A Step-By-Step Guide for Growing Microgreens at Home

The COVID-19 pandemic is forcing many to stay home and avoid social activities. Besides the fear of infection, psychologists are observing a negative impact on mental health during this period of social isolation.

Microgreens grown on a kitchen windowsill. Photo: Francesco Di Gioia, Penn State

There is also the need to engage in a healthy lifestyle, which involves taking care of our health with regular physical activity and maintaining a healthy diet.

While the COVID-19 crisis is not a food emergency and there is plenty of high-quality food available at the local level, going to the grocery store is more challenging right now and many have modified their grocery shopping habits. And in an attempt to minimize exposure to the virus, people are reducing the frequency with which they go grocery shopping, which may limit the opportunity to buy the most perishable greens.

Given the circumstances, with the arrival of the spring, many are reviving the idea of “Victory Gardens" and are investing in their home garden to grow their own fresh vegetables, while re-discovering the beneficial de-stress effects of gardening. If you do not have space for a garden, believe that you do not have a “green thumb," or are discouraged by your previous gardening experiences, do not despair! Microgreens may provide you a new opportunity.

According to the 2015-2020 Dietary Guidelines for Americans, the recommended amount of vegetables in a 2,000-calorie diet is 2½ cup-equivalents of vegetables per day.

Vegetables are a rich source of many nutrients that are critical for our health including; dietary fiber, pro-vitamin A, vitamin C, vitamin K, vitamin E, vitamin B6, folate, thiamin, niacin, and choline, as well as essential minerals like potassium, iron, zinc, copper, magnesium, and manganese.

Microgreens are nutrient-dense tiny greens that may be grown in limited space, in a relatively short time, even on a windowsill or in your kitchen. Given their high nutritional value and the variety of species that you can grow, microgreens have the potential to provide you with nutrient-dense greens, and the de-stressing experience of working in your home garden.

Please check the ABCs of Microgreens to learn more about what microgreens are, how they are used, the species that are suitable to grow as microgreens, and where to source seeds.

What You Needed to Grow Microgreens at Home

Microgreens production for self-consumption in a household does not require the use of any special tool and besides the seeds, you should be able to find everything you need at home or in any household-product store (Figure 1). If you plan to grow microgreens continuously, for a more efficient production, it might be convenient to buy some growing trays and small tools specifically designed to produce microgreens.

The basic items you need are:

- Seeds
- Drinking water
- Growing medium or mat
- Growing containers or trays
- A small kitchen scale or measuring cups
- A spray bottles and a pitcher
- A sharp knife or a pair of scissors

For some species that require to be pre-soaked, you may need a few cups for soaking the seeds in water and a small colander to rinse the seeds once or twice before germination. Depending on where you are planning to grow microgreens you need a clean surface or a shelf to place the growing trays. While the natural sunlight available behind a window, on a balcony, or a small porch are generally enough to grow

microgreens, it is possible to supplement the natural sunlight with a source of artificial lighting specifically developed for plant growth. Moreover, some species may be grown in a dark environment and do not require any light from sowing until harvest.

Figure 1. Example of tools and material needed to start cultivation of microgreens at home: You will need 1) microgreens seeds, 2) small cups or containers to soak the seeds in water, 3) growth trays and 4) a growing medium (in this case is a peat and perlite mix), 5) measuring cups/spoons to measure the right amount of seeds per tray, 6) a small colander, 7) a pitcher and 8) a spray bottle. Photo: Francesco Di Gioia, Penn State

A key element necessary to produce microgreens is the growing medium. The most popular media used are peat-based mixes, coconut coir, as well as mats constituted of natural (cotton, kenaf, hemp) or synthetic fibers (rockwool). The growing medium is important because the capacity to hold soil moisture and the frequency with which water should be applied depends on its properties, and also many other aspects such as, the availability of nutrients and the quality of the microgreens. The suggestion is to use what is easily available and relatively not expensive, making sure that it is environmentally sustainable and that it is clean and safe.

How to Grow Microgreens

Step 1. Calculate and measure the optimal amount of seeds needed for your trays

After selecting the species of microgreens you would like to grow and purchasing microgreens seeds, calculate the amount of seeds you need for your square, rectangular, or circular planting trays following the instruction provided here or using the Microgreens Seed Density Calculator developed to make things very easy for you.

You can measure the number of seeds using a small scale that you may have in your kitchen, once you measure the amount of seeds for a tray, you can measure the amount of seeds you need using measuring cups or spoons.

Left: Example of a scale used to measure the amount of seed for a small tray. Right: Example of teaspoon and tablespoon used to measure the amount of seed for a small tray. Photos: Francesco Di Gioia, Penn State

Step 2. Prepare your trays and growing media

Trays and or containers of different shapes and sizes may be used to plant microgreens. Since microgreens do not require a lot of medium to grow on flat trays are generally preferred over regular nursery pots. While microgreens planting trays of different sizes may be purchased from different sources, it is also possible to recycle containers deriving from food packaging. The main recommendation is to make sure you are using material that is suitable for food production, that is clean, and that the trays have drainage holes at the bottom, which will allow to water the trays from the bottom without letting the water get in contact with the greens while enabling the excess of water to drain.

Left: Example of a tray with drainage holes at the bottom filled with a peat and perlite mix. Right: Example of 10' × 30' tray with and without drainage holes at the bottom. Photos: Francesco Di Gioia, Penn State

After filling or setting the trays with the growing medium, using a clean container without holes and filled with drinking water you can slowly wet the growing medium from the bottom, and once the medium is wet enough let the excess of water drain. The moisture of the medium will help small seeds to stick to the surface and will keep the seeds moist during the germination process.

Left: Watering planting trays from the bottom. Right: Example of trays filled with a peat perlite mix before and after being watered from the bottom. Photos: Francesco Di Gioia, Penn State

Step 3. Seed your trays

At this point, you can start seeding by evenly distributing the defined amount of microgreens seeds on the entire growing area of each tray. Most of the microgreen's seeds do not require any treatment. However, for some species characterized by larger seeds or by a hard seed shell the germination process may be accelerated if seeds are pre-soaked in water. Seeds can be soaked in water overnight for 8-12 hours. During this process it is beneficial to rinse the seeds in running water a couple of times to wash the seeds and let them get some oxygen.

After distributing the seeds on the growing medium surface, it is not necessary, and it could be better to not cover the seeds with soil so that the sprouts remain clean. After seeding It is enough to apply some water occasionally using a spray bottle just to keep the seed moist during the germination process. To facilitate the germination process and keep a good moisture level during the germination it is recommended to keep the seeds in a dark environment for a few days. This can be easily achieved covering the microgreens trays with something that can block the sunlight.

Left: Seeding mustard microgreens. Right: Example of pea and sunflower seeds soaking in drinking water. Photos: Francesco Di Gioia, Penn State

Left: Seeding peas after pre-soaking in water for about 10 hours. Right: Seeding sunflower after pre-soaking in water for about 10 hours. Photos: Francesco Di Gioia, Penn State

Use a spray bottle for misting water on the seeds after seeding. Photo: Francesco Di Gioia, Penn State

Left: Growing trays may be stacked to put some weight on larger seeds and kept in the dark. Right: Growing trays kept in dark during the germination. Photos: Francesco Di Gioia, Penn State

For some species like pea and sunflower, it is recommended to put some weight on the seeds during the germination process to keep the seeds in contact with the soil. In the case of sunflower and other species, maintaining the weight on top of the shoots during the germination process also facilitates the detachment of the seed hulls from the cotyledons.

Step 4. Microgreens growth and management

After the germination process is complete and seedlings reach a certain height it is possible to uncover the trays and expose the sprouts to sunlight. In selecting a place to grow your microgreens, consider that like any other plant microgreens benefit from good exposure to sunlight, therefore place them where you have more light. Usually, a window on the south side of the house or apartment will receive more sunlight than one exposed north. As the microgreens start growing, if the light is limited you will see the shoots leaning toward the light. A good level of sunlight will assure optimal growth and a higher accumulation of antioxidants are produced by plants primarily in response to the solar radiation.

At this point, besides the light, the only thing to do is to check that the seedlings have enough water. Water should be provided only if necessary, avoiding excess moisture and allowing drainage to prevent the development of mold. To limit the contact between water and the greens it is recommended to water the trays from the bottom. Opening the window occasionally to enhance air circulation may be beneficial as well to avoid excess moisture.

Left: Brassica germinated seeds kept in dark 3 days after seeding. Center: Brassica germinated seeds exposed to sunlight 3 days after seeding. Right: Brassica germinated seeds exposed to sunlight 4 days after seeding. Photos: Francesco Di Gioia, Penn State

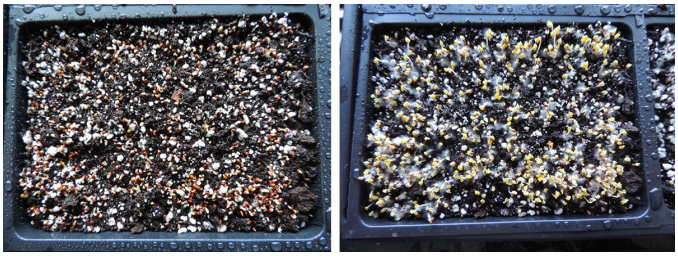
Step 5. Microgreens harvest

Depending on the species and the growing conditions microgreens may be ready to harvest in a few days or in a couple of weeks after germination is complete. Microgreens may be harvested using a clean sharp knife or a pair of scissors right before being used for any preparation. Washing microgreens in fresh drinking water before consuming them is always recommended, however, be aware that microgreens plant tissues are very gentle, and their shelf life may be substantially reduced after washing. An alternative could be to bag and store microgreens at low temperatures and wash them right before they are used.

After harvesting your microgreens, if your growing medium is organic you can compost it, while you can wash and re-use your planting trays or containers.

Left: Harvesting microgreens. Right: Microgreens salad freshly harvested. Photos: Francesco Di Gioia, Penn State

Mustard microgreens – from seeding to harvest. Photos: Francesco Di Gioia, Penn State



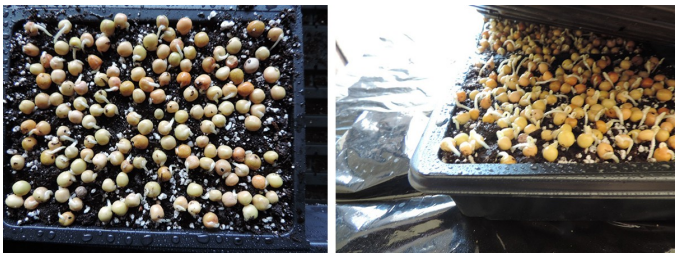
Left: Day 1. Complete germination. Right: Day 2.

Left: Day 3. Right: Day 4.

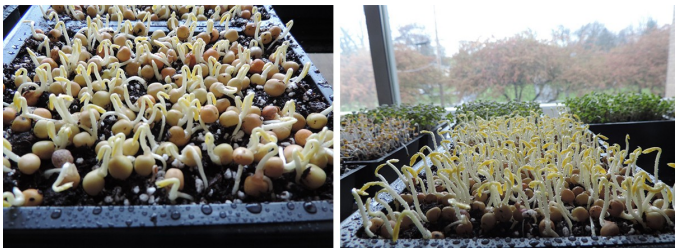
Left: Day 5. Right: Day 6.

Left: Day 7. Right: Day 8.

Pea shoots – from seeding to harvest. Photos: Francesco Di Gioia, Penn State



Left: Day 1. Right: Day 2.



Left: Day 3. Right: Day 4.

Left: Day 5. Right: Day 6.

Left: Day 7. Right: Day 8.

Left: Day 9. Right: Day 9.- Harvest.

References

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