



Method 8.14 – Refined sugar: ten-day low Brix floc

1. Rationale

This method is applicable to white granulated and liquid sugars.

2. Principle

A sugar solution using filtered or carbonated water is acidified with phosphoric acid and allowed to stand for ten days at room temperature. The solution is observed on days 3, 7 and 10 for the formation of floc. Floc is matter which appears in the beverage as flaky or wooly tuft-like masses.

3. Apparatus

- 3.1 **Cellulose acetate membrane filters:** 0.45 μm , 47 mm ϕ
- 3.2 **Filtration apparatus** for use with vacuum
- 3.3 **A light source** giving a bright light beam (preferably a strong pencil-like beam)
- 3.4 **Autoclave** to sterilize bottles
- 3.5 **Schott bottle:** 500 cm^3 autoclaved to sterilize
- 3.6 **Volumetric flask:** 100 cm^3

4. Reagents

- 4.1 **Sodium benzoate preservative** (1 g/litre)

Weigh 0.1 g sodium benzoate ($\text{C}_6\text{H}_5\text{COONa}$) in a 100 cm^3 volumetric flask and make to volume with distilled water.

- 4.2 **Phosphoric acid** (2 N)

Phosphoric acid (H_3PO_4) is a corrosive acid and should only be handled while wearing gloves and safety glasses.

Dissolve 46 cm^3 phosphoric acid in 200 cm^3 distilled water in a 1 000 cm^3 volumetric flask and make to the mark. Always add the acid to the water and not the other way around.

- 4.3 **Filtered or carbonated distilled water**

Filter distilled water through a 0.45 μm cellulose acetate membrane. If available, carbonated water supplied by bottlers or produced using a household carbonator (for soda water), is preferably used.

5. Procedure

Glassware must be thoroughly clean. Dissolve 55 g of sugar in 60 cm³ of filtered or carbonated distilled water in a 500 cm³ Schott bottle and add 50 cm³ of the sodium benzoate solution as a preservative. Add 4 cm³ phosphoric acid and dilute to 500 cm³. Close the bottle and allow to stand for 10 days and examine for the presence of floc without disturbing the bottle during this time. Floc is matter which appears as flaky or wooly tuft-like masses. Examine on the third, seventh and tenth days for floc appearance.

6. Expression of results

As listed below, a number is attributed to the floc to express its character. The size of the floc particles and not their quantity determines the rank.

Table 1: Rating system for floc

Rating	Designation	Description
Negative	0	Complete absence of visible particulate matter.
Turbid	0	Cloudy, but contains no visible discrete particles.
Pinpoint	1	Very small, discrete particles, the shape of which is not discernible but which are visible in a strong beam of light
Light	2	Several particles gathered together to form a small, fleecy particle visible in a strong beam of light (approximate size 0.8 mm)
Medium	3	A feathery-like particle visible in a strong beam of light (approximate size 1.5 mm)
Heavy	4	An agglomerate of colloidal particles forming a large, fluffy particle, visible without the need for a strong beam of light (approximate size 3 mm)

All results must be reported unambiguously together with the day of observation. For example, a rating of 4 on the seventh day would be reported as 4:7 while a rating of 3 on the third and seventh days would be reported as 3:3,7.

7. References

Natbev Coca-Cola (2004). *Sugar Analytical Procedures*.

SMRI (2004). Determination of the floc in white sugars by the 10 day low Brix coca-cola method. *SMRI Test Methods*, TM064.