

Aim:-

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~~24/02/22~~
Determination of viscosity of semisolid by using viscometer.

Reference:-

A Text book of pharmaceuticals - I, Dr. AA. Hajare, Nirali Publication, Page - 35 - 36.

Requirement:-

- Chemical :- Any semisolid material
- Glassware and apparatus:- Brookfield viscometer, Beaker and measuring cylinder.

Theory:-

The purpose of this experiment is to learn handling of Brookfield viscometer, understand its use in determination of viscosity of materials and to know which materials can be and cannot be studied for their rheological properties by the viscometer.

Brookfield viscometer consists of a cup which is at stationary and a bob (spindle) which is rotating. Different sized rotating spindles or disc are ~~called~~ used and immersed in test

Teacher's Signature _____

materials. The selection of spindles (large diameter and surface area) are used while for higher viscosity liquids small spindles (small diameter and surface area) are suitable.

Recent models of Brookfield viscometer are used for a wide variety of materials from liquids to semisolids. The rate of shear can be varied as per requirement.

The spindle, dipped in motor, by a beryllium-copper torsion suitable for particular viscosity movement of pointer shows dial reading, which is net effect of stiffness of spring and viscosity of material. Viscosity is calculated by multiplication of dial reading and spindle number with speed at which it moves. Digital display of new model automatically shows viscosity (cp), torque, speed (r.p.m) and temperature (°C) of test material.

Procedure:

1. Prepare the gel using gel-forming materials (gelling agents) like carbopol or any other suitable polymer.

2. Keep the gel for atleast 24 hours for uniform dispersion and homogenization.
3. After 24 hours when gel is completely formed, place sufficient quantity in the beaker or sample holder provided with the instrument.
4. Set-up the base level of instrument using level indicator on the top of instrument and plug in for constant electric supply.
5. Clean the spindle and attach to the instrument.
6. Rotate the spindle in the gel till you get a constant dial ~~red~~ reading on the display of the viscometer.
7. Repeat the determination atleast three times for reproducible results.
8. Maintain a constant temperature using thermostat throughout the observation/determination.
(Note :- If effect of temperature is to be studied then maintain the study temperature for atleast 20 min and then determine viscosity).

Observations:

1. Temperature = $^{\circ}\text{C}$
2. Amount of gel = g
3. Spindle No =
4. Speed of the spindle in gel = r.p.m
5. Average reading of three determinations =

Calculations:

Recent model have facility directly to display viscosity on but for old models following formula are used:

$$\text{Viscosity of gel} = \text{Dial reading} \times A$$

Where A is the value provided by the manufacture of the viscometer (given in viscometer manual), for the particular spindle and speed, used for study.

Precautions:

1. Brookfield viscometer is a very costly instrument handle it carefully.
2. Adjust level and know operation of instrument properly.
3. See that spindle is dipped sufficiently up to mark on it in the gel.
4. Keep in mind those formula to calculate ~~the~~ rheological parameters vary with viscometer model.

Result.

Viscosity of tested semisolid at a °C was found to be cp determined by Brookfield's viscometer (model) using spindle no. at rpm and torque.

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