

III. Basic equipment in a plant pathology laboratory

A. Autoclave

Autoclaves are used for sterilizing with moist heat. Water vapor inside an autoclave can reach a temperature of 120°C and 181b/in³ (1.4 kg/cm²) pressure. The heat source may be electric or, in the case of a pressure cooker, a gas burner. A pressure cooker works like a big autoclave but has the advantage of being very low-cost. Both devices are used primarily for sterilizing artificial media but can also handle soil, sand, vermiculite, or any other substrate used for growing plants and microorganisms.

B. Oven

An oven provides a wide temperature range by means of dry heat. It is used for drying plant or soil samples at constant temperatures and sterilizing glassware at high temperatures.

C. Isolation chamber

Laminar flow chambers (LFCs) have an air flow mechanism that filters outgoing air. This avoids contamination by microorganisms and provides sterile conditions. Microvoids work much the same way as LFCs but are smaller and cheaper. If LFCs and microvoids are not available, a small room with a gas or alcohol burner (to avoid contamination) and no air current may serve as an isolation chamber.

D. Incubator

An incubator can be calibrated to a wide range of light/ temperature combinations. Incubators are extremely useful for artificially growing many plant pathogens requiring specific light/temperature conditions. Partial incubators can be built by hand out of wood. Since temperature cannot be controlled in this type of incubator, it should be located in a place where temperature is 15-22°C, the range at which many plant pathogens develop.

Some incubators are provided with fluorescent light that can be used to encourage sporulation. Near-ultraviolet (NUV) light is supplied by fluorescent tubes, and a light control is used to regulate light/darkness cycles.

E. Refrigerator

It is a basic requirement in the microbiological laboratory and used for storing stock cultures of microorganism at 4°C to save sub-culturing every few days. The stored cultures at low temperature are fairly inactive and will not suffer damage due to evaporation of medium. It is

also used to store sterilized media to prevent dehydration and to serve as a repository for thermolabile solutions, serums, antibiotics and biochemical reagents.

F. Water bath

This device consists of a container that maintains water at a constant temperature. Water baths have many uses. For example, Erlenmeyer flasks containing freshly sterilized culture medium can be placed in a water bath at 46°C for 30 minutes to cool it before pouring into Petri dishes. Water baths are essential for measuring growth of some organisms in liquid media at specific temperatures, and have other uses in bacteriology and virology.



Figure 1. Manually operated (A) and automatically controlled digital (B) autoclaves, C: Pressure cooker (Stovetop autoclave), D: Oven, E: Incubator (growth chamber), F: Isolation chamber (laminar flow hood), G: Water bath