Preserving seeds with Unwins and The Royal Botanic Gardens

Munters dehumidifiers provide the ability to dry the air to very low dew point levels, which together with simple cooling systems, provide the ideal environment for storage and packing. Packing in a dry environment at Unwins, encapsulates dry air in the pack, avoiding regain and prolonging the seed viability, simply, at a low energy cost, regardless of the weather. Munters dehumidifiers also play a major role in preserving for posterity, seeds of every existing wild plant in England with over 1,800 seed species currently grow wild in England dried using Munters desiccant dehumidifiers. The Royal Botanic Gardens seed conservation section has also builtup a bank of seeds from arid and semi-arid areas of the tropics, which account for a third of the earth's land surface.

QUICK FACTS

- ✓ Simple installation for a controlled enviroment
- ✓ Efficient systems with low running costs
- ✓ Extended viability for the seeds
- ✓ High germination rates
- ✓ Longer shelf life
- ✓ Low energy storage

The seed bank is the most sophisticated of its kind in the world, designed to preserve seeds for 200 years using a combination of desiccant dehumidification and deep freezing. To achieve this, the seed requires optimum storage conditions: a low moisture level in the seed, and a low storage temperature. The Munters dehumidifiers are essential to creating the first of these conditions. Typically, a fresh seed contains from 15% to 80% of its weight in moisture. The ideal for deep freeze storage is 5%. As with all seeds and grains, to dry the seeds using conventional heating would damage the seed structure and to store the seed with too much moisture present causes ice crystals to form inside the seed and kills it.

There are four Munters dehumidifiers involved in the two-stage process of drying the seeds. Two Munters desiccant dehumidifiers – maintain a relative humidity of 15%. Incoming seeds are stored for about a month to reduce their moisture content slowly to a level where the seeds will not germinate before long-term storage.

The drying and preparation room is maintained at a constant 10% relative humidity by Munters and a temperature of 15ºC; the lower relative humidity level dries the seed even further, to the level required for long-term storage. The relative humidity level is maintained by two Munters ML690 desiccant dehumidifiers. Many older seed banks have used cooling dehumidification for drying seeds, but the building maintenance manager at the Royal Botanic Gardens, found that desiccant dehumidifiers are much more energy efficient at the low dewpoint and reduced temperatures required in the seed bank.

At the Royal Bontanic Gardens the germination of the seeds can be delayed while they are sorted, in some cases removed from their husks or pods, X-rayed to check for bugs, cleaned and packed in sealed jars or foil sachets. This produces an economic benefit for the Seed Conservation section. When a seed collector has collected a sufficiently large quantity of seeds, he airfreights them, so they arrive in large batches. In the event of the store room becoming overcrowded with incoming seeds, the drying process can be accelerated. Small batches are placed in a crate attached to a duct with a fan. This draws the low humidity air across the seeds and into the duct to be vented outside, taking the moisture from the seeds with it.

For many years now, a controlled dry, cool environment commercial seed storage and packing has been used, with seeds packed into foil laminated and vapour sealed packets to prolong storage life. Whilst the packer at Unwin has control over his own storage environment, when the packed seeds are dispatched, this control is lost, and must rely on the quality of the pack for a good shelf life. The drier and cooler the seeds, the longer the shelf life, so by packing the seeds in a dry atmosphere, moisture regain in the packs can be virtually eliminated so that shelf life is extended and the seeds will germinate when finally sown.

Depending on the seeds species, variable humidity levels are ideal to coincide with the required moisture content for best preservation, within economic constraints.

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