

Effects of computer games essay sample

[Environment](#), [Water](#)



INTRODUCTION

Background of the Study

Drinking water is a basic human need, including food, shelter and clothing. The lack of safe drinking water is a leading cause of mortality, especially in local communities where waterborne diseases are persistent due to low quality surface source waters. Appropriate treatment technology can render this poor water resource into safe potable water; however, conventional technology may not be appropriate for those communities in terms of economics, availability, and operational constraints. There are constraints encountered in the use of chemical coagulants, such as scarcity of foreign currency for importation and inadequate supply of chemicals. Although aluminum is the most commonly used coagulant in the developing countries, studies have linked it to the development of neurological diseases (e. g. pre-senile dementia or Alzheimer's disease) due to the presence of aluminium ions in the drinking water (Jekel, 1991).

As a consequence of the above mentioned drawbacks, there was a need to develop alternative, cost effective and environmentally friendly coagulants. A number of effective coagulants from plant origin have been identified: Nirmali (Tripathi et al., 1976); Okra (Al-Samawi and Shokralla, 1996); red bean, sugar and red maize (Gunaratna et al., 2007), *M. oleifera* (Jahn, 1988). Of all the plant material investigated, seeds of *Moringa oleifera* are one of the most effective sources of coagulant for water treatment. *Moringa oleifera*, known as Malunggay, is native in Philippines throughout the tropics. Malunggay is also known as horseradish tree, drumstick tree and mother's

best friend. It grows fast and reaches up to 12m. The bark is grey and thick and looks like cork, peeling in patches.

It loses its leaves from December to January and new growth starts in February to March. Malunggay produces cream coloured flowers when it is 8 months old and the flowering season begins in January and continues through to March. The fruit ripens from April to June and the pods are triangular in cross section, 30 to 50cm long and contain oily, black, winged seeds. The malunggay tree is grown mainly in semiarid, tropical, and subtropical areas. While it grows best in dry, sandy soil, it tolerates poor soil, including coastal areas. It is a fast-growing, drought-resistant tree that is native to all parts of the country. More so, malunggay seeds treat water on two levels, acting both as a coagulant and an antimicrobial agent. It is generally accepted that Malunggay works as a coagulant due to positively charged, water-soluble proteins, which bind with negatively charged particles (silt, clay, bacteria, toxins, etc) allowing the resulting “flocs” to settle to the bottom or be removed by filtration (Crapper, 1973).

According to the Industrial Technology Development Institute (2009), the seed kernels of malunggay contain significant amounts of water-soluble protein that carries a positive charge. When added to turbid water, it can attract negatively charged particles like contaminants, resulting in collection of particles that are easily removed through settling. Among all the plant materials that have been tested over the years, powder processed from the seeds from *Moringa oleifera* has been shown to be one of the most effective as a primary coagulant for water treatment and can be compared to that of

alum (conventional chemical coagulant) (Madsen et al., 1987; Oslen, 1987; Postnote, 2002).

It was inferred from their reports that the powder has antimicrobial properties. Earlier studies have found Moringa to be non-toxic (Grabow et al., 1985), and recommended its use as a coagulant in developing countries (Barth et al., 1982; Bhole, 1987; Jahn, 1988; Müller, 1980; Ndabigengesere et al. 1995 and Olsen 1987). The main objective of this study is to confirm the effectiveness of *M. oleifera* seeds as water coagulant. This paper evaluates Moringa oleifera seeds as coagulants and reports an economical and environmentally safe method of water purification. This will show the way to improve the quality of drinking water in the remote areas.

STATEMENT OF THE PROBLEM

The main objective of this study is to confirm the effectiveness of powdered Malunggay seeds as water coagulant. Specifically, this study will answer the following questions: 1. What effect does powdered malunggay seeds have on the total coliform bacteria, pH, turbidity, TS and TDS of water? 2. What effect does powdered malunggay seeds have on the Acidity, SPC, color and Alkalinity of water?

SIGNIFICANCE OF THE STUDY

Water supply is a basic need required for human beings. It is not only for us but also to all living organisms on Earth. However, for one to really gain the benefits of water, it is important to secure the quality of water that they consume. The need for a clean and safe drinking water is really evident

nowadays. According to Diaz (1999), about 1.2 billion still lack safe drinking water and more than 6 million children die from diarrhea all over the world. Philippines is one of the countries which is included in this issue. Today, the lack of clean and safe water is one of the issues that many countries encounter.

In Philippines, people living in urban areas are using water which comes from the water systems that provides clean and safe water. These water systems provide only water on the selected areas that they can reach. It emphasizes that they can't distribute water all over the country. People in remote areas for examples are getting water from the wells, overflowing and rainfall water and other sources not knowing that it is harmful to them. Since, our concern are the people who has the difficulty of obtaining clean water, the researchers tend to help them in order for them to use water that can prolong their lives and to avoid diseases.

SCOPE AND LIMITATION

The first part of the study will be conducted at Learning Resource Center, Maranding, Lala, Lanao del Norte. Analyzation of the samples will be done at Department of Science and Technology, Cagayan de Oro City. The time duration of this study will be two months. Dried malunggay seeds, mortar and pestle, knife, strainer and containers are the materials that will be used to produce powdered malunggay seeds. The dependent variable is the total coliform bacteria, pH, turbidity, TS, TDS, Acidity, SPC, Color and Alkalinity. The independent variable is the amount of powdered malunggay seeds.

REVIEW OF RELATED LITERATURE

Moringa oleifera is the most widely spread species of the plant family Moringaceae. It is native to Philippines but is naturalized in many other countries in the tropics. It is a small, fast growing, drought deciduous tree that ranges in height from 5-12m with an open umbrella shaped crown, straight trunk with corky, whitish bark. *M. oleifera* is a multipurpose tree with most of its parts being useful for a number of applications. The shelled *M. Oleifera* seeds have been found affective for the removal of heavy metals such as cadmium by adsorption (Sharma et al., 2006). The residue containing seed husks is regarded as waste but research has shown that a simple steam pyrolysis procedure can form high quality micro porous activated carbon from both the waste husks of *M. Oleifera* and the pods (Warhurst et al., 1997). Olayemi and Alabi (1994) investigated the traditional water purification using *Moringa oleifera* seeds at University of Ilorin.

The efficacy of *Moringa oleifera* Lam seeds paste for water purification was studied. Chemical analysis found the seed to contain 34. 1 % protein, 15 % carbohydrates and 15. 5 % lipids. Phytochemical tests and spectral studies led to the elucidation of a oidal glycoside-streophantidin as a bioactive agent in the seed, The seed paste was effective in the clarification and sedimentation of inorganic and organic matter in raw water. It reduced the total microbial and coliform counts by 55 % and 65 %, respectively, after 24 hours whereas alum achieved 65 % and 83 % reduction under similar conditions. Gidde, Bhalerao and Majithiya (2008) conducted a research to

investigate *Moringa oleifera* as an Household Alternative Coagulant for Water Treatment.

The site of their research was College of Sci.& Tech. Farah, Mathura. A series of experiments was conducted on three synthetic raw water turbidities viz. 50, 150, and 450 NTU representing low, medium and moderately high range, respectively to investigate the effects of dosage using shelled blended *M. oleifera* distilled water extract as coagulant for comparison with Alum also used as coagulant, residual turbidity was used as the parameter to judge the performance of the process. Increase dosage of *Moringa oleifera* lead to decrease turbidity up to the optimum dosage after which the residual turbidity increases due to floc restabilization.

Amagloh and Benang (2009) conducted a study at Navrongo, Ghana. The researchers investigated the effectiveness of *Moringa oleifera* seed as coagulant for water purification. Their research was carried out to confirm the effectiveness of powder extracted from mature-dried *Moringa oleifera* seeds which is commonly available in most rural communities of Africa. This was done using Completely Randomised Design with loading doses of 4, 6, 8, 10, and 12 g/L of the powder processed from *Moringa* seeds, and aluminium sulphate (alum) as coagulant. A control (water from the pond with only distilled water without alum and *Moringa* treatments) was also included. The turbidity, pH, and conductivity and total coliform were determined for all the samples. The turbidity for the samples ranged from log₁₀ 0.30 to log₁₀ 1.36 NTU while the conductivity ranged from log₁₀ 2.29 to log₁₀ 2.72 μS/cm. The 12 g/L treatment of *Moringa* and 10 and 12 g/L alum treatments gave

values that are acceptable according to the World Health Organisation (WHO) guidelines for safe drinking water.

The control sample gave the higher extremes values which are unacceptable. The pH values (7.29 to 7.89) obtained for the treatments were in the recommended range set by WHO. The Most Probable Number per 100 ml for total coliform counts had values from 2 to 17 at 95% confidence limits. The Moringa treatment gave lower counts. Findings of this research lend to support to earlier works recommending the use of Moringa for water treatment. Sarpong and Richardson (2010) studied about the Coagulation efficiency of *Moringa oleifera* for removal of turbidity and reduction of total coliform as compared to aluminum sulfate at Department of Civil and Environmental Engineering, New Mexico Institute of Mining and Technology, P. O. Box 2855, Socorro, 87801, New Mexico, USA. They used *Moringa oleifera* seed extract as a primary coagulant for a local river water source with respect to turbidity removal and total coliform reduction.

Aqueous solutions of powdered *M. oleifera* seeds and conventional aluminium sulfate (alum) were evaluated. The quality of the treated water was analyzed using a standard jar test procedure and compared with that achieved using alum. Based on these exploratory experiments, an equivalency dose (mg *Moringa oleifera*/mg aluminum sulfate) was established and tested. At the estimated equivalency dose turbidity removal was virtually the same between the two coagulants; however, the *M. oleifera* extract was not as efficient as alum for Total Coliform reduction. The use of this natural coagulant did not affect the pH and conductivity of the treated

water at the dosage used. Aqueous sodium chloride solutions of powdered *M. oleifera* seeds showed a marked improvement in coagulation efficiency; however, salt extraction at the levels explored would increase the salinity of the source water considerably.

Mangale, Chonde, Jadhav and Raut (2012) conducted a study at Department of Environmental Science, Shivaji University, Kolhapur, India to investigate *Moringa oleifera* (Drumstick) seed as natural Absorbent and Antimicrobial agent for River water treatment. They carried out to confirm the effectiveness of seed powder extracted from mature-dried *Moringa oleifera* seeds which are commonly available in most rural communities. The main objective of their work is to evaluate the antimicrobial activity and efficiency of a natural absorbent from *Moringa oleifera* seeds in treating river water.

During their study, surface water samples were collected for treatment by *Moringa* seeds in powdered form, resulting in an effective natural clarification agent for highly turbid and untreated pathogenic water. Various doses of *Moringa* seed powder viz. 50, 100 and 150 mg/l were taken and checked for the efficiency dose on raw water. After treatment of seed powder with water samples were analyzed for different parameter like pH, Turbidity, TDS, TS, Hardness, Chlorides, Alkalinity, Acidity, MPN and SPC. All parameters were reduced with increasing dose of 50, 100 and 150 mg/l seed powder respectively (except alkalinity and pH).

METHODOLOGY

Powdered Malunggay Seeds

The pods that were plucked were cracked to obtain the seeds which were air-dried for 3 days. The shells surrounding the seed kernels were removed using knife and the kernels were pounded using laboratory mortar and pestle into powder and was sieved using a strainer to obtain a fine powder. This method is a slight modification of the one proposed by Amagloh and Benang (2009). This was the coagulant prepared from Moringa. Seed Collection

The malunggay pods were taken within the municipality of Lala. The seeds were harvested when they were fully matured. This was determined by observing if there are any cracked pods on the plants.

Water Sample Collection

Five litres of sample were obtained from the Maranding River, Maranding, Lala, Lanao del Norte. This was further divided into 4 beakers. The volume of sample in each beaker was 1000 ml.

Laboratory Analysis

The jar test will be used. A 3 ml of the various concentrations including the control of all the loading dosages prepared will be measured into a beaker containing 1000 ml of the river water. The solutions will be mixed rapidly for 2 min; followed by 10 min of gentle mixing using glass rod to aid in coagulant formation. The suspensions will be left to stand without disturbance for 1 h. This is the method adopted since there is no standard method for conducting the jar test (Ndabigengesere et al., 1995).

pH Measurement

pH of the solutions were evaluated using Calibrated Crison pH meter Basic C20. A volume of 200 ml of the supernatants obtained from the beakers containing the treatments were measured into a beaker. The pH reading was taken after it has been stabilized.

Turbidity Measurement

Initial and final turbidity was measured using a portable turbidimeter calibrated with StablCal. Manufacturer's recommendations and procedures for turbidimeter calibration, sample preparation, and sample measurement was followed. The sample turbidity was expressed as nephelometric turbidity units (NTU).

Total coliform (MPN) procedure

Total Coliform counts was quantified using the Membrane Filtration method with m-coliBlue24 culture media and a portable microbiological incubator (Hach Model 25699). Due to the potential high count of Total Coliform in the source water, a serial dilution technique was adopted based on the manufacturer's recommendation for a raw river source. Samples will be incubated for 24 h at 35° C. The resultant red-colored colonies were counted and the results expressed as colony forming units (CFU) per 100 ml.

Conductivity Measurement

The samples used for the pH measurements were used for the conductivity test. A calibrated Crison Conductimeter Basic C30 was used. The

conductivity meter probe was then inserted making sure it did not touch the beaker. The reading was recorded from the LCD display after it had stabilized.

Total Dissolved Solids Testing

Total Dissolved Solids was obtained through the use of a portable TDS meter. The meter will measure the current passing between the electrodes and uses that to determine the water's conductivity. The meter dial (or LCD readout) was calibrated to indicate TDS in parts per million.

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