How to Do a Germination Test

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If you're like me you probably have a shelf somewhere with lots of packages of old seeds; some just a year old, but some older than that, and you're starting to wonder whether they're worth planting next spring or whether they should be replaced. Seed companies and seed banks test their seeds for germination all the time (at least they should) and you can too.

As seeds age they lose "viability"; or the ability to sprout. A germination test uses a small sample of your seeds to check how viable the rest are, simply by trying to sprout them ahead of time and seeing how many germinate. A germination test is the only meaningful measurement of seed viability, since it doesn't really matter how old the seeds are. If they germinate well, they're good, even if they're old. And if they don't germinate well, they're not good, even if they're fresh.

Common sense says that the best way to test germination is to mimic the way you would try to sprout your seeds in the spring. So if you would plant your tomato seeds in potting soil on a windowsill in April, just test some of your old seeds the same way now, so you know whether or not you can rely on them later.

However, there's a big difference between a simple home germination test and the kind of test that seed companies should do. Put simply, seed companies have to make sure their germination tests are accurate, not affected by variations of temperature and soil moisture, and the number of seeds tested has to be statistically significant. Depending on your scale and purpose, some of those factors might matter for you, and some might not. Let's look at them in detail so you can decide what's best for your situation.

Paper or Soil

If you read about germination tests you'll probably see a lot of examples of people folding and rolling blotter paper. This is a great way to test germination: count out a certain number of seeds, place them on absorbent paper spaced about a centimeter apart, fold the paper over the seeds and wet it lightly, then roll it up and keep it slightly moist for a few days to a week. If you don't have blotter paper you can just use brown paper towels (the rough, cheap kind because they don't soak up too much water).

The advantage of this method is that you can easily see how many seeds have sprouted, how many are just beginning to sprout, and how many show no action at all. Your result will be

Number of seeds sprouted x 100

_____ = Germination rate as a %

Number of seeds tested

Another method is to count out a certain number of seeds, and sow them in potting soil. When they sprout, count them and use the same formula. This works perfectly well too, but it is often much more difficult to count the seeds that are only beginning to sprout and have not reached the surface yet.

Sometimes these can amount to a large percentage, so if you don't see them your germination rate will seem much lower than it really is.

Whether you use paper or soil, the concept is the same, and the difference probably depends on how accurate you need your counting to be. Personally, I use paper when I need an exact count, and I find soil more convenient when I just want an approximate sense of whether some seeds are worth planting or not.

Not Too Wet, Not Too Dry

The biggest cause of bad germination tests is the same as the biggest cause of death among houseplants : overwatering. Tiny seeds wrapped in paper don't need to be soaking wet. They just need a little moisture, and believe it or not, they need air. Plants breathe, and seedlings are plants, so if they're trapped underwater they literally drown.

Many of my early germination tests in household paper towels were disasters, simply because the towels were too wet and the seeds died and rotted. I'll never know how many of those seeds were actually perfectly good, but I thought they weren't because of my lousy testing.

A much better way is to fold and roll the paper towel, with just enough moisture to stick the paper to itself. Put the rolls in a large zip-lock bag, vertically so the ends of the rolls point toward the opening, and leave the bag open to the fresh air. Check the ends of the paper rolls every few days, and if they start to dry out, spray a bit more water on them. This gives enough moisture for the seeds to sprout, but also enough air. Just right.

If you use the soil method, just keep the soil evenly moist, just like you do when you start your seeds for real.

You can also ruin a germination test by allowing the paper or soil to dry out. Sometimes you can save it, especially if the seeds haven't gotten too far in the germination process yet (they're pretty resilient when they're still dormant) but if you get a low germination result, it's probably best to start over completely.

How Many Seeds?

The biggest difference between a home gardener's germination test and a seed company's test is the number of seeds that have to be tested. The industry standard is to test 400 seeds from each batch, actually doing four separate tests of 100 seeds. That gives a precise germination percentage that can be advertised on seed packets, and the purpose of doing four separate tests is to compare those four results to see if they all agree. If they don't, it means something went wrong in the testing procedure, like uneven moisture or temperature.

You probably don't want to sacrifice 400 of your seeds just to find out how well the others will germinate, unless you have a lot more than 400 to spare. For home tests, you don't have to. Think of it this way: if you test one seed and it sprouts, what does that tell you about the rest? Well, nothing, because it could have been the only good seed. If you test two seeds, and they both sprout, that give you a bit more confidence in the rest, but it still could be a fluke.

If you test ten seeds, and say eight germinate, then you can be pretty sure that around 80% of the other seeds will sprout. But if one or two of the tested seeds weren't average, then the actual germination

percentage will be off by 10% or 20%. That would be a huge variance for a seed company's purposes, but maybe not for a home gardener checking their seeds. As you test more seeds, the percentage becomes more accurate and reliable, so the number of seeds you use in your test should reflect your needs.

When Seeds of Diversity tests a seed sample, we test as many seeds as possible (up to 400) for quality assurance. But in our Seed Library collection we often have small seed samples, maybe 100 seeds or fewer. Since we can't sacrifice those seeds just to test them, we might check only 15 or 20 to determine whether the rest need to be regrown right away.

For my own home garden, I usually don't care about the exact germination percentage. I just want to know if an old packet of seeds is worth planting or not. So a quick test of ten seeds in a houseplant pot on my windowsill is all I need to get a rough idea of how good those seeds are.

Getting Warmer, Getting Colder

Another consideration is that some seeds prefer to germinate at warmer or colder temperatures. The classic example is pepper and eggplant seeds, which love warm soil, and either refuse to germinate in cool soil or take several weeks longer. If you grow peppers from seed, you already know that it's best to germinate them someplace warm, such as the top of your fridge or near a heater. Do the same thing for germination tests, and remember that your windowsill is probably colder in mid-winter than it is in early spring. There's no sense in throwing out perfectly good seeds because your germination test was too cold.

There are seeds that prefer cool soil for germination. These include spring greens and most root vegetables. So if you happen to be testing your seeds in a hot place, consider whether that might be giving artificially low germination rates. On the other hand, this is probably not a problem for most Canadian gardeners in the winter!