ILLUSTRATED CONCEPTS IN AGRICULTURAL BIOTECHNOLOGY
A series from the NifTAL Project • MIRCEN, Department of Agronomy and Soil Science
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A SIMPLE TRANSFER CHAMBER FOR ASEPTIC WORK WITH MICROORGANISMS

Rhizobia are beneficial root-nodule bacteria which fix nitrogen in symbiosis with legumes. Isolation of rhizobia from root nodules, subculturing, plating, and other routine aseptic manipulations of these bacteria require a sterile environment. Commercially built laminar flow transfer hoods achieve this through air filtration and positive pressure within the chamber which prevents contaminants from entering. Unfortunately, these hoods are unaffordable for many researchers and teachers of Rhizobium microbiology in developing countries.

A simple chamber for aseptic work, as shown in Figure 1, can be constructed from readily available materials and according to the drawing in Figure 3 (detailed blueprints are available from the NifTAL Project). When using correct procedures and precautions, this chamber can produce good results, thus eliminating the need for expensively manufactured transfer hoods for routine work with Rhizobium.

In this design, the placement and position of the bunsen burner is critical for producing a sterile environment (Figure 2). The bunsen burner is admitted into the chamber through a hole made in the base in such a way that approximately one inch of the top of the burner protrudes into the chamber. Thus, the gas supply line and the air intake ports of the burner remain positioned outside the chamber. When the burner is lit, the flame eventually warms up the air inside the chamber and an unidirectional air current results. This warm air current exists through the open front thus preventing entry of contaminants.

Construction:

The dimensions are given in Figure 3 and materials used are readily available in most hardware stores. Back, top, bottom, front door frame, and sides are made of plywood (1.5 cm thick). Window openings are cut out and plexiglass or glass is cut to size to fit the openings. Hardwood moldings are used to hold the glass in place. A wooden reinforcement strip across the top of the chamber serves as an anchor for the door which is attached to it by three cabinet door hinges. Plastic laminate is glued over the working surface with contact cement. A 1.5 cm hole is drilled at 14 cm distance from the back of the chamber and at an equal distance from each side. The chamber is elevated by four wooden blocks which are glued into place. All uncovered wooden surfaces are painted with an oil-based or epoxy-type paint.

Operating Instructions:

1. Open the hinged door and wipe the interior thoroughly with an antiseptic such as 70% ethanol. Allow the ethanol to dry.
2. Turn on the gas and light the burner. The flame should be blue and adjusted to no more than 6 cm high.
3. Close the hinged door and wait 10 minutes before using the chamber.
4. When work is completed, turn off the flame and disconnect the burner gas line. This is important because a leaky gas valve may cause the chamber to fill with gas possibly causing an explosion when the burner is lit again for operation.

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