Method 1.6 - Official Methods: estimated soil in cane

1. Rationale

This method is applicable to cane or bagasse and is used to estimate the amount of soil in cane in the absence of a direct method.

2. Principle

A sample is thermally decomposed and the ash content calculated. The ash content is compared with the ash content of a clean sample which is assumed to be 0.6%. Note that the ash content of a dry sample would be 2.0%.

3. Apparatus

3.1 Light duty balance readable to 0.01 g
3.2 Moisture oven operating at 105°C
3.3 Weighing scoop
3.4 Furnace operating at 650°C
3.5 Crucible: Vitreosil, 400 cm^3, 62 mm deep
3.6 Lid to fit crucible: Vitreosil
3.7 Desiccator with self-indicating silica gel

4. Procedure

Heat the crucible and lid for approximately 30 minutes in the oven at 105°C. Remove the crucible and lid from the oven and allow to cool in a desiccator for about 1 hour before weighing accurately to 0.01 g. Add approximately 50 g of sample to the crucible. Weigh the dish, lid and contents accurately to 0.01 g. Place the lid on the crucible, transfer to the furnace at 650°C and incinerate for 10 minutes. Remove the lid and incinerate for another 35 minutes. Replace the lid and transfer the crucible to a heat resistant surface to cool for 2 minutes. Transfer the crucible to a desiccator to cool for 90 minutes and weigh accurately to 0.01 g.

5. Calculations

$$\text{Ash } (\%) = \frac{(M_3 - M_1)}{(M_2 - M_1)} \times 100$$

where M_1 ≡ mass of crucible and lid (g)
M_2 ≡ mass of crucible, lid and sample before incineration (g)
M_3 ≡ mass of crucible, lid and sample after incineration (g)

Estimated soil in sample = ash (%) – 0.60%

Report as percentage to one decimal place.

6. Example

Mass of crucible empty	=	213.85 g
Mass of crucible with sample	=	263.85 g
Mass of crucible after drying	=	215.61 g

$$\text{Ash} = \frac{(215.61 - 213.85)\,\text{g}}{(263.85 - 213.85)\,\text{g}} \times 100$$

$$= 3.52\%$$

Estimated soil in bagasse = (3.52 – 0.60)%
= 2.92%

Report as 2.9%

7. References

SASTA (1985). *Laboratory Manual for South African Sugar Factories*. 3rd Edition: 241 - 242.