

SUITABILITY OF NATURAL COAGULANT (MORIENGA OLEIFERA) TO REPLACE ALUM

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Abstract— Water is an important resource for life. River water, bore water, well water etc is source for drinking water & other activities in Indapur Taluka, Pune District, Maharashtra, India. River water is not consider as a pure water. Because in river water with dissolved non essential material in it. The only way to purify the river water is purification process by using natural coagulant. Due to which problem of pollutant water quality improves high important in the present day. The quality of any source of water is depends upon its physical & chemical properties. Various author conducted their studies on chemical & physical properties of pollutant water. This review attempts to highlight the main achievement in purifying water & the outline the advantages of using natural coagulant (MO) to replace chemical coagulant (Alum) for purification of water.

Introduction

Due to rapid development of various industries in Indapur, Pune region, the river water quality is get deteriorate because of wastewater from various industries like sugar industries, chemical industries, fertilizer industries & paper industries etc. in & around Indapur region.

The cost of water treatment is increasing & the quality of river water is not stable due to suspended & colloidal particle load caused by storm runoff during rainy season. In India about 1.2 billion people still lack safe drinking water & more than 6 million children die from diarrhea in developing countries every year.

The Earth surface covered by water is 2/3 rd of Earth surface & human body consisting of 70% water. So water is very important for life. 42 liters of water contains by adult body & just a small loss of 2.7 liter by adult human body.

Causes of taking less water or drinking of pollutant water are weakness, headaches, nervousness, irritability etc. Dr. F. Batmanghelid in his book gives great essay on water. He writes, "Since the water we drink provides for cell function & its volume requirements, the decrease in our daily water intake affect the efficiency of cell." Chemical coagulants are harmful for human body due to over dose of using chemical coagulant for purifying water. So there is need to replace natural coagulant for water purification. These project studies focus on to reduce amount of oil, to reduce hardness of water, to maintain pH, to reduce turbidity etc. by using MO seeds as a natural coagulant for purification of water. Natural coagulant is important for improve the characteristics of water.

I. PREVIOUS WORKS

Hamzah M.Salleh (2009) conducted study on Moringa Oleifera seed as natural coagulant for water treatment. He had used moringa oleifera seed powder for jar test. After jar test the result found moringa oleifera can be used as a natural coagulant alternative to the alumina & other chemical coagulant.

The present study deals with the Suitability of natural coagulant (MO) to replace chemical coagulant for purifying water in Malaysia & other countries. The cost of water treatment increasing & the quality of river water is not stable because of high storm runoff during the rainy season in country Malaysia. The turbidity level increases in rainy season, so the need for water treatment. The result of Hamzah M.Salleh found a natural alternative for water coagulant to reduce the turbidity. He has been found that Moringa Oleifera is the best natural coagulant that can replace alum which used highly in Malaysia. He's studies focusing on MO seeds to find the active constituents which are responsible about the coagulation & improving the water property.

A. J. Oloruntade (2013) for A case for the use MO seed natural coagulant to improve water quality in rural farms in NIGERIA. He used natural coagulant, water supply, MO for treatment after treatment of water. As a result of this, there have been calls for community participation in the supply of many of the amenities, including water.

The author had led to the consumption of water from many sources by the rural peoples without any treatment. Therefore he suggested the need for an alternative water treatment method which is be costly, with health effects & unfriendly to the environment hence he beleave on safe & environmental friendly natural coagulant, Moringa Oleifera for water treatment in Nigeria's rural area, with the use of the plant it is excepted that the cost of water treatment will be reduce & this natural coagulant improve the quality of water. Since, researches are still ongoing on the use of MO for water treatment. It was recommended that adequate care should be taken on the suitable procedure & dosage.

ELSEVIER conducted study on the comparison between MO seed & Alum they got result A research project was commissioned to investigate the performance of Moringa oleifera compared with that of aluminium sulphate ($Al_2(SO_4)_3$) and ferric sulphate ($Fe_2(SO_4)_3$), termed alum and ferric respectively. A series of jar tests was undertaken using model water, different raw water sources and hybrid water containing a mixture of both of these types of water. Results showed that M. oleifera removed 84% turbidity and 88% E. coli, whereas alum removed greater than 99% turbidity and E. coli. Low turbidity river water (<5 NTU), with an E. coli count of 605 colony forming units (cfu)/100 ml was treated 11 with M. oleifera and ferric. Results showed an 82% and 94% reduction in E. coli for M. oleifera and ferric respectively. Tests on turbid river water of 45 NTU, with an E. coli count of 2650 cfu/100 ml, showed a removal of with turbidity of 76% and E. coli reduction of 93% with M. oleifera. The equivalent reductions for alum were 91% and 98% respectively. Highly coloured reservoir water was also spiked E. coli (104 cfu/100 ml) and turbidity (160 NTU) artificially created by kaolin; termed hybrid water. Under these conditions M. oleifera removed 83% colour, 97% turbidity and reduced E. coli by 66%.

Corresponding removal values for alum were 88% colour, 99% turbidity and 89% E. coli, and for ferric were 93% colour, 98% turbidity and 86% E. coli. Tests on model water, using a secondary treatment stage sand filter showed maximum turbidity removal of 97% and maximum E. coli reduction of 98% using M. oleifera, compared with 100% turbidity and 97% E. coli for alum. Although not as effective as alum or ferric, M. oleifera showed sufficient removal capability to encourage its use for treatment of turbid waters in developing countries.

A.R.Khan (June 2000) conduct study on natural coagulant for water treatment. The authour had used MO seeds as natural coagulant. The great problem in river water is turbidity. By using Mo which are locally easy available to reduce turbidity. The test were carried out using rive water & artificial turbid water with conventional jar test apparatus. Maximum intensity & duration were determined by A.R.Khan. After dosing water soluble extracts of Moringa Oliefera reduced turbidity to 5.9 Nephelometric Turbidity Unit (NTU), from 100 NTU & 5 after dosing & filtration.

He found natural coagulant worked better with high turbid water compare to medium or low turbid water. 89 to 96% total coli from reduction with natural coagulant treatment of turbid water . Using locally easy available natural coaglant, easier, suitable & enviornmental friendly option for water treatment were observed.

S. A. A. Jahn,(1988) A few traditional plant flocculants such as those found in Moringa seeds have been observed to act as primary coagulants and have been recommended for domestic water treatment in rural areas of Africa and Asia, where people cannot afford conventional coagulants. Once a plant has been shown to possess outstanding clarifying properties, applied taxonomy and selective breeding can help in the identification of sources of even more potent flocculants and in the production of the best "flocculant crop" for a particular situation.

III.CONCLUSION

From the literature it was observed that the, due to rapid urbanization & pollution the water quality is get deteriorated day by day. So it is necessary to analyze the river water quality for various parameters to check it's suitability for drinking purpose & secondary use. So it is highly recommended that the use of MO seed as a natural coagulant for water treatment.

Moringa oleifera seeds present a viable alternative coagulant to alum in treating water for rural dwellers since it's environmentally friendly and cheaper.

Moringa oleifera is an effective natural coagulant which can be used in improving the physicochemical characteristics of water in terms of pH, turbidity, TDS and conductivity. In coagulation, Moringa seeds hardly affect pH of water as compared to alum which requires pH adjustment after treatment. This is likely to reduce the high cost of the current water treatment systems.

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