Lab 8
Physical Properties of Viruses



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Plant viruses exhibit significant variation in their resistance to physical (temperature, dilution) and chemical (pH, chemicals) factors within plant sap, which serves as a foundational method for their identification and characterization.

These differences, alongside host range and vector transmission, allow for the differentiation of distinct virus species.

Physical Properties of Viruses:

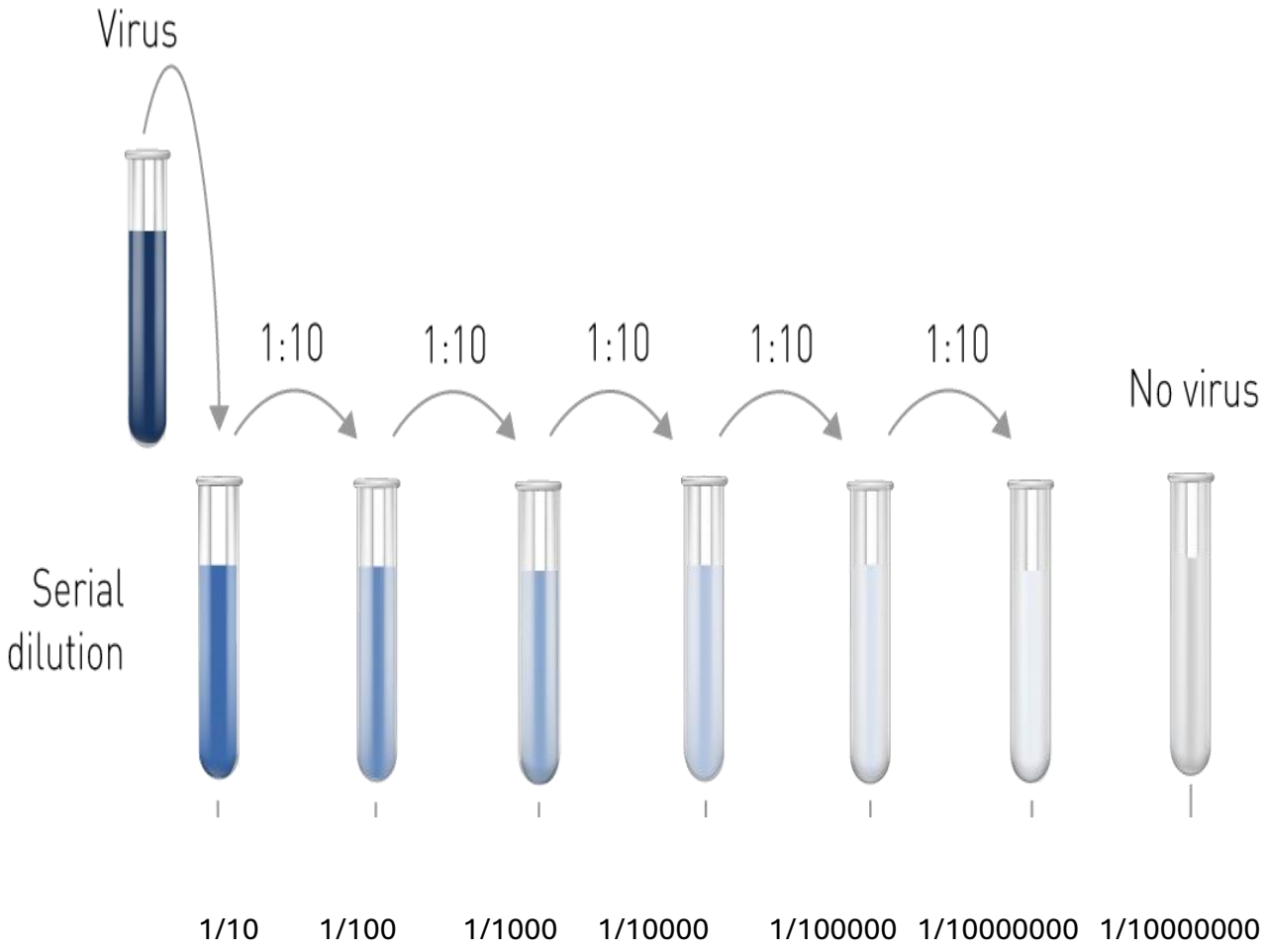
1- Dilution end point (DEP)

2- Thermal inactivation point (TIP)

3- Longevity in crude sap (LIV)

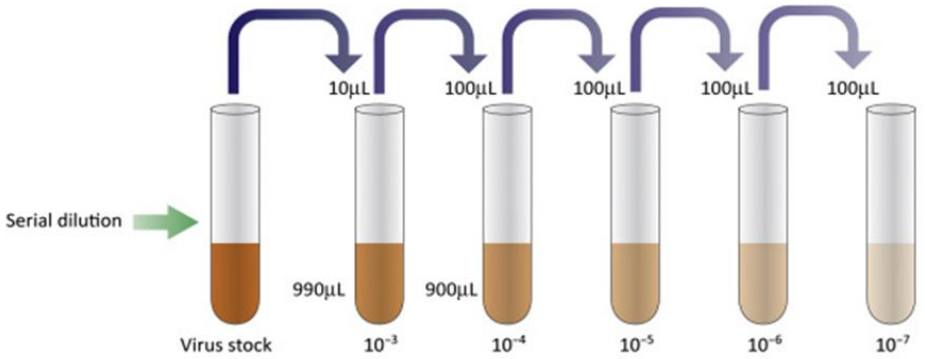
1- Dilution end point (DEP):

The dilution end point (DEP) is the highest dilution of plant sap containing the virus at which it still causes infection, When a plant virus dilution exceeds this point, it loses the ability to cause infection due to insufficient viral concentration.



Materials:

pipette, test tubes, infected plant sap, distilled water or 0.9% saline and host plant (Datura) .



Method:

1-The sap was prepared.

2- The sap is taken in a test tube and three test tubes, each with 9 ml of sterile diluents, which can either be distilled water or 0.9% saline, are taken.

3- A sterile pipette is taken 1 ml of plant sap is drawn into the pipette, then added to the first tube to make 10 ml. This provides an initial dilution of 10-1.

4- The new pipette, 1 ml of mixture is taken from the 10-1 dilution and is emptied into the second tube, this provides dilution 10-2.

5- The same process is then repeated for the remaining tube. This provides dilution 10-3.

6- The different dilutions are used for inoculation on test plants.

7- The local lesion host (Datura) is used as test plant

8- Leaves are inoculated with each of the dilutions, the inoculated leaves are labelled and kept.

9- Observed for the development of localized symptoms.

Dilutions	Local lesion				Total of local lesion	Average
	1	2	3	4		
10-1						
10-2						
10-3						







2-Thermal inactivation point (TIP):

The temperature at which the infectivity of virus can be completely lost at ten minutes.

TIP may vary with viruses, TIP for most of the viruses ranges from 55-70 C.

Method:

1-The sap from the infected plant was prepared as in the above experiment.

2- 2 ml of the sap is pipetted into glass test three tubes.

3- they are placed in a water bath provided with a thermostat

4- The water bath is filled with water until the level reaches 3 cm above the level of the sap in the tubes.

5- The test tube is kept for ten minutes each at 50, 70, 100 C in the water bath, and is left cool.

6- Leaves are inoculated with each treatment.

7- Observations on the number of local lesions produced on the leaves.

temperature	local lesion				Total of local lesion	average
	1	2	3	4		
50c						
70c						
100c						



3-Longevity in crude sap (LIV):

The storage time after which the sap loses its infectivity is called LIV.

To determine LIV the crude sap sample can be normally stored at 20o C.

In vitro longevity of infected sap of TMV is 3000 days, the purified virions remain viable for 50 years when kept at 5o C.

Method:

1-The sap from the infected plant was prepared as in the above experiment.

2-The sap is taken a test tube, and a few drops of chloroform are added.

3- the plant host is inoculated with after 24 hours, then after 72 hours, then after 120 hours.

4- Observations on symptoms produced on the leaves.

Treatments	symptoms
24 Hours	
72 Hours	
120 Hours	

