



## Method 1.11 - Official Methods: mixed juice insoluble solids

### 1. Rationale

This method is applicable to mixed juice samples and is used to obtain data for cane payment purposes.

### 2. Principle

The mixed juice sample collected is prepared and by the addition of Celite 577, the amount of insoluble solids is determined and is used to correct the mass of mixed juice.

### 3. Apparatus

- 3.1 Squat beakers (100 cm<sup>3</sup>, 250 cm<sup>3</sup>)
- 3.2 Light duty balance
- 3.3 Riffle
- 3.4 Juice mixer
- 3.5 Buchner funnel (110 mm  $\phi$ )
- 3.6 Buchner flask
- 3.7 Drying oven at 105°C
- 3.8 Dessicator
- 3.9 Filter paper, Whatman No. 1 or equivalent (150 mm  $\phi$ ), dried at 105° for 3 hours and stored in a dessicator
- 3.10 Stirring rod (150 mm  $\times$  6 mm)

### 4. Reagents

- 4.1 Filter aid - Hyflo Supercel (dried and stored in a dessicator)

### 5. Procedure

Zero the balance. Place a 250 cm<sup>3</sup> beaker, a 100 cm<sup>3</sup> beaker and a filter paper on the balance pan. Add approximately 12 g filter aid to the 250 cm<sup>3</sup> beaker and approximately 4 g filter aid to the 100 cm<sup>3</sup> beaker. Note the total mass to the nearest 0.01g.

Place the 250 cm<sup>3</sup> squat beaker under the riffle. Agitate the composite sample in the container with the juice mixer and rapidly transfer to the primary funnel of the riffle. Collect approximately 150 g in the 250 cm<sup>3</sup> beaker.

Return the 250 cm<sup>3</sup> beaker plus contents to the scale pan and note the total mass (which again includes the mass of the filter paper, 100 cm<sup>3</sup> beaker, etc.) to the nearest 0.01 g.

Transfer the filter paper to the Buchner funnel and wet it with water so that the paper fits tightly around the sides of the funnel.

Precoat the filter paper with the 2 g of filter aid in the 100 cm<sup>3</sup> beaker. This is done by adding water to the filter aid in the beaker and then pouring the slurry down a glass rod

onto the filter paper. Rinse all the filter aid adhering to the beaker and glass rod into the funnel.

Stir the contents of the 250 cm<sup>3</sup> beaker so that the filter aid and juice are well mixed.

Filter the juice by pouring it slowly down a glass rod onto the precoated filter paper, taking care not to flood the filter aid surface with juice, i.e. pour the juice in at a rate lower than the drainage rate of the filter; this is important to ensure quick filtration. This initial filtration should be done at a differential pressure of 15 kPa. During the filtration the beaker contents must be stirred occasionally and visual checks must be made on the clarity of the filtrate to ensure that no by-passing of filter aid or insoluble solids occurs.

Rinse the beaker well with distilled water and pour the rinsings into the funnel.

Increase the vacuum to give a differential pressure of 50 kPa and wash the filter with ten 30 cm<sup>3</sup> aliquots of distilled water, allowing the filter to drain between additions. Finally allow the filter to drain for 5 minutes under vacuum.

Release the vacuum and transfer the filter paper and contents quantitatively back to the 250 cm<sup>3</sup> beaker. Care must be taken to ensure that no filter aid remains adhering to the sides of the funnel.

Dry the 250 cm<sup>3</sup> beaker and contents and the 100 cm<sup>3</sup> beaker at 105°C for 4 hours.

Cool in a dessicator for 30 minutes and weigh. Record the mass to the nearest 0.01g.

## 6. Calculations

$$\text{Insoluble solids \% mixed juice} = \frac{M_3 - M_1}{M_2 - M_1} \times 100$$

where  $M_1$    ≡    mass of beaker and filter aid (g)  
       $M_2$    ≡    mass of beaker and sample before drying (g)  
       $M_3$    ≡    mass of beaker and sample after drying (g)

For South African conditions insoluble matter % mixed juice is usually of the order of 0.5%.

## 7. References

SASTA (1985). *Laboratory Manual for South African Sugar Factories*. 3<sup>rd</sup> Edition: 259 - 260.