GRAIN CALCULATION

Using a grain with 16.98mm diameter port:

Simulated mass of 1 grain= 529g

15% allowance for waste:

$$Total\ mass\ of\ constituents = \ 1.15\ \times\ 529 = \ \boldsymbol{608.4g}$$

The ratio of KNO_3: Sorbitol=65:35

$$Mass\ of\ KNO3 = \ 0.65 \times 608.4g = \boldsymbol{395.46g}$$

$$Mass\ of\ solid\ sorbitol = \ 0.35 \times 608.4 = \ 212.94g$$

Liquid sorbitol contains 70% sorbitol.

Hence mass of liquid sorbitol to be measured becomes:

$$\frac{100 \times 212.94}{70} = \boldsymbol{304.2g}$$

Mass of iron (iii) oxide =1% total mass

$$= 0.01 \times 608.4 = \boldsymbol{6.084g}$$

SUMMARY (For cooking one grain the following measurements shall be used):

ELEMENT	MASS(g)
Potassium nitrate	395.46
Sorbitol	304.2
Iron (iii)oxide	6.084