

# Plant Virus Identification using Transmission Electron Microscopy (TEM)

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# Overview



I. Grinding symptomatic plant tissues in buffer



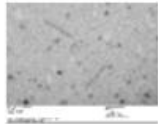
II. Low-speed centrifugation (keep the supernatant)



III. High-speed centrifugation (keep the pellet)



IV. Preparation of grids for TEM



V. TEM screening

**Fig.A.** Steps in the process of sample preparation for viral detection by TEM. Icons by Pixabay, Delapouite, and Pypaertv. Photos by Tatiana Lenskaia.

# I. Grinding plant tissues in buffer

- Grind plant tissues thoroughly in liquid nitrogen:  
<https://www.youtube.com/watch?v=AI1SsJ4JwXc>
- Add buffer and continue grinding:  
<https://www.youtube.com/watch?v=OeIRziBNn6c>
- Filter through a cloth to remove plant remnants:  
<https://www.youtube.com/watch?v=X4z3hC06wAQ>

## II. Low-speed centrifugation

This type of centrifugation is used for a crude separation of particles. This step allows us to remove most of the remaining plant tissues and have virus particles released into the liquid buffer.

After the centrifugation,

the **supernatant is kept**  
(liquid fraction in the tube),

and the pellet is discarded  
(solid fraction at the bottom of the tube).

### III. High-speed centrifugation

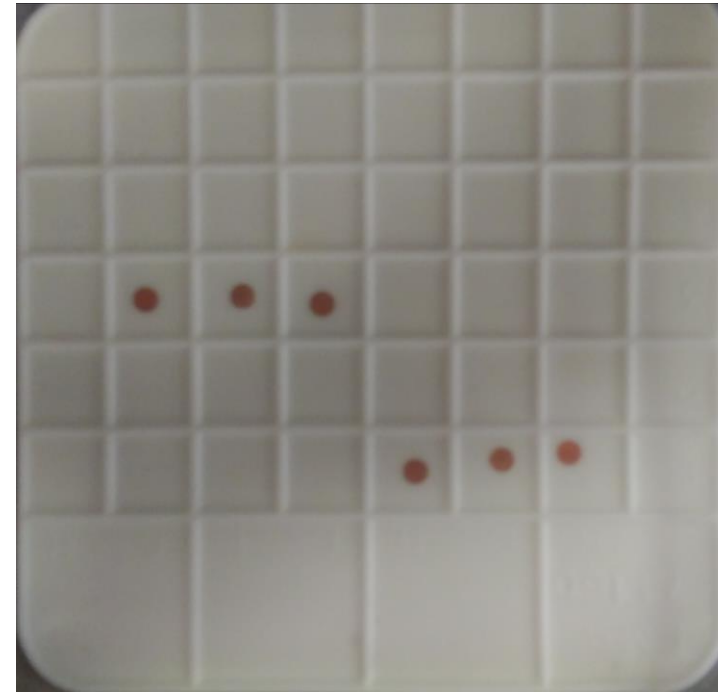
This type of centrifugation is used for a fine separation of particles. This step allows us to remove most of the remaining buffer and have virus particles concentrated as a pellet at the bottom of the tube.

After the centrifugation,

the **pellet is kept**  
(solid fraction at the bottom of the tube),

the supernatant is discarded  
(liquid fraction in the tube).

## IV. Grid preparation

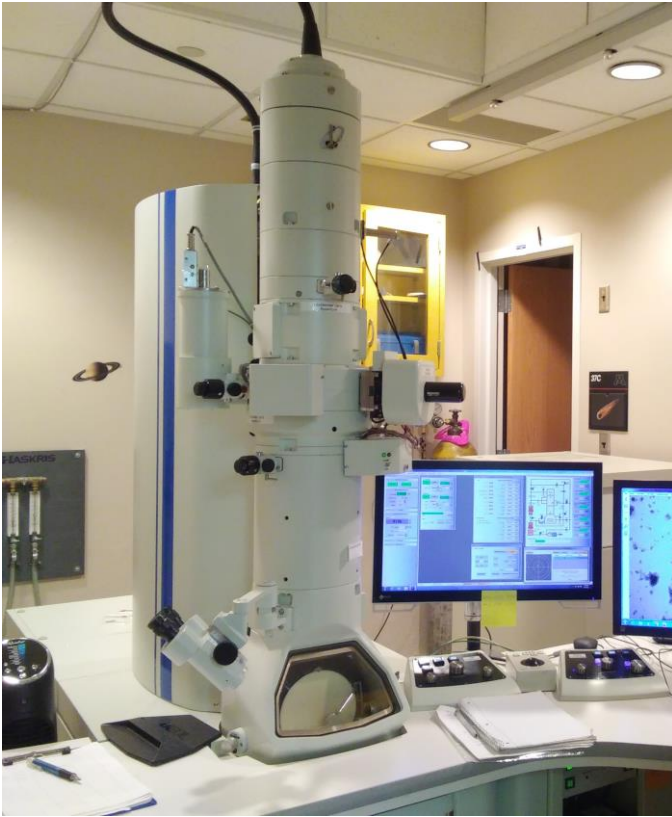


**Fig.B.** Example of the TEM grids.  
Photo by Tatiana Lenskaia.

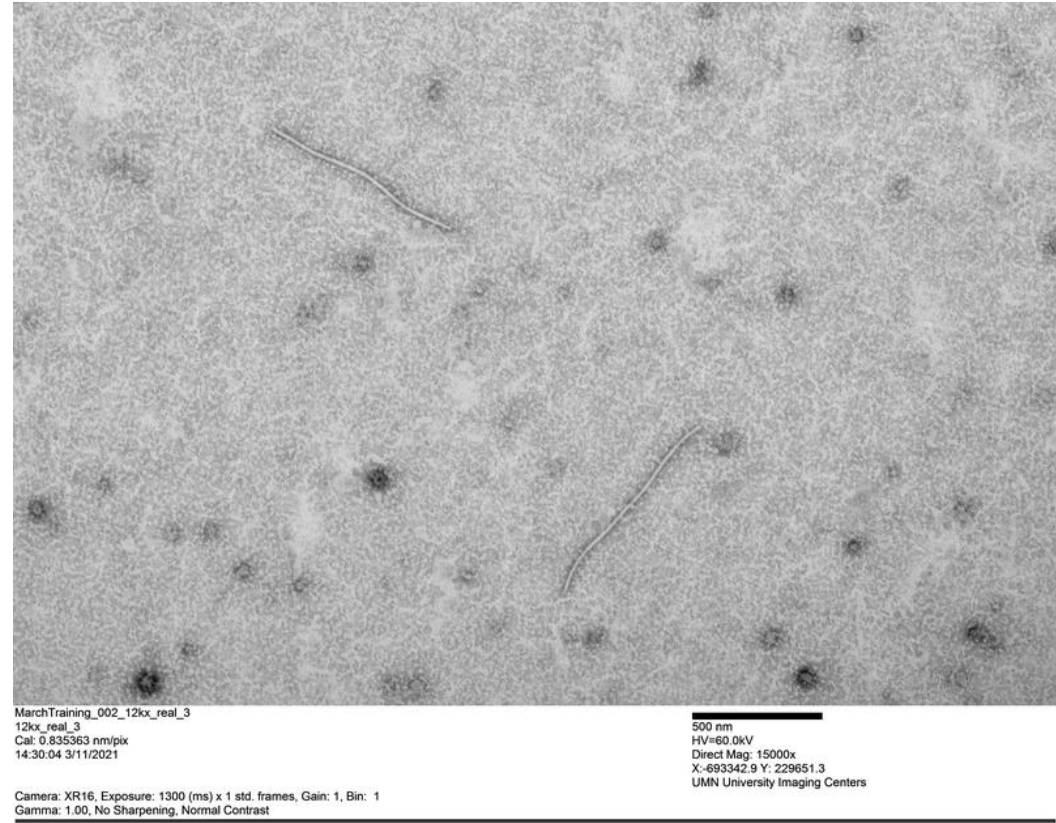
For detail:

<https://www.sciencelearn.org.nz/resources/500-preparing-samples-for-the-electron-microscope>

# V. TEM screening



**Fig.C.** An Example of a transmission electron microscope. Photo by Tatiana Lenskaia



**Fig.D.** Example of an image of viral particles taken during TEM screening. Microscopist: Tatiana Lenskaia.