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# STUDY OF SURFACE WATER AND GROUND WATER TREATMENT BY USING BIO COAGULANTS

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## ABSTRACT:

Natural materials should be used in the coagulant-flocculation process as much as possible. According to the literature, it is worthwhile to develop and, if possible, convert natural materials into commercial. On the other hand, natural coagulants are insufficient as a primary treatment since their efficacy is being hampered by increasing restrictions. Emerging technology and in-depth research contribute to the creation of these restricted settings as well as the success of chemicals. Natural coagulants are also commonly employed as coagulant aids in conjunction with manufactured coagulants. The type of coagulants used in the treatment of waste-water coagulation, in particular the usage of natural coagulants, is the subject of this investigation. Natural materials' potential for future expansion as aids and as sustainable composite coagulants are also discussed in this analytical report.

**Keywords: Ground water, bio coagulants.**

## 1. INTRODUCTION:

Surface waters play a very important role in maintaining the water resources available on the surface. Under surface water, urban lakes serve as an important source of water for people living in the surrounding area. In recent years, most of these lakes have become pollutant potholes due to industrialization, urbanization, and uncontrolled man-made activities. Changes or modifications in the physical, chemical and biological properties of water lead to the growth of phytoplankton in the water. This is the main cause of turbidity in surface water [1]. Haze, like smoke in the air, is the turbidity or turbidity of a liquid caused by a large number of individual particles that are generally invisible to the naked eye. Turbidity measurement is an essential test of water quality.

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Liquids can contain suspended solids composed of particles of various sizes. Some particulate matter is large and heavy enough to quickly settle to the bottom of the container when the liquid sample is left unattended, but when the sample or particles are agitated regularly, the very small particles become very slow [2]. It sinks or does not settle at all. These small solid particles cloud the liquid. Muddy water must be clean. Aggregators such as aluminium sulphate (alum) and ferrous sulphate are commonly used. Alum is commonly used as a chemical coagulant. When alum is added to raw water, it mixes with the bicarbonate alkali present in the water to form a glutinous precipitate. These flakes attract fine particles and solids in the raw water and settle at the bottom of the tank. However, this procedure is expensive and hurts people in stores. To conquer these limitations, natural coagulants such as Moringa oleifera, Tamarindus Indica seed, Phaseolus Vulgaris, Abelmoschus esculentus, Coccinia Grandis, Zea mays, Carica papaya, and Strychnos potatorum, Rice husk, Canna Indica, Typhaceae, Adenanthara pavonine, Azadirachta indica, Banana stem and Mustard are used. These natural coagulants are superior to chemical water treatment because they are reported to be natural, edible, environmentally friendly, economical and easily available.

Healthy Rivers and Lakes are needed to maintain the ecological balance of the nature and they augment our bio diversity. Rivers and Lakes store huge amount of water and helps during droughts and shortages and act as a sink during floods. Rivers and Lakes also help in groundwater recharge, and also influence the water quality of downstream watercourses. Most of the major surface water bodies in Uttar Pradesh have been heavily polluted. This led to over exploitation of existing groundwater supplies. Inconsiderate disposal of solid and hazardous waste has polluted these aquifers to the extent that they are not able to meet the drinking water standards. Over pumping of groundwater has resulted in lowering of the groundwater level in most parts of the state. Coagulation of water using alum as the coagulant is a regular practice in all water works since long time. Coagulation helps in removing the colloidal particles as well as pathogens that are attached to the particles. However, the cost of these chemicals and its side effects in long run has caused to consider the natural coagulants as an encouraging alternative. In the present study, Moringa Oleifera, tamarind seeds and activated charcoal made from rice husk were selected as coagulants. Earlier studies had shown that most of these bio-coagulants can reduce turbidity better than alum. Tamarind seeds are also are said to reduce turbidity and fluoride

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content. Activated charcoal derived from rice husk is found to be an excellent medium to remove turbidity, colour and few heavy metals. Water is essential for human survival. It has been reported that the total amount of water in the world is about 1400 million cubic km and remains constant. Apparently, more than 97.5% of this total volume is seawater of the rest 2.5% is ground water and ice locked away in the glaciers and the polar ice cap.

## 2. LITERATURE SURVEY

Sk. Rakibul Islam, SM Samin Ishraq, Prottoy Kumar Sarker, Shadman Kaiser [2017] For experiments on the application of moringa seeds to coagulate suspended solids, they selected water from the Briganga River in Sadargat, Dhaka as a sample. From this study, they concluded that the use of moringa seeds as a coagulant significantly reduced the turbidity of the sample. Moringa seeds can be used where alum is not an excellent alternative. In colour testing, alum was more effective, but with aesthetically pleasing seed powders, the colour reduction was found to be very effective. When Moringa seed is applied as a coagulant and later filtered, better results are observed as the turbidity of the sample is reduced to 1.96 NTU (optimal dose) and the colour is reduced to 29 PtCo units. This is certainly satisfying. Therefore, the use of Moringa Oleifera seeds as biocoagulants can make a significant difference in water purification systems in both developing and developing countries. Reena Abraham1, Harsha P2 [2019] Two separate experiments are performed in this task. One is tamarind seed powder as a coagulant and the second is papaya seed powder as a coagulant. Coagulation and aggregation were performed using a jar tester to study the effect of coagulant dose on coagulation and the effect of agitation and sedimentation time on coagulation. Before and after solidification, various parameters such as turbidity, conductivity, TSS, pH, BOD and COD were measured. From this study, we can conclude that tamarind indica seed powder was found to be more effective in reducing various parameters of kitchen drainage. Natural coagulants can also expand the ability to treat a variety of other wastewater, including fibre wastewater, tanned wastewater, and even surface water treatment. The use of locally available natural coagulants has proven to be a cost-effective, environmentally friendly and safe wastewater treatment method. Ms. Vrushali V. Shimpi 1,Ms. PoojaR.Jondhale 2, Ms Ritu B. Gangurde3, Ms Tejal D. Jadhav4, Ms Shireen S. Kapse 5 [2018] In this study, a conventional vessel tester is used in the experiment to coagulate a water sample using MO. The results of this study propose that Moringa oleifera at a

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concentration of 100-150 mg / L is effective as a coagulant for the treatment of wastewater and groundwater in the industry. The optimum amount of coagulation of Moringa oleifera is also affected by the initial state of the sample to be coagulated. The higher the contamination level, the higher the optimal dose required. Sonal Chonde and Prakash Raut [2017] The main purpose of this work was to use MO seeds as a natural adsorbent for the treatment of dairy wastewater (DIW). Moringa oleifera plant seeds contain natural polyelectrolytes that can be used as coagulants to purify turbid water. After treating the seed powder with water, the sample was analyzed for various parameters such as pH, electrical conductivity, TDS, TSS, hardness, chloride, COD, and BOD. All parameters showed a decrease with increasing seed powder dose. Therefore, the application of these economical Moringa Oleifera seeds is recommended for environmentally friendly, nontoxic and simplified wastewater treatment.

## 3. METHODOLOGY

Today, the dry alum bag is dropped into a solution which is then transported to the mixing and flocculation basin of the plant. There also exists the polymeric polyelectrolyte coagulant which is long chain high molecular weight molecules which bear a large number of charged molecules with their net charge either positive, negative and/or neutral. The chemical groups on the cationic polymer are thought to combine with active sides of colloids; such interaction of a single molecule with a large number of particles produces a bridging effect binding them together into a large particle which settles under the action of gravity. Historical Development of Biocoagulants: Some previous studies have screened a number of plants as disinfectant for water treatment. Native plants have traditionally been used to improve quality of water in many countries in Africa and Latin America viz. Seeds of Moringa used in Guatemala, peach and bean seeds are used in Bolivia as coagulant aids clarify water. It has been reported that dried beans and peach seeds have been used in Bolivia and other countries of water treatment. Similarly, Schoenoplectus tatora, an aquatic plant has been used in Bolivia and Peru for Water Quality treatment. Seeds of Moringa Oleifera The seeds of Moringa oleifera tree have been found to be of great importance and most widely studied. Oil extracted from the seed is used to treat goitre and acute rheumatism and also applied as remedy for hysteria scurvy. The oil is also used in cosmetics production and as lubricants in delicate machines like watches. The seed is, today, used in water treatment as a coagulant and disinfectant. The seed contains fixed oils, fatty acids such as

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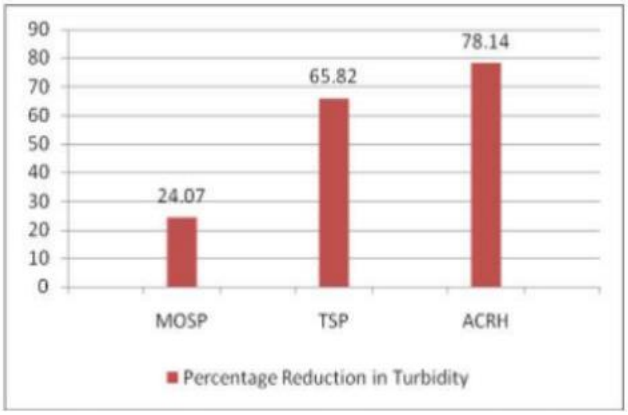
palmitic acids, oleic acids, behinic acids, stearic acids and pterygospermin, an unstable substance with low melting point which decomposes readily to benzylisothionate. Chemical Constituents of Moringa Oleifera (lam) Moringa Oleifera Lam contains several phytochemicals, some of which are of high interest because of their medicinal value. In particular, Moringa Oleifera or Moringaceae family is rich in a fairly unique group of glycoside compounds called glucosinolates and isothiocyanates. The effectiveness of the Moringa plant in treating ovarian cancer has been linked to the ability benzyl isothiocyanate (BITC) and phenethyl isothiocyanate (PEITC) to induce apoptosis in ovarian cancer cells in vitro. There is even evidence supporting the antitumour activity of isothiocyanates in cancers of the lung, breast, skin, esophagus and pancreas. The root bark of Moringa Olefera contains two alkaloids; total alkaloids 0.1%, which are Moringine known to be identical to benylamine and Moringinine known to belong to the sympathomimetric group of bases. Many other Minors phytochemicals in traces such as; essential oil with pungent smell, phytosterol, waxes, and resins are found in the entire plant. Furthermore, a rich and rare combination of zeatin, qurcetin, betasitosterol, caffeoy/quinic acid, pteygospermin and kaempferol have been identified in the plant as well. These components are also found in other Moringa species except for varying quantities, but studies are still inadequate on the other species. In some parts of Northern Nigeria in the early days some indigenous people walk with crushed seeds of Moringa when going to the farm, and would use it to treat any suspicious water they came across, before drinking, especially while on farms that are far away from homes with difficulty of getting potable water. It is worth noting that as much as some communities still remember and practice their traditional knowledge especially in water management, many still do not have or might have forgotten these old methods and now abandoned and lost. A number of communities in rural Africa do not treat their drinking water at all yet. The implication of this has invariably tantamount to increase in the rates of infectious diseases.



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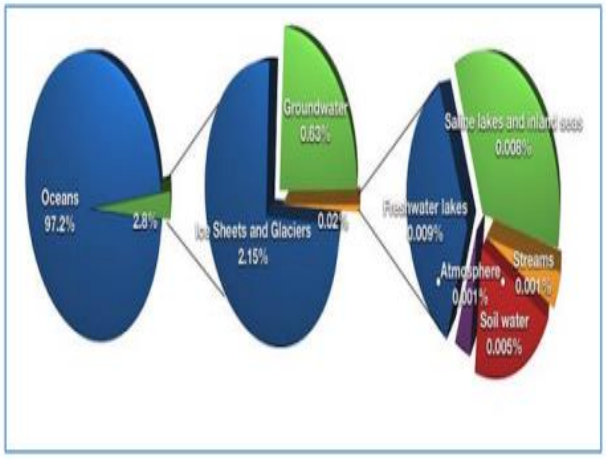


## CONCLUSION

By conduction of jar test for the bio coagulants such as Moringa oliefera, tamarind seeds and activated charcoal using rice husk, it is clearly seen that activated charcoal is a better coagulant in removing turbidity. It has extensively developed internal pore structure. Due to activation, internal pore network is created and thus carbon gets its unique characteristics leading to high surface area, porosity and greater strength. The conclusion is drawn that biocoagulants have been used in many African indigenous communities from antiquity with great benefits and we can use these biocoagulants in INDIA as well for water purification purposes.. In an era of increasing environmental concerns, water scarcity ad-mist the draw backs of chemical coagulants and poor sanitary facilities in most low income earning countries, the need to further develop natural coagulants as alternative environmentally favourable water purifying chemicals is exigent.

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