# DETERMINATION OF SUGAR (SUCROSE) BY SOMOGYI'S METHOD

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## INTRODUCTION

Sugar is widely used in the manufacture of food as a taste and flavour enhancer. It is also capable of inhibiting, retarding or arresting the process of fermentation, acidification or any other decomposition of food. Thus sugar is also used as a preservative.

The sugar extracted from the sample is converted into glucose with diluted HCl. The glucose content is determined by Somogyi's method. The content of sugar is then back calculated from glucose content. The recovery of sugar was found to be 91% and the reproducibility was satisfactory.

### PREPARATION OF SAMPLE

Take a representative sample of the product, pass it through the mincer, transfer into a labelled polyethylene bag and keep it chilled.

### REAGENTS

a) Somogyi solution A

Anhydrous $Na_2CO_3$ 25g

- KNa – tartarate.$4H_2O$ 25g
- 500 ml $H_2O$
- $CuSO_45H_2O$ 7.5 g
  - 200 ml $H_2O$
- add drop by drop while stirring
- $NaHCO_3$ 20 g
- KI 5 g
- $KIO_3$ (1M = 6N) 0.892 g

Make up to 1 litre with distilled $H_2O$.

b) Somogyi solution B

KI 25g

$K_2C_2O_4.H_2O$ (potassium oxalate) 28g

Make up to 1 litre with distilled $H_2O$.

c) 0.1N HCl

Dilute 10 ml 1N HCl in 100 ml volumetric flask.

d) 0.1N NaOH

Weigh 1 g NaOH, dissolve in distilled water and make up to 250 ml in a volumetric flask.

e) 2N $H_2SO_4$

Conc. $H_2SO_4$ 60 ml dilute to 1 litre.

f) Starch indicator

Weigh 1 g soluble starch and 0.1 g salicylic acid, dissolve both in 99 ml distilled water. Boil to dissolve the starch.

g) Dried $KIO_3$

Weigh about 2 g of $KIO_3$, dry in the oven at 120°C for 1 hr.

h) 2.5% KI

Weigh 2.5 g KI, dissolve in 97.5 ml of distilled water.

i) 0.05N $Na_2S_2O_3$ solution

Sodium thiosulphate $Na_2S_2O_3.5H_2O$, 13 g.

$Na_2CO_3$ 0.2 g

Make up to 1 litre with decarbonated $H_2O$

j) 0.005N $Na_2S_2O_3$

Dilute 100 ml of 0.05N $Na_2S_2O_3$ to 1 litre.

DETERMINATION OF FACTOR (F) OF 0.05N $Na_2S_2O_3$

Weigh about 1.5 g dried $KIO_3$ accurately

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Make up to 500 ml with $H_2O$ in volumetric flask

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Pipette 10 solution — Blank: Pipette $H_2O$, 10 ml

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Add 2.5% KI, 20 ml

Add 2N $H_2SO_4$, 20 ml

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Titrate with 0.05N $Na_2S_2O_3$ with starch indicator

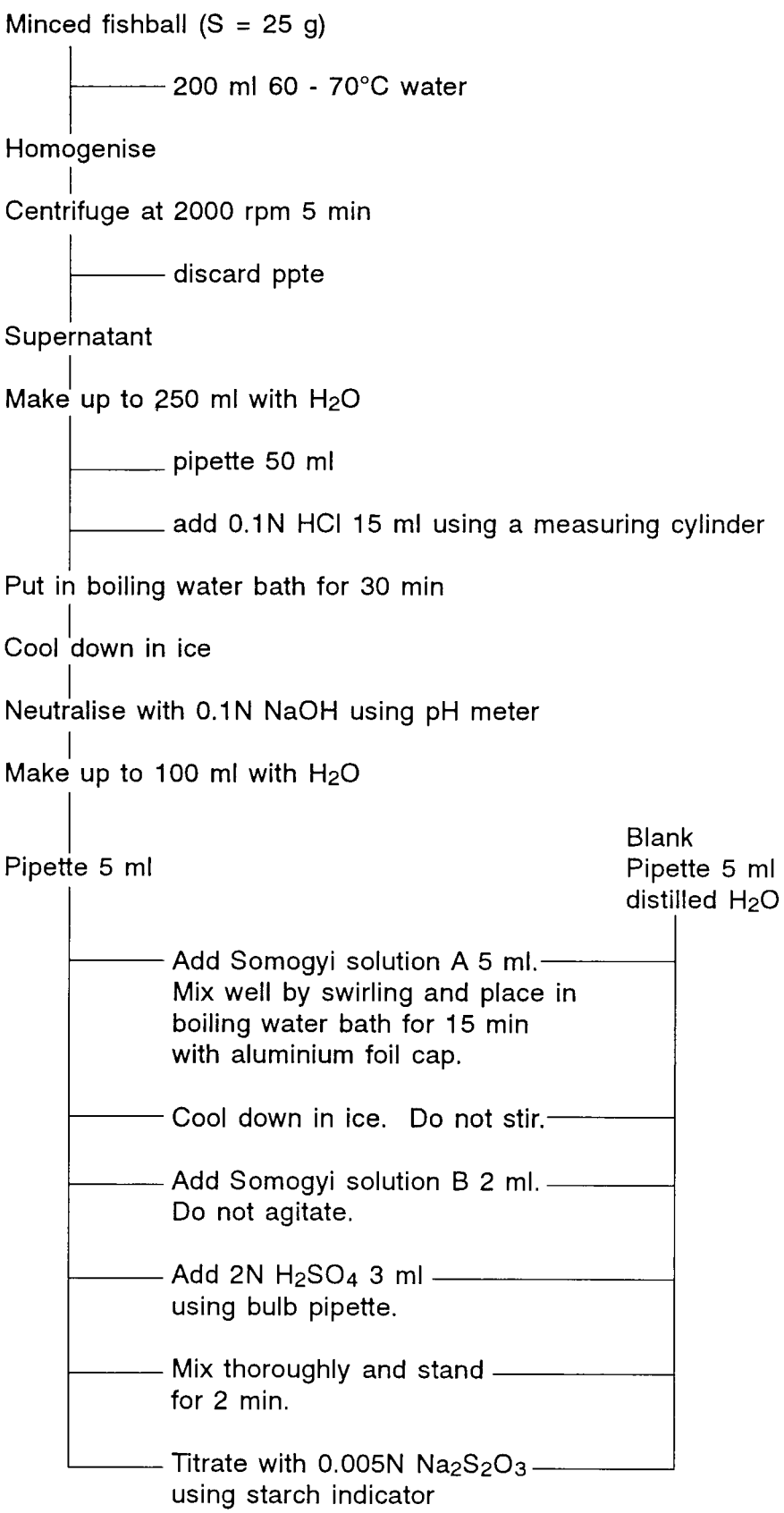
$$\text{Factor, } F = \text{wt. of } KIO_3 \times \frac{10}{500} \times \frac{1}{0.0017835} \times \frac{1}{(B - A)}$$

0.0017835 : conversion factor of 1 ml 0.05N $Na_2S_2O_3$ to KIO3 (g)

A : titration volume of $KIO_3$ solution (ml)

B : titration volume of blank (ml)

**PROCEDURE**


Minced fishball (S = 25 g)
200 ml 60 - 70°C water
Homogenise
Centrifuge at 2000 rpm 5 min
discard ppte
Supernatant
Make up to 250 ml with $H_2O$
pipette 50 ml
add 0.1N HCl 15 ml using a measuring cylinder
Put in boiling water bath for 30 min
Cool down in ice
Neutralise with 0.1N NaOH using pH meter
Make up to 100 ml with $H_2O$
Pipette 5 ml
Blank
Pipette 5 ml
distilled $H_2O$
Add Somogyi solution A 5 ml.
Mix well by swirling and place in
boiling water bath for 15 min
with aluminium foil cap.
Cool down in ice. Do not stir.
Add Somogyi solution B 2 ml.
Do not agitate.
Add 2N $H_2SO_4$ 3 ml
using bulb pipette.
Mix thoroughly and stand
for 2 min.
Titrate with 0.005N $Na_2S_2O_3$
using starch indicator

## CALCULATION

$$\text{Sucrose (\%)} = 0.0001449\ (B - A)\ F \times \frac{100}{5} \times \frac{250}{50} \times 0.95 \times \frac{1}{S} \times 100$$

$$= 13.7655\ (B - A)\ F \times \frac{1}{S}$$

where 0.0001449 : 1 ml 0.005N $Na_2S_2O_3$ = 0.0001449 g glucose

A : Sample titration volume (ml)

B : Blank titration volume (ml)

F : Correction factor of $Na_2S_2O_3$

S : Sample weight

0.95 : Conversion factor of glucose to sucrose

## REFERENCES

David Pearson. The chemical analysis of food. 7th Ed: 128.

Official methods of analysis of the Association of Official Analytical Chemists. 13th Ed. 1980:226, 14.114(d)
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