

CICER ARIETINUM IS USED AS NATURAL COAGULANT FOR WATER TREATMENT

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Abstract - *Cicer Arietinum (CA)*, seeds were investigated as an alternative natural material for treating surface water based on the problems arises with chemical coagulants like Alum. A threat for human health named Alzheimer's disease is associated with the high aluminium residual in treated water. Therefore alternative natural material has been emphasised as a solution. The study of lab results illustrates that natural coagulant helps reducing turbidity of different turbid water (80, 150, 250 NTU) sample are well. For 250NTU sample the adsorbent has been performed efficiently reducing turbidity to 0-15 NTU for different turbid water sample. Meanwhile the natural coagulant removed the turbidity in the water represents that, use of the cicer arietinum is efficient in the water treatment process.

Key Words: cicer arietinum, turbidity, coagulation, natural coagulants, dosage.

1. INTRODUCTION

Water is a predominant structure on the Earth, needs for all the creature of earth's survives. It is the basic element for every life on the earth surface. On earth there are many sources of water but for human, easily accessible water is the surface water. In the recent decades, our surface water is also becoming the discouraged one because of its higher turbidity level. In the 20th century from 1970's onwards, we have seen some of the drawbacks while using the chemical coagulants like aluminium salts. This aluminium content in the water is dangerous for human and it affects on the human health. If by using a large quantity of aluminium salts, then it will results in one of the disease called Alzheimer's disease. To reduce this alternative use of natural coagulants began.

1.1 Materials and Methodology

Preparation of cicer arietinum adsorbent

The naturally dried cicer arietinum seeds has to be taken from the locally available market. These seeds has to be allowed for sundry up to minimum 3 to 4 days, the seeds were powdered by making crushing and smashing the seeds.

Collection and preparation of sample

The sample for the experiment is collected in the Tungabhadra river harihara in davangere district. Further prepare the 3 different types of synthetic water samples, by adding divergent quantities of kaolin to the river water sample. 3 divergent samples are made and those are low turbid water, medium turbid water and high turbid water(80,150,250).

Jar test procedure

Take six number of 1000ml beakers,in each 6 beakers simultaneously weigh the prepared adsorbent powder in weighing machines in the different dosages 50, 100,150....mg/lt. Further keep all the jars in a driving unit and then lower the peddles in to the beakers and fix them tightly. Start the driving unit, the water has been agitated at various mixing time and speed. For the first 5 minutes of the agitation, keep the speed limit in 180-200 rpm (rapid mixing) and for the next 25 minutes slow down the speed level to 60-80rpm (slow mixing). Plot the graph of % removal v/s dosage and select the optimum dosage.

2. RESULTS AND DISCUSSIONS

Sl. no	Coagulant dosage with 20% Alum mg/lt	%Removal in Turbidity NTU	%change in pH	%change in TDS
1	50+10	88.6%	-7.3	10.45
2	100+20	90.5%	-7.89	16.84
3	150+30	93.8%	-6.57	23.7
4	200+40	93.7%	-6.2	34.29
5	250+50	96.8%	-5.7	37.69
6	300+60	95.3%	-5.4	33.7

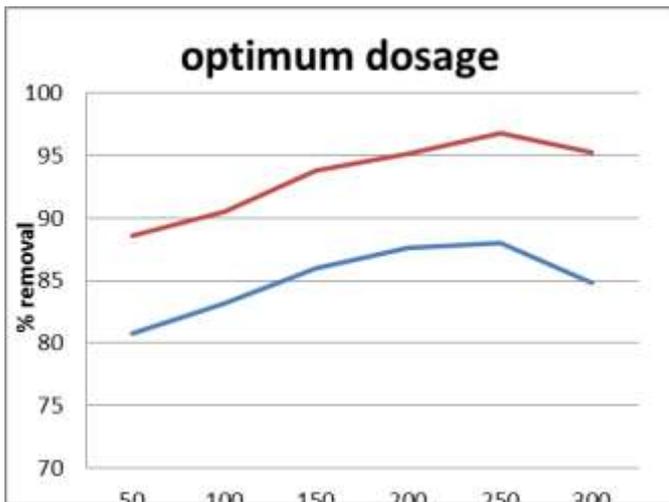


Chart -1: optimum coagulant dosage

By adding the alum the results were showing very good at its treatment level, that is upto 97% they have removed the turbidity. So when compare to only cicer arietinum adsorbent, adding alum is very efficient. The cost for the natural adsorbent is lower than that of alum, it requires 0.25gms/litre and the local market rate available for this cicer arietinum is 40rs/kg. But the alum rate is 300rs/kg, however alum requires less quantity for treatment that is 0.10gms. When compare to this, it will be somewhat cost effective and using natural adsorbent is doesn't have any consequences.

3. CONCLUSION

Always the natural things are better than the any other chemicals, because it does not have any harmful effects on human health. In case of water treatment, chemical coagulants like alum will effect on the human health and causes many diseases like Alzheimer's disease. So for avoiding all such a kind of problems, natural coagulants are proved to be the best. And cicer arietinum has a capacity to remove the turbidity level up to 80-88%. Coming to the advantage part of these natural coagulants, they are much effective, economical and eco-friendly and also biodegradable in the process of water purification. Turbidity will definitely get increase in the monsoon season because of the erosion of soil and runoff. In that case, in the higher turbidity levels the natural coagulant (cicer arietinum) is much efficient for the removal of turbidity in the water purification process. Instead of using the chemical coagulant that cause many harmful health diseases, use the natural coagulants. And in natural coagulants, cicer arietinum has proved that it is much efficient for the removal of turbidity in the treatment of purification of water.

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