Aim :-

To determine the drying content of sodium carbonate.

Reference :

Khan and vyas "Industrial Pharmacy" CBS publication and distributors, 4th edition page No.

Requirement :- Petridish, Hot air oven, calcium carbonate, weighing balance, spatula.

Principle :

To behaviour of ~~dry~~ drying of solid is explained by during curve. The time required for drying a batch of weight of material in a dry air can be estimated with the help of drying curve. Drying is a mass transfer process consist of the removal of water or other solvent by evaporations from a solid, semisolid, liquid. This process is obtained used as final production steps before packing products

Theory :-

Sodium carbonate, $Na_2CO_3 \cdot 10H_2O$ is the inorganic compound with the formula Na_2CO_3 and its various hydrates.

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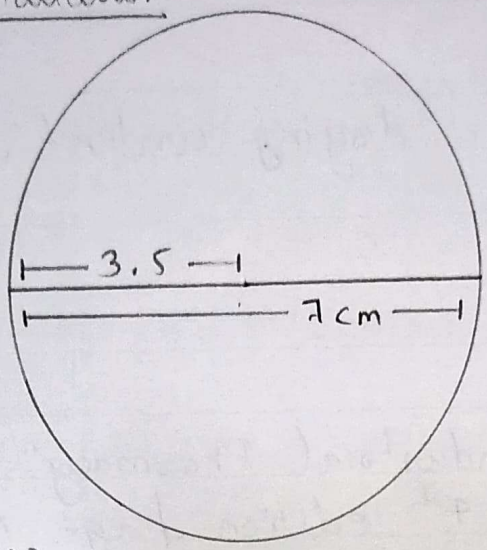
Observation and calculation



Diameter = 7cm

Radius = 3.5cm

$$\text{Area} = \pi r^2$$
$$= \frac{22}{7} \times (3.5)^2$$
$$= \frac{269.5}{7} = 38.5 \text{ cm}$$

Calculation

Weight of empty petridish (W_1) = 16.95 g.

W_1 + sample (W_2) = 19.95 g

$W_1 + W_2$ + water (W_3) = 23.77 g

Area of Petridish = 38.96 cm^2

★ Drying content at zero minute

$W_3 = 23.77$

$$\text{Drying content} = \frac{W_3 - W_2}{\text{Area of Petridish}} \times 100$$
$$= \frac{23.77 - 19.55}{38.96} \times 100$$
$$= 0.0993 \times 100$$
$$= 9.93$$

★ Drying content at 15 min

$W_3 = 22.91$

$$= \frac{22.91 - 19.95}{38.96} \times 100$$
$$= \frac{2.96}{38.96} \times 100$$
$$= 7.69$$

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Procedure:

i) Take a clean petridish without lid and consider it's weight as "W_1 gram".
ii) Note the area of petridish
iii) Take 10gm calcium carbonate in a clean petridish and consider its weight as "W_2 gram".
iv) Prepare slurry by adding water consider it's weight as "W_2 gram".
v) Heat petridish in hot air oven at temp. 70° c.
vi) Note down the weight of sample after every 15 minutes.
vii) Continue drying until there is no change in weight of the sample is obtained.
viii) Determine percentage drying content by using formula.

$$\%\ \text{drying content} \Rightarrow \frac{W_3 - W_2}{\text{Area of petridish}} \times 100.$$

Result:

The percentage drying content area determined to be 6.4.89 %.

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★ Drying content at 30 minute

$W_3 = 20.70$

$$\Rightarrow \frac{20.70 - 19.95}{38.96} \times 100$$

$$\Rightarrow 0.019 \times 100$$

$$= 1.95$$

★ At 75 minutes

$W_2 = 19.95$, $W_3 = 19.95$

$$\Rightarrow \frac{19.95 - 19.95}{38.96} \times 100$$

$$\Rightarrow \frac{0}{38.96} \times 100$$

$$\Rightarrow 0$$

Avg. drying content $= \frac{9.93 + 7.69 + 1.95 + 0}{4} = 4.89\%$