



Method 2.4 – Prepared cane and bagasse: thermal ash

1. Rationale

This method is applicable to prepared cane and bagasse and determines the amount of ash left in a sample after thermal decomposition.

2. Principle

A sample of prepared cane or bagasse is decomposed at 650°C. The mass of ash that remains is expressed as percentage thermal ash on sample.

3. Apparatus

- 3.1 **Light duty balance** readable to 0.01 g
- 3.2 **Moisture oven** operating at 105°C
- 3.3 **Furnace** operating at 650°C
- 3.4 **Weighing scoop**
- 3.5 **Crucible:** Vitreosil, 400 cm³, 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 dish and lid (g)
 M_2 ≡ mass of dish, lid and sample before incineration (g)
 M_3 ≡ mass of dish, lid and sample after incineration (g)

Report as percentage to two decimal places.

6. Example

Mass of dish and lid	=	320.65 g
Mass of dish, lid and sample before incineration	=	370.73 g
Mass of dish, lid and sample after incineration	=	322.02 g

$$\begin{aligned}\text{Ash} &= \frac{(322.02 - 320.65)\text{g}}{(370.73 - 320.65)\text{g}} \times 100 \\ &= 2.74\%\end{aligned}$$

7. References

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

SMRI (1997). Determination of ash % cane. *SMRI Test Methods*, TM063.