AmbujaNeotia

THE NEOTIA UNIVERSITY

ज्ञानम् आत्म प्रदीपाय

PHYSICAL PHARMACEUTICS - II

IV SEMESTER (2nd YEAR B.PHARM)

PRACTICAL LAB MANUAL

1. Determination of particle size by Sieve analysis

Aim:-To determine particle size distribution by sieving method
Principle: - Particle that is placed on sieve set has uniform size of pore, when the sieve set is shaken normally the smaller particle are passed through the screen and higher particle are retained.

REQUIREMENTS
Apparatus: Sieve set, sieve shaker.

PROCEDURE
The sieves are arranged in descending order of their pore size. Weighed amount of sample was placed at the top of the sieve shaker. Now the sieve shaker was started manually. The powder material retained in various sieve was collected and weighed .A plot was constructed taking particle size on x-axis and % weighed retain on y-axis.

Result interpretation
According to Indian pharmacopeia powder are classified as follows

Sieve Number	Grade of Powder
10	Coarse
20	Modularly coarse
40	Modularly fine
80	Fine
120	Very fine

CONCLUSION
From the above experiment we concluded that the given sample of calcium carbonate, talc, magnesium stearate, lactose was successfully separated and distributed.

SIEVE NO	WEIGHT RETAINED	% WEIGHT RETAINED
1		
2		
3		
4		
5		

2. Determination of bulk density, true density and porosity

Aim: To determine the bulk density, true density and porosity of supplied powder

Bulk density is defined as the ratio of weight of powder to the bulk volume is the volume occupied by certain weight of powder when gently poured into the measuring cylinder.
Bulk density = weight / bulk volume

Tapped density is the ratio of weight of powder to the tapped volume. Tapped volume is the volume occupied by certain weight of powder after standard no. of tapping.
Tapped density = weight / tapped volume

Carr's index may be defined as
Carr's index = (Tapped density – bulk density / tapped density) × 100

Hausner's ratio is the no. i.e co-related to flow-ability of the powder.
Hausner's ratio = Tapped density / bulk density

REQUIREMENTS
Chemical: Lactose, Calcium carbonate, ZnO, Talc
Apparatus: Measuring cylinder, Funnel, weighing balance, Burette stand.

PROCEDURE
Determination of bulk density and tap density
10gm of powder sample was weight accurately. Then it was transferred in to a 100ml measuring cylinder. The volume was noted as bulk volume V. Then the measuring cylinder was tapped 100times. The volume noted as tapped volume.
Bulk Density=Weight/Bulk Volume
Tapped Density=Weight/Tapped Volume

Determination of carr's index and housner's ratio:-
Carr's Index= {(Tapped Density –Bulk Dencity) /Tapped Density } ×100
Housmer's Ratio=Tapped Density/Bulk Density.

Determination of flow rate
Flow Rate=Weight of Powder/Time Required To Flow

Result interpretation

CARR'S INDEX	TYPES OF FLOW
5-15	EXELLENT
12-16	GOOD
18-21	POOR
>23	VERY POOR

Conclusion-

POWDER NAME	BULK DENSITY	TAPPED DENSITY	CARR'S INDEX	HAUSNER RATIO	FLOW RATE

3. Determination of viscosity of liquid using Ostwald viscometer.

Aim: To determine the viscosity of liquid using Ostwald viscometer.

Principle- Ostwald viscometer is use to determine viscosity of Newtonian fluid, When the liquid flow by gravity time for the liquid to pass between two marks A and B through the capillary tube is determined. The time of flow under test is compared with time required for the liquid of known viscosity, the viscosity of unknown liquid.
η can be determine using following equation.
$\eta = \int t / \int t X \eta$

$\int$=Density of unknown liquid
t=Time of flow of unknown liquid
$\int$ =Density of standard liquid
t=Time of flow of standard liquid
η=Viscosity of standard liquid

REQUIREMENTS
Chemical: Distilled water, Ethanol, Acetone.
Apparatus: Ostwald viscometer, Electronic balance, Stop watch.

PROCEDURE
The viscometer was mounted is vertical position on a suitable stand. Water was filled in to the viscometer up A. The time was counted for water to flow from mark A to mark B. The same procedure was repeated for liquid by using the above formula viscosity of the test liquid can be determined

LIQUID	TIME OF FLOW				DENSITY	VISCOSITY
	I	II	III	MEAN		
WATER						
ETHANOL						
ACETONE						
TOLUENE						

CONCLUSION
Viscosity of the unknown liquid is _____was found to be _____is determined by using Ostwald viscometer.

4. Determination of viscosity of gel using brook-field viscometer

Aim: To determination of viscosity of prepared gel using brook field viscometer.

Principle:
Brook field viscometer is a type of volitional viscometer. It contains different size violating spindle which is immersed in the test material to be tested. The selection of the spindle is based upon the viscosity of the material. For liquid with low viscosity large size spindle are used while for high viscosity small size spindle are used.

Chemical: Carbopol, Gelatine, Tragacanth, Distilled Water.
Apparatus: Brook Field viscometer, Beaker, Mechanical stirer, Glass rod.

PROCEDURE
Prepared the gel with different concentration of carbopol or gelatin, setup the base level of the instrument using level indicator. The spindle was cleaned and attached to the instrument. Then the spindle was rotated in the gel until a constant reading displaced on the viscometer. Repeat the method for three times and find out the average value.

POLYMER	CONCENTRATION	VISCOSITY
CARBOPOL	0.5	
CARBOPOL	1	
CARBOPOL	1.5	
GELATIN	0.5	
GELATIN	1	
GELATIN	1.5	
TRAGACANTH	0.5	
TRAGACANTH	1	
TRAGACANTH	1.5	

Conclusion-
Viscosity of the prepared gel is found to be _____as determined by the viscometer using spindled no 2 and100RPM.

5. Determine the angle of repose and influence of lubricant on angle of repose

Aim- To determine the angle of repose and influence of lubricant on angle of repose

Principle:

Angle of repose is defined as the maximum angle possible between the surface area of the pile of powder and horizontal plane. The angle of repose is given by

$(\theta) = \tan^{-1} (h/r)$

Where, h = height of pile

r = radius of the base of the pile

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Bulk density = weight / bulk volume

Tapped density is the ratio of weight of powder to the tapped volume. Tapped volume is the volume occupied by certain weight of powder after standard no. of tapping.

Tapped density = weight / tapped volume

Carr's index may be defined as,

Carr's index = (Tapped density – bulk density / tapped density)× 100

Hausner's ratio is the no. i.e co-related to flowability of the powder.

Hausner's ratio = Tapped density / bulk density

Glidant efficeancy=Time of flow with glident/Time of flow without glident.

REQUIREMENTS

Chemical: Lactose, Talc, Starch, Magnesium stearate.

Apparatus: Funnel, Burette stand, Stop watch.

PROCEDURE

Take the sample mixture containing Lactose and Glident. Then it was poured in to the funnel keeping the tip of the funnel closed. A white paper was placed below the funnel on a solid surface. The distance between the tip and the solid surface kept nearly 5cm. Now the tip of the funnel is opened so that a tip of the powder formed.time of flow,height,radious of the hip was measured. By using the formula angle of repose and glident efficiency can be calculated.

$\tan\theta = h/r$

$\theta = \tan^{-1} (h/r)$

Glidant efficeancy= Time of flow with glident/Time of flow with outglident.

Formula	Lactose	Talc	Starch	Magnesium sterate	Angle of repose	Time of flow	Glident efficiency
	10 gm						
	10 gm	1					
	10 gm	2					
	10 gm	3					
	10 gm		1				
	10 gm		2				
	10 gm		3				

	10 gm			1			
	10 gm			2			
				3			

Conclusion-

From the above experiment we concluded that glident _____ at concentration _____has maximum glident efficiency.