Australian Government
Department of Agriculture, Water and the Environment

PRODUCT REFERENCE

Department approved methods for the preservation of plant material

There are several methods of preservation that are approved by the department that reduce the biosecurity risks of healthy plant material which has been imported for research purposes.

Desiccation in silica gel

Silica gel is a salt that absorbs water from its surroundings and contains it, making desiccation in silica gel a reliable process of drying and preserving small quantities of most plant material. Techniques include placing small amounts of plant material into a bag containing silica gel (most commonly in the form of small balls or grains), or placing the plant material into porous bags e.g. teabags, and then into larger plastic bags containing the silica gel. The gel then proceeds to draw moisture out of the samples, preserving the material in a fully dried state. Silica gel changes colour when it has absorbed as much moisture as it can.

Picture: Dried *Hibiscus* in silica gel *(Source: http://plantarum.ca/botany/silica/)*

It is a department requirement that a ratio of at least 10 parts silica to 1 part plant material is maintained. The sample must be fully dried, and surrounded by silica gel either physically touching the sample, or on the other side of a porous surface **at the time of import**.

Freeze Drying

Freeze drying is a method used to dehydrate plant samples to preserve them. Freeze drying works by freezing plant material to an extremely low temperature then creating sublimation (transition of solid directly to gas) through the addition of heat and pressure to remove any moisture. Further secondary drying is then undertaken.

The department requires that samples be frozen at a temperature between −50 °C to −80 °C and then undergo further drying. Documentary evidence of the process from the supplier is required on consignment arrival.

Freezing in liquid nitrogen

Samples must have been frozen in liquid nitrogen at -196°C. Documentary evidence of the process from the supplier is required on consignment arrival.

Grinding into powder

Plant material must be fully ground into a fine powder with no large chunks – this includes seed that has been ground into a powder.

Preservation in one of the following solutions (the preservative must fill at least 80% of the container):

1. 2% CTAB solution (Cetrimonium bromide)

CTAB is a detergent that is used to dissolve cell membranes to cause cell lysis while maintaining the integrity of precipitated DNA during isolation.

2. RNAlater

RNAlater is a stabilization solution that permeates tissues to stabilize and protect cellular DNA.

3. 70% or higher ethanol, propanol or other aldehyde equivalents

Simple alcohol compounds denature proteins, remove water and disrupt cell membranes to change cell permeability and cause lysis.

Specimens that have been preserved in 70-100% alcohol may be drained off prior to export to comply with the transport of dangerous goods requirements. To ensure adequate preservation, drained specimens must have been preserved in the solution for a minimum of 24 hours per 5mm thickness, prior to being drained off for transport.

4. FAA fixative (Formaldehyde Acetic Acid alcohol)

Formalin acetic acid alcohol is a general-purpose fixative. Formaldehyde penetrates tissue thoroughly and the alcohol and acid balance tissue contraction and expansion.

5. Carnoy's fixative

Carnoy's fixative is a chloroform-containing fixative, not commonly used in preservation of plant material.

Note: Care must be taken to ensure that material is not contaminated with biosecurity risk material prior to or after preservation as this negates the risk-reduction quality of the preservation technique.