Comparative Study of Purity of Different Samples of Water by Sterilization Method

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Abstract: *Increase in need of pure water makes the situation urgent to check the quality of drinking water. There were different methods to test the physical, chemical and biological contaminants in water. In this study the water quality of different samples used for drinking purpose were analysed using sterilization method. Among the samples used in this study, it is evident that the lake water is most impure and amount of bleaching powder needed for its sterilization is more. The Bore Well water is found to be pure and required least amount of bleaching powder for its sterilization.*

I. Introduction

The need for water is increased with increasing world population. It is used for drinking, cooking, bathing, brushing, washing and other purposes. It helps to keep our surroundings clean and maintain our life healthy [1, 2]. It is essential to identify the resources of pure drinking water because many available resources are polluted in many ways [3]. The tap water supplied in our home also sometimes contains various contaminants that can lead to certain health issues [4, 5]. The physical and chemical contaminants can be removed by sedimentation, filtration and some other chemical methods [6]. But the effective method to remove harmful microorganisms from drinking water is chlorination using bleaching powder [7, 8]. In this work, a comparative study of purity of different samples of water collected from different sources was conducted using sterilization method.

II. Experimental Methods

All the reagents used for this study were of analytical grade. The water samples collected were from pond, tap, bore well and lake in Sanghumugham which is a coastal area in Thiruvananthapuram, Kerala.

2.1.Preparation of N/20 sodium thiosulphate solution

6.2 g of hydrated sodium thiosulphate ($Na_2S_2O_3.5H_20$) was dissolved in 500 mL of distilled water to prepare N/20 sodium thiosulphate solution.

2.2.Preparation of 10% Potassium iodide(KI) solution

10 g of of potassium iodide was dissolved in 100 mL of distilled water to prepare 10% KI solution.

2.3.Preparation of N/20 Potassium dichromate solution

0.61 g of potassium dichromate is weighed accurately and dissolved in 250 mL distilled water.

2.4. Preparation of bleaching powder solution

2.5 g of bleaching powder was weighed and transferred into a 250 mL conical flask. Add about 100 mL of distilled water. Place stopper in the flask and shake it vigorously. The suspension thus obtained is filtered and the filtrate is diluted with

water to make up to the volume of 250 mL. The solution obtained is 1% bleaching powder solution.

2.5.Preparation of starch solution

About 1g of soluble starch was taken and mixed with 10 mL of distilled water to obtain a paste. The paste was poured into 100 mL of boiling water in a beaker with constant stirring. It was then boiled for 4 to 5 minutes and then allowed to cool and used as the indicator.

2.6.Estimation of amount of bleaching powder by iodometric titration

a) Standardisation of Sodium thiosulphate

Thiosulphate solution is standardised using standard potassium dichromate using starch as indicator.

b) Estimation of free chlorine present in different water samples by iodometry

100 mL of the desired water sample was taken in a stoppered conical flask. 20 mL bleaching powder solution and 20 mL KI solution were added to it. It is titrated against N/20 sodium thiosulphate solution taken in the burette. When the solution in the conical flask becomes light yellow in colour, 2 mL of starch indicator was added and blue coloured solution obtained was titrated against sodium thiosulphate solution. The endpoint is the disappearance of the blue colour. The titrations were repeated to get concordant values.

III. Results and Discussion

The iodometric titrations were carried out for pure bleaching powder solution and four different water samples as mentioned in procedure 2.6. The amount of bleaching powder required for disinfecting 1litre of each sample was calculated and is given in Table 1.

Table 1: Amount of bleaching powder required for disinfecting 1litre of each sample

Sample	Amount of Bleaching powder (g)
Pond Water	0.8800
Tap Water	0.5600
Bore Well Water	0.4800
Lake Water	1.2000

The sample which is more impure required more bleaching powder for its sterilization. As a result, the amount of liberated chlorine will be less. From the above observations it is evident that the lake water is most impure and amount of bleaching powder needed for sterilization is more. The Bore Well water is found to be most pure and required least amount of bleaching powder for its sterilization. The Lake water is always polluted by natural and manmade sources. But the bore well water, which is found to most pure, will sometimes, is polluted with iron which is present in underground of earth. The tap water also treated one, but it may contain some chemical or biological contaminations on its passage from the distribution system.

The diagrammatic representation of this study is shown in Fig.1

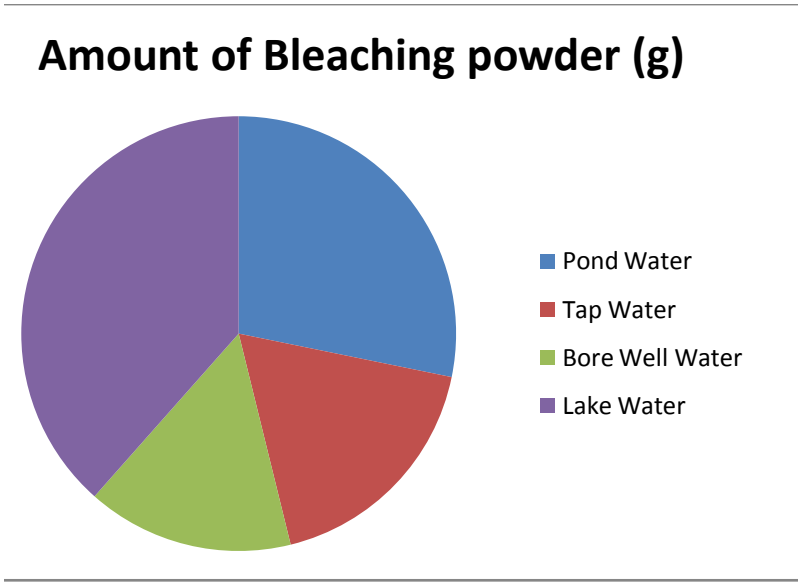

Fig.1: The diagramatic representation of sterilization study of different water samples

IV. Conclusion

Water used for drinking purpose should be free from microorganisms. Bleaching powder addition is a convenient method for sterilization. Amount of bleaching powder required for sterilization of different water samples depends on the amount of impurities present in it. From among the samples used for experimentation, lake water required the maximum amount of bleaching powder for disinfection hence concluded that it contained the maximum amount of impurities. This study demonstrates an easy method to check purity of water samples collected from different sources

using sterilization method.

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