THE DETERMINATION OF SUGAR IN WATER

Using α-naphthol

INTRODUCTION

The quantitative determination of small traces of sugar in water is of considerable importance to sugar manufacturers and in all factories where sugar is handled. If the sugar content in boiler water exceeds 50mg. /l., corrosion of the boiler is almost certain to ensue. This contamination of the boiler water may be the result of returned condensates, or wash water used in boiler feed, which gives a zero polarimetric reading.
Sugar losses in effluent waters may also be determined in this same method.

PRINCIPLE OF THE METHOD

Sugar reacts with α-naphthol and sulphuric acid to give a violet colour, which may be used for the estimation of sugar in dilute solutions[1]. The intensity of this violet colour, which is proportional to the sugar concentration, is measured by comparison with a series of Lovibond permanent colour glass standards. The method has also been applied to the determination of sugar in other dilute solutions[2].

REAGENTS REQUIRED

1. **α-Naphthol ($C_{10}H_7OH$) Solution**. Dissolve 20g. of α-naphthol in 100ml. of 95% ethanol (C_2H_5OH). Store in an amber glass bottle.

2. **Sulphuric Acid (H_2SO_4)**. Concentrated (98%). **(CARE:- CORROSIVE)**

THE STANDARD LOVIBOND COMPARATOR DISC 3/29A

This disc covers the range 0, 5, 10, 15, 30, 45, 60, 75, 100mg./l. of sugar and is calibrated for use with a 5mm. cell.

Method

1. Filter and/or dilute the sample as necessary.

2. Pipette 2ml. into a 6in. X 1in. hard glass test tube.

3. Add 5 drops of reagent 1 directly to the liquid without touching the sides of the tube with the reagent. Mix.

4. Run 5ml. of sulphuric acid (reagent 2) gently down the side of the tube to form a separate lower liquid layer. When addition is complete mix well, taking the precautions usual when dealing with concentrated sulphuric acid.

5. Stand the tube for 3 minutes and then cool under running water for 2 minutes.

6. Pour the solution into a 5mm. comparator cell, stand for a further 2 minutes and then place the cell in the right hand compartment of the Comparator.

7. Match the colour of the sample against the standards in the disc using a standard source of white light, such as the Lovibond Daylight 2000 unit or, failing this, North daylight.

Dilutions to the sample, when required, should be made with cold hard tap water and the reagents should be checked weekly by preparing known sugar standards with tap water.

NOTES

This test procedure was devised in the laboratories of Tate & Lyle Limited, and permission to reproduce it is gratefully acknowledged.

Tests should be made on fresh or recently obtained samples only, as the sugar content of samples several hours old would be greatly reduced by bacterial action.

REFERENCES

1. R. Frailong, *Bull. Soc. chim. sucr. dist.*, 1910, **27**, 1188

2. Forbach and Severin, *Zentra-ges. Physiol. Path. Stoffin.*, 1911, **6**, 177

REVISION HISTORY

Date	Change Note	Issue
07/01/02	36/460	2
03/05/05	CA243	3