



## Estimation of Sulphate Ion Concentration by Nephelometry

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**ABSTRACT:** Nephelometry is the measurement of scattered light as a function of concentration of suspended particles (less than, approx 100mg/litre). At low concentration of a suspensions, there is uniform scattering. Hence the intensity of scattered light is proportional to the concentration. The aim of the study was to determine the sulphate ion concentration in tap water by using nephelometry.

**KEYWORDS:** Nephelometry, Sulphate ion, Intensity.

### INTRODUCTION

Nephelometric analysis is based on the measurement of the intensity of scattered light as a fraction of the concentration of the dispersed phase<sup>1</sup>. In nephelometry, light is allowed to pass direct through the sample solution having suspended particles<sup>2</sup>. The amount of radiation scattered by the particles is measured at an angle (90<sup>0</sup>) to incident beam. NaCl and HCl acid is added to check growth of microcrystals of barium sulphate<sup>3</sup>. Glycerol-ethanol is added to stabilize turbidity. Barium chloride is added to produce turbidity by producing barium sulphate.

### MATERIALS AND METHODS

**Materials:** Potassium Sulphate, Sodium Chloride, Hydrochloric acid, glycerol, ethanol, barium chloride, distilled water,

nephelometer. All the chemicals used were of analytical grade. The standard sulphate solution was prepared for this study.

### Experimental Methodology:

0.5, 1, 1.5, 2.0, 2.5, 3.0, 3.5, 4 ml of standard  $K_2SO_4$  solution were transferred from burette into each separate 100 ml volumetric flask & number them from 1 to 8. To each flask pipette out 10 ml NaCl-HCl reagent and 20 ml of glycerol-ethanol solution, dilute to 100 ml distilled water. 0.3 gm of  $BaCl_2$  was weighed to each flask. Stopper them and shake for exactly 1 min by inverting flask once in a second. Permit each flask to stand for 2-3 mins and read out the turbidity in the nephelometer. By employing the concentrated  $K_2SO_4$  solution as standard and by the help of sensitivity control adjust the micrometer reading into 100 divisions. A



blank solution is prepared by adopting the above option sequentially but without the addition of  $K_2SO_4$  solution. Insert the blank solution in the nephelometer and adjust zero. Without disturbing the sensitivity controller, record the reading for different concentration of standard solution.

## DISCUSSION AND CONCLUSION

**Table 1: Nephelometer reading Vs. Sulphate ion concentration**

Concentration	NTU
0.00	0
0.50	12
1.00	25
1.50	38
2.00	50
2.50	63
3.00	75
3.50	87

4.00	100
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Now it was observed that, for test solution NTU=22

Concentration at 22 NTU= 8.75 ppm

The study was based on the measurement of the intensity of scattered light as a fraction of the concentration of the dispersed phase. In our study, it was observed that, tap water contains 8.75 $\mu$ g/ml or 8.75ppm of sulphate ion by using nephelometry.

## REFERENCES

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