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 cm³ autoclaved to sterilize
3.6 Volumetric flask: 100 cm³

4. Reagents

4.1 Sodium benzoate preservative (1 g/litre)

Weigh 0.1 g sodium benzoate (C₆H₅COONa) in a 100 cm³ volumetric flask and make to volume with distilled water.

4.2 Phosphoric acid (2 N)

*Phosphoric acid (H₃PO₄) is a corrosive acid and should only be handled while wearing gloves and safety glasses.*

Dissolve 46 cm³ phosphoric acid in 200 cm³ distilled water in a 1 000 cm³ 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 cm$^3$ of filtered or carbonated distilled water in a 500 cm$^3$ Schott bottle and add 50 cm$^3$ of the sodium benzoate solution as a preservative. Add 4 cm$^3$ phosphoric acid and dilute to 500 cm$^3$. 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

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

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
