present work, before and after treatment of pH values of water sample were determined as 7.5 and 6.9 respectively. The observed values of pH were within the WHO standards. These pH values are suitable for aquatic life. The turbidity values of water sample before and after treatment were recorded as 346 NTU and 64.2 NTU respectively. According to the visualization and measurement results, the turbidity of water sample was reduced after treatment of *M. oleifera* seeds powder (Figure 6). So *M. oleifera* seeds powder removed 90 % to 99% of turbid in the treated water. The total suspended solids of water sample before and after treatment were recorded as 780 ppm and 70 ppm respectively. After treatment, the total suspended solids of sample were lower than the WHO standards. The total dissolved solids of water sample before and after treatment were recorded as 140 ppm and 20 ppm respectively. The observed values of total dissolved solids were lower than WHO standards. The observed values of conductivity of water sample before and after treatment were recorded as 124.1 µS/cm and 170 µS/cm respectively. The observed values were lower than WHO standards. The value of dissolved oxygen in water sample before and after treatment were recorded as 6.1 % and 7.1 %. The observed values of dissolved oxygen were lower than WHO standards. All of these data are shown in Table 2.

Table 2. Some Physicochemical Properties of Creek Water before and after treatment with *M. oleifera* seeds Powder

Parameters	Before treatment	After treatment *M.oleifra* Seeds	WHO Standards
pH	7.5	6.9	6.5-8.5
TSS (ppm)	780	70	150
TDS(ppm)	140	20	500
Turbitidy(NTU)	346	64.2	150
DO (ppm)	6.1	7.2	150
Cd (□s)	124.1	170.1	600

Determination of Turbidity by Visualization

Figure6. Beforeandaftertreatmenofcreekwatersample

Conclusion

The present study is concerned with creek water quality and treatment by using *M. oleifera* seeds powder. Some physicochemical properties such as pH, Total suspended solid, Total dissolved solid, turbidity, conductivity, dissolved oxygen of water sample from Ngamoeyeik creek were investigated before and after treatment by using *M. oleifera* seeds powder. *M. oleifera* seeds act as a natural coagulant, flocculent, absorbent for the treatment of creek water. It reduces the pH, Total suspended solid, Total dissolved solid, turbidity, dissolved oxygen after treatment . The conductivity value is slightly increased after treatment . *M. oleifera* seeds could be used as natural coagulant for water treatment with low environment risks.*M. oleifera* seeds is not giving any toxic effect and eco-friendly, and therefore can be used in the rural areas where no facilities are available for the treatment of drinking water.

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