

Growing Microgreens and Baby Greens for Home Use

-SteveG, Revised Jan 6, 2018



Microgreen salad with pickled beets, olives and Mandarin oranges



Microgreen stir-fry with mushrooms and peppers



Microgreens, 4 trays, 2' x 4' area



Microgreens and Baby Greens
8 trays, 4' x 4' area

Introduction

This guide is intended to be a basic description of growing Microgreens (and Baby Greens) for home use, summarizing all I have learned to date. This will describe how to provide yourself with fresh salad greens daily, continuously, year-round, in a very small space for pennies, rather than dollars.

What are microgreens? Greens go through this growth cycle:

Seeds > Sprouts (5-days)> Microgreens (10 days)> Baby Greens (16+ days)> full-Sized Greens (60 Days)

So, you can see Microgreens are half-way between Sprouts and Baby Greens. Many different types of seeds can be used for Microgreens and Baby Greens.

Microgreens are unbelievably easy to grow. They are the easiest type of gardening I have ever done and I have done it all.

Vendors

I receive no compensation from any of the vendors I reference. I have found them to be very good. This does not mean others are bad, only that I have personal good experience with these vendors and the quality and prices are excellent. Basically you need a reliable and economical sources for grow light, reflective film, seeds, trays, hydroponic pads, potting soil, and nutrients. Shop around and see where you can find the best quality and price.

Scale – Two People

The scale described in this document is to grow enough microgreens for daily consumption by two people (one very large salad per day).

To do this will require 6 glass trays (10" x 15") – two trays started every 5 days. The growing space needed is 2' x 4'. Any at given time there are 4 trays under the grow light and two trays in the dark germinating the seeds. If you want to do Baby Greens as well, add two to four more trays.

This can be adjusted if you eat more or less salad than we do, or if you are feeding more or less people. For example if you are feeding 4 people, or you eat a lot of salad, then you will need 12 trays and an area 4'x4'.

Grow Light

One 100 watt LED grow light will cover a 4' x 4' area and give enough light. The best LED light I have found is this one: <http://store.prosourceworldwide.com/illuminator-Mother-Keeper-Grow-Lights-p/illuminator%20mother%20keeper.htm> . It will work trouble free for at least 10 years and grow the plants very well. I put it on a "Kill-A-Watt" meter to test it and 16 hours per day usage costs us \$7/month (at \$.17 per KWH). Other types of grow lights will require higher wattage for the same usable light output and cost much more in electrical usage (about \$30 per month for the same usable light output). That is a big difference and well worth the \$299 cost of the LED grow light which pays for itself within a few months in the amount of electricity it saves.

Reflective Film

To improve the utilization of the light output from your grow light, surround your plants with reflective film on all sides and the top. This can be as simple as white paper or cardboard, or aluminum foil. I personally like Orca Grow film. It is tough, light-dispersive, and highly reflective.

25 ft roll, \$63, <http://www.amazon.com>

50 ft roll, \$110, <http://www.amazon.com>

Seeds

I get my seeds from "Living Whole Foods, Inc" which has six sister websites:

<https://www.growingmicrogreens.com/>

<https://www.wheatgrasskits.com/>

<https://www.handypantry.com/>

<https://www.herbkits.com/>

<http://www.mvseeds.com/>

<https://www.wheatgrasskits.com/organic-mushroom-products>

These are representative quantities of seeds available: 4 oz, 1#, 3#, 5#, 25# and 33# (the larger sizes are available in sealed cans/buckets that can store for up to 5 years and still sprout).

The first three sites all sell the hydroponic pads.

Basically seeds are in three categories: All can be grown in soil; some can be grown in soil as Baby Greens; most, but not all, can be grown on a hydroponic pad. For Microgreens, if it is possible, you want to grow on hydroponic pads since this is the least time consuming. However, some seeds can only be grown in soil (like sunflower, peas, beets), and all Baby Greens must be grown in soil.

Propagation Trays

By far, the best way is to use Pyrex glass trays. They are the easiest to clean and there is no change of contamination of your microgreens from plastic additives.

You can buy a 10" x 15" x 3" Pyrex Bakeware dish directly from Pyrex for \$7 here, <http://www.pyrexware.com/4-quart-oblong-baking-dish/5302470.html> or in local department stores. This tray is 5" shorter than the standard 10"x20" nursery trays.



Home / Bakeware / Pyrex® 4 Quart Oblong Baking Dish

Hydroponic Pads

For seeds that can be grown on hydroponic pads, you really do not need hydroponic pads. I have found that several layers of paper towels work just as well. However, if you prefer pads see the appendix for details on these.

Potting Soil

Any potting soil you prefer can be used for those seeds that need soil to grow well. Use caution in your selection however, as some potting soils contain gnat eggs, or other insect eggs that will fill your home with bugs.

The best I have found for cost and quality is this one, available locally at "Growin' Crazy" (hydroponics store), 93 Kingstown Road, Wyoming, RI 02898, phone: 401-284-0810, open 7-days per week, 11:00 AM - 7:00 PM, "**Sunshine Advanced Mix #4 Growing Mix**" by Sun Gro Horticulture, Canada, 3 cu ft compressed (4.6 cu ft uncompressed), this bag contains 138 quarts – enough for 45 microgreen trays at 3 quarts per tray. It contains: Canadian Sphagnum Peat Moss, Perlite, Coir (coconut husks), Dolomite Lime (to adjust pH), Mycorrhizae (beneficial fungus), Organic wetting agent (Yucca extract). Cost: \$40 (\$.89/3-quarts). It has no bugs or insect eggs!

Three quarts of potting soil will fill a tray to a 1.25" depth. To fill the tray to the top would require twice this amount. Three quarts is sufficient, but you can use more if you wish.

Here are some other potting soils:

OMRI-Approved, Organic Potting Mix, an 8-quart bag costs \$7.70 plus shipping at <https://www.handypantry.com>. I used this initially, but found the less expensive alternative above, equally as good. This has worked out well so far – no bugs, as are found in some other mixes. (\$3.85/4-quarts)

An economical potting mix can be bought at Job Lot in the Spring, "New Era Soilite Potting Mix". A 16-quart bag costs \$3.00. It contains: Sphagnum Peat moss, Humus, Sand, Composted Forest Products, Horticultural Perlite, Ground Dolomitic Limestone. (\$0.75/4-quarts)

OMRI-Approved, Miracle-Gro 'Organic Choice' Potting Mix is \$10 for a 32-Quart bag (\$1.25/4-quarts) at <http://www.amazon.com> however, many users complain that it is filled with gnat eggs that hatch when you use it. Also, it contains "Natural" Pasteurized poultry litter, meaning from chickens fed GMO grains. That OMRI lets them get away with this pathetic.

Nutrients

For the first ten days you really do not need to add any nutrients – the plants will grow. For Baby Greens nutrients are required. However, we eat plants partly to get minerals. I want to make sure my plants get their minerals, so I add minerals to my microgreens water. There are many nutrient solutions available. I like FloraNova for the basic minerals, and ConcenTrace for the trace minerals.

Is this "Organic"? That is a complicated question. All plants require inorganic elements dissolved in water – that is the only way they can be absorbed by the plants – period, end of story.

When grown in soil, "Organic" fertilizers break down slowly in the soil to gradually release the inorganic elements the plants can utilize. This slow release allows worms and bugs to help enrich the soil. A balance of good bugs and bad bugs occurs and plants thrive.

Whereas in "conventional" farming, the inorganic elements are sprayed directly, usually on dead soil, along with herbicides, pesticides, and fungicides. Worms and bugs cannot tolerate these high doses and are driven off or killed. Excess inorganic elements drain off the farmlands, go into rivers and cause excessive plant growth in the rivers and oceans which deplete the oxygen in the water and kill off the fish, as well as contaminate large areas with herbicides, pesticides, and fungicides.

Back to Microgreens and Baby Greens, given the short turnaround time (10 days and 16+ days), there is not enough time for Organic fertilizers to break down and provide the elements for the plants. Of course an elaborate system could be constructed whereby a reservoir of Organic fertilizer is allowed to slowly break down and be carefully monitored by testing to find the optimal point where it could be used while guarding that pathogens are not present that would contaminate the Microgreens and Baby Greens and make you sick. A commercial operation might be able to accomplish this feat. For a home grower, however, this would simply not work.

Hence, I use inorganic nutrient solutions on my Microgreens and Baby Greens. No herbicides, pesticides, and fungicides are needed or used.

FloraGrow is available on Amazon or a local hydroponics shop.

<http://www.amazon.com>

It costs \$22 per quart. Since you only use 1 teaspoon per gallon of water, one quart lasts for almost a year.

This has the basic elements needed by plants: Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, Sulfur, Boron, Chlorine, Cobalt, Copper, Iron, Manganese, Molybdenum, and Zinc.



ConcenTrace Trace Mineral Drops

<http://www.vitacost.com>

This is extracted from seawater and contains all the elements in seawater minus the salt. I put one squirt of this in each gallon of nutrient solution.



Videos – How-To

Growing Microgreens is so ridiculously simple and easy.

If you want to see videos on how these are grown, here is a good series:

[Microgreens - pH Balancing Water](#)

[Microgreens - Soil-Method - Part 1](#)

[Microgreens - Soil-Method - Part 2](#)

[Microgreens - Hydroponic Part 1](#)

[Microgreens - Hydroponic Part 2](#)

[Microgreens - Hydroponic Part 3](#)

[Microgreens - Hydroponic Part 4](#)

Water – pH 5.8

The ideal pH for Microgreens is 5.8.

pH 5.8 water: For our pH 7.0 spring water, I found that adding 1/8 teaspoon of Citric Acid per gallon of water gives me a pH of 5.8. I make up one each one-gallon jug at a time to use for initial watering.

Nutrient Solution: I make up two each one-gallon jugs, add 1/2 teaspoon of FloraNova Grow nutrient, and one squirt (a few drops) of ConcenTrace Trace Mineral Drops.

I use the pH 5.8 water for initial germination and the nutrient solution for later growth once the trays are put under the grow light. Making them ahead of time makes watering easier and allows the water to equilibrate to room temperature.

Here is a summary of the steps involved.

I usually make one tray of seeds that grow on the pads and one tray that grow on soil on the same day, and repeat every 5 days. On a continuous basis, I end up with 4 trays under the grow light and two trays covered on a shelf to germinate. At 10 days I start harvesting two of the trays. I use scissors, and in a haircut fashion, remove 1/5th of the growth in those two trays daily for 5 days (days 10 to 14). This yields a continuous supply for salads and soups.

Quantity of water needed will vary – below are just approximations. Want it not too wet, not too dry.

For Growing Microgreens Hydroponically

- Remember only some seeds can be done this way – refer to the above chart.
- Cut the Hydroponic pad to fit the tray. I also cut off the 4 corners so it seats better.
- Lay down Hydroponic pad in the glass tray.
- Add 1.5 cups of pH 5.8 water to the 10"x15" glass tray.
- Mist.
- Mix up the seed combination you want and sow the seeds, spreading evenly across the pad.
- Mist.
- cover the glass tray with a black plastic nursery tray to keep out the light. Mist the inside of this cover.
- Mist morning and evening for 3 days.
- Continue misting morning and evening for next 1-1/2 to 2 days.
- Remove cover and place tray under the grow light.
- At this point, add ~¾ cup of nutrient solution once each day. At first it may only need ½ cup, then as it grows, it may need ¾ or 1 cup.
- Tilt tray in several directions to evenly wet the pad. Pour off any excess
- Harvest on days 10-14 using the haircut method to remove 1/5th of the shoots each day.
- Rise in colander to float out any seed hulls.
- Dry in spinner, or drip dry in colander or on paper towel, and use immediately. However, they will keep in the frig for a day or so if you have extra.

For Growing Microgreens or Baby Greens in Soil

- Remember only some seeds can be done this way – refer to the above chart.
- Add potting mix to glass tray 1.25" deep (3 quarts of potting mix).
- Add 3 cups pH 5.8 water to tray and level it and gently tap down.
- Mist. This will allow a few days for the soil to hydrate before topping with the seeds.
- Some seeds need to be pre-soaked with pH 5.8 cold water in frig – see above chart.
- For sunflower seeds, after soaking for 12 hours, let them sit in colander for 2 days rinsing with pH 5.8 water, 2x to 3x per day, until roots begin to emerge.
- Next, sow seeds by spreading evenly across the soil.
- Press seeds lightly so seeds have good solid contact with soil.
- Mist.
- For cilantro and beets cover over with ¼" soil.
- For peas, cover with ½" soil.
- For sunflowers, do not cover with soil – let them sit on top of the soil.
- Tap down lightly then mist again.
- Cover with a black plastic nursery tray with inside surface misted for several days.
- Mist every 12 hours.
- After several days, remove cover and place tray under the grow light.
- At this point, add ~1-1/2 cups of nutrient solution once each day, watering along the edges of the tray. At first it may only need ¾ cup, then as it grows, it may need 1-1/2 or 2 cups.

- Begin harvesting at 10 days for Microgreens and 16 days for Baby Greens, using the haircut method to remove 1/5th of the shoots each day for Microgreens, and 1/6th of the greens for Baby Greens.
- Rise in colander to float out any seed hulls.
- Dry in spinner, or drip dry in colander or on paper towel, and use immediately.
- Our personal preference is for Sunflower seeds. They are crunchy and delicious in salads. Some people prefer peas, but we find them too stringy. Lately Sunflowers are all we grow in soil. We find the other microgreens in soil are too time consuming to clean to wash off the soil. The soil sticks to the to the others, whereas Sunflowers wash off easily.

Here are some delicious mixes I make for the hydroponic pads (paper towels). We love the aroma and taste of Fennel and Onion so we put it in every mix. Also the radish has colorful red highlights and adds tang to the mix:

Hydroponic Pad Mix #1

- 1/8 cup Fennel (1/8 cup = 2 TBSP)
- 1.5 tsp Onion
- 1.5 tsp Radish, Red Arrow
- 3 tsp Basic Salad Mix

Hydroponic Pad Mix #2

- 1/8 cup Fennel (1/8 cup = 2 TBSP)
- 1.5 tsp Onion
- 1.5 tsp Radish, Red Arrow
- 3/4 tsp Cabbage
- 3/4 tsp Curley Cress
- 3/4 tsp Kale
- 3/4 tsp Lettuce

Hydroponic Pad Mix #3

- 1/8 cup Fennel (1/8 cup = 2 TBSP)
- 1.5 tsp Onion
- 1.5 tsp Radish, Red Arrow
- 3/4 tsp Broccoli
- 3/4 tsp Cauliflower
- 3/4 tsp Kohlrabi
- 3/4 tsp Mustard, Tatsoi

Hydroponic Pad Mix #4

- 1/8 cup Fennel (1/8 cup = 2 TBSP)
- 1.5 tsp Onion
- 1.5 tsp Radish, Red Arrow
- 3/4 tsp Broccoli
- 3/4 tsp Cabbage
- 3/4 tsp Curley Cress
- 3/4 tsp Kale

Hydroponic Pad Mix #5

- 1/8 cup Fennel (1/8 cup = 2 TBSP)
- 1.5 tsp Onion
- 1.5 tsp Radish, Red Arrow
- 3/4 tsp Cabbage, Bok Choi
- 3/4 tsp Cauliflower
- 3/4 tsp Kohlrabi
- 3/4 tsp Lettuce

Sunflowers are very tasty.

Soil Mix - Sunflowers

- 1 cup Sunflowers, Black (small seeds)
- or-
- 1.5 cups Sunflowers, Striped (large seeds)

Here is a soil mix we like, but as I said before, cleaning the soil from the greens is time consuming, so we usually just do Sunflowers:

Soil Mix #1

- 2 TBSP Beets
- 2 TBSP Chard
- 2 tsp Mustard
- 2 tsp Sorrel

Measurements

- 3 tsp = 1 TBSP
- 4 TBSP = ¼ cup

Data on Seeds

The chart below shows how much seed to use per tray, the cost of the seeds, whether pads or soil needs to be used for the seeds, and whether Baby Greens can be grown from the seeds. Look at the column "Price per Serving" to see how economical microgreens are for your budget.

Microgreens - Data

Type	Price/lb	Per 10"x15" glass tray			Price per Serving	Pre-soak	Preferred Medium	Time (days)		
		oz.	Volume	Price				Germination	Harvest	Baby Salad

"Salad Mix" Seeds: broccoli, blue curly kale, purple vienna kohlrabi, arugula, red acre cabbage, snowball cauliflower.

"Spicy Salad Mix" Seeds: broccoli, blue curly kale, purple vienna kohlrabi, arugula, red acre cabbage, snowball cauliflower, Red Giant Mustard.

For Hydroponic Pads (or Paper Towels)

Bok Choi	\$11.75	0.75	2 TBSP	\$0.55	\$0.11	no	hydroponic	2-5	8-12	16+ in soil
Broccoli	\$13.99	0.75	2 TBSP	\$0.66	\$0.13	no	hydroponic	2-3	8-10	not recommended
Broccoli, Sprouting - Di Cicco (organic)	\$23.00	0.75	2 TBSP	\$1.08	\$0.22	no	hydroponic	2-3	8-10	not recommended
Cabbage, Golden Acre	\$11.75	0.75	2 TBSP	\$0.55	\$0.11	no	hydroponic	2-5	8-12	16+ in soil
Cabbage, Napa	\$11.75	0.75	2 TBSP	\$0.55	\$0.11	no	hydroponic	2-5	8-12	16+ in soil
Cabbage, Red Acre	\$14.25	0.75	2 TBSP	\$0.67	\$0.13	no	hydroponic	2-5	8-12	16+ in soil
Cabbage, Savoy	\$17.50	0.75	2 TBSP	\$0.82	\$0.16	no	hydroponic	2-5	8-12	16+ in soil
Cauliflower - Self-Blanche	\$18.90	0.75	2 TBSP	\$0.89	\$0.18	no	hydroponic	2-3	10	not recommended
Cress, Curled	\$11.50	0.75	1.75 TBSP	\$0.54	\$0.11	no	hydroponic	3-4	8-12	16+ in soil
Fennel, Florence	\$19.20	0.75	1/4 cup	\$0.90	\$0.18	no	hydroponic	3-4	12+	not recommended
Kale, Blue Curled	\$9.50	0.75	2 TBSP	\$0.45	\$0.09	no	hydroponic	2-3	8-12	16+ in soil
Kohlrabi, Early White	\$10.00	0.75	2.5 TBSP	\$0.47	\$0.09	no	hydroponic	2-5	8-12	not recommended
Kohlrabi, Purple Vienna	\$11.75	0.75	2.5 TBSP	\$0.55	\$0.11	no	hydroponic	2-5	8-12	not recommended
Komarsuna (Mustard-Spinach)	\$8.25	0.75	2.5 TBSP	\$0.39	\$0.08	no	hydroponic	1-2	10	not recommended
Lettuce, Butterhead	\$12.00	0.75	3 TBSP	\$0.56	\$0.11	no	hydroponic	2-3	10-12	16+ in soil
Lettuce, Romaine, Parris Island Cos	20.08	0.75	3 TBSP	\$0.94	\$0.19	no	hydroponic	2-3	10-12	16+ in soil
Onion, Red Burgandy	\$35.38	1	2.25 TBSP	\$1.66	\$0.33	no	hydroponic	3-4	10-14	not recommended
Onion, Sprouting, Organic	\$49.46	1	2.25 TBSP	\$2.32	\$0.46	no	hydroponic	3-4	10-14	not recommended
Pak Choi	\$14.25	0.75	2 TBSP	\$0.67	\$0.13	no	hydroponic	1-2	8-12	16+ in soil
Radish, Red Arrow	\$8.20	1	2.5 TBSP	\$0.38	\$0.08	no	hydroponic	1-2	5-12	not recommended
Radish, Sango Purple	\$35.48	1	2.5 TBSP	\$1.66	\$0.33	no	hydroponic	1-2	5-12	not recommended
Radish, Triton Purple	\$7.81	1	2.5 TBSP	\$0.37	\$0.07	no	hydroponic	1-2	5-12	not recommended
Salad Mix, Basic	\$13.99	0.75	2.25 TBSP	\$0.66	\$0.13	no	hydroponic	2-3	8-12	not recommended
Salad Mix, Spicy	\$13.99	0.75	2.25 TBSP	\$0.66	\$0.13	no	hydroponic	2-3	8-12	not recommended
TatSoi (a type of mild mustard green)	\$22.99	1	2.5 TBSP	\$1.08	\$0.22	no	hydroponic	2-3	8-12	16+ in soil

For Soil only

Beet, Detroit Dark Red	\$10.99	1	4.5 TBSP	\$0.52	\$0.10	8-12 hrs	soil only	3-4	8-12	not recommended
Cilantro, Leisure Splits	\$11.37	1.33	1/3 cup	\$0.71	\$0.14	no	soil only	1-2 weeks	3-4 weeks	not recommended
Cilantro, Slow Bolt	\$9.89	1.33	1/3 cup	\$0.62	\$0.12	no	soil only	1-2 weeks	3-4 weeks	not recommended
Mustard, Mizuna	\$17.25	1	2 TBSP	\$0.81	\$0.16	no	soil only	1-2	10	16+ in soil
Mustard, Mizuna, Red Streak	\$34.88	1	2 TBSP	\$1.64	\$0.33	no	soil only	1-2	10	16+ in soil
Sorrel, Large Leaf	\$33.00	1	2 TBSP	\$1.55	\$0.31	no	soil only	1-2	10-12	not recommended
Sunflower, Black, Organic	\$19.62/3# Can	6	1 cup	\$1.84	\$0.37	8-12 hrs	soil only	2-3	8-12	not recommended
Sunflower, Black, Organic	\$96.06/18# Bucket	6	1 cup	\$1.50	\$0.30	8-12 hrs	soil only	2-3	8-12	not recommended
Sunflower, Striped, Organic	\$59/25# Bucket	9	1.5 cups	\$1.34	\$0.27	8-12 hrs	soil only	2-3	8-12	not recommended
Swiss Chard - Lucullus	\$8.07	2	1/2 cup	\$0.76	\$0.15	12-24 hrs	soil only	2-5	10	16+ in soil

Did not like these for microgreens

Amaranth	\$7.99	1	1.5 TBSP	\$0.37	\$0.07	no	hydroponic	2-3	10	not recommended
Amaranth, Red Garnet	\$30.00	1	1.5 TBSP	\$1.41	\$0.28	no	hydroponic	2-3	10	not recommended
Amaranth, Red Garnet, Organic	\$62.00	1	1.5 TBSP	\$2.91	\$0.58	no	hydroponic	2-3	10	not recommended
Basil, Genovese	\$15.99	1	2 TBSP	\$0.75	\$0.15	no	hydroponic	3-4	8-12	16+ in soil
Basil, Italian Large Leaf	\$13.26	1	2 TBSP	\$0.62	\$0.12	no	hydroponic	3-4	8-12	16+ in soil
Clover, Sprouting - Red (organic)	\$9.42	1	1.5 TBSP	\$0.44	\$0.09	no	hydroponic	1-2	8-12	not recommended
Pea, Green Sprouting	\$17.76/5#	12	1 cup	\$2.00	\$0.40	12-24 hrs	soil only	2-3	8-12	not recommended
Pea, Green Sprouting	\$88.99/35# Bucket	12	1 cup	\$1.43	\$0.29	12-24 hrs	soil only	2-3	8-12	not recommended
Pea, Green, Dun	\$128.99/35# Bucket	12	1 cup	\$2.07	\$0.41	12-24 hrs	soil only	2-3	8-12	not recommended
Pea, Green, Dun	\$21.76/5# Can	12	1 cup	\$2.45	\$0.49	12-24 hrs	soil only	2-3	8-12	not recommended

These we did not like: Amaranth (molds), Arugula (bitter taste), Basil (takes too long to sprout), Clover (too chewy and tastes like grass), Peas (too stringy)

Disposal of spent pads and soil

I put all of these in our compost pile for use in our organic garden.

Appendix

Here is additional information. This information is not essential but is provided for completeness.

Hydroponic Pads

For seeds that can be grown on hydroponic pads, you really do not need hydroponic pads. I have found that several layers of paper towels work just as well. However, if you prefer pads see below.

For seeds that can be grown on hydroponic pads, there are two pads available – one Organic and one not. The non-Organic pad is very clean and probably not an issue – it is made from recycled water bottles, i.e. Polyethylene Terephthalate (PET). If you drink from water bottles, then these pads would be fine for you. Some [research](#) suggests that PET might yield [endocrine disruptors](#) under conditions of common use (exposure to elevated temperatures). So, consider that as well.

Organic Hydroponic Pad, 'Micro-Mats':

\$14 for 10 each pads, <https://www.growingmicrogreens.com>

- **Pros**
 - Organic & fully compostable.
 - Made from sustainably harvested wood fiber.
 - Much better water holding capacity than Sure-to-Grow pads or paper towels. Better resists drying out if you are late watering.
 - Works incredibly well for wheatgrass and barley grass, and is a good solution for microgreens.
- **Cons**
 - Once the Micro-Mat is saturated, it is very delicate. It can easily tear when lifting a corner. When harvesting microgreens on a Micro-Mat the "hair cut" method is the only viable option. The "uprooting/trimming" method which works with Sure-To-Grow pads won't work with the Micro-Mats.

Non-Organic Hydroponic Pad, 'Sure to Grow Pad':

\$14 for 10 each pads, <https://www.growingmicrogreens.com>

Pros

- The sure to grow pads are much lighter than Cocotek pads making shipping affordable.
 - They fit 20"x10" growing trays perfectly, edge to edge with no gaps, which is ideal for microgreens.
 - Work very well with microgreens and micro-herbs.
- **Cons**
 - Not organic.
 - Non-compostable synthetic fibers. Must be thrown out making for a less eco-friendly product.

I prefer to use paper towels or the Organic pads, so I can compost the roots for my outside Organic garden after each Microgreen harvest. This builds into a large pile of free compost over the weeks and months.

Propagation Trays

Rather than glass trays, which I prefer, you can also use nursery trays or other trays. These are described below. I find the glass trays are the easiest to clean and you are not contaminating your microgreens with chemicals from plastic trays (also called "Flats", or "1020 Flats", or "Nursery Trays", Size: 10" x 20")

I have spent a lot of time shopping trying to find trays made from "Food-safe" plastic. The hydroponics stores assure me they are "Food-Safe" but when I contact the manufacturers they tell me a different story. The

manufacturers tell me these are not “Food-safe” and they “Cannot guaranty they do not contain heavy metal contaminants”. Others are made in China and have unknown, and untraceable composition. We all know the bad record China has in the news of contaminating plastics with heavy metals.

Since heavy metals can cause brain damage, brain fog, and damage to internal organs, you do not want them in your food. That is why you are growing food yourself – to get better quality food.

“Food-Safe” must meet three basic requirements

- 1) Must be made from virgin plastic (HDPE, PE, PP, PS, and PET) - not recycled (so the history, specs, and ingredients of the resin are known).
- 2) It must be extruded with a higher-cost non-toxic mold release agent.
- 3) Cannot be made with heavy-metal (toxic) ingredients.

Recycled plastics usually have random and unknown composition and are not considered food-safe, unless the supply source is tightly controlled.

Non-food grade would use the cheaper, generally toxic, mold release agents.

Heavy metals like lead, cadmium, chromium, mercury, and antimony have been added to plastics as catalysts, pigments, fillers, UV stabilizers, and flame retardants.

Any of these items can migrate into the water then into the food, so they are not allowed in “food-safe” plastics.

Here are some studies showing that pollutants are absorbed by plants:

Conference, Society of Environmental Toxicology and Chemistry (SETAC), Securing a sustainable future: Integrating science, policy and people, abstracts of about a 100 papers,
http://berlin.setac.eu/embed/Berlin/Abstractbook2_Part1.pdf

Interactions among Soil, Plants, and Endocrine Disrupting Compounds in Livestock Agriculture,
https://etd.ohiolink.edu/ap:0:0:APPLICATION_PROCESS=DOWNLOAD_ETD_SUB_DOC_ACCNUM:::F1501_ID:osu1311287470,attachment

Bioaccumulation of Endocrine Disrupting Compounds from Recycled Water in Edible Fruits and Vegetables, University of Florida,
<https://portal.nifa.usda.gov/web/crisprojectpages/0223734-bioaccumulation-of-endocrine-disrupting-compounds-from-recycled-water-in-edible-fruits-and-vegetables.html>

Uptake of human pharmaceuticals and personal care products by cabbage from fortified and biosolids-amended soils, <http://www.ncbi.nlm.nih.gov/pubmed/23051741>

Phytotoxic effects of the environmental endocrine disruptor bisphenol A on Brassica Rapa (Wisconsin fast-start® mustard plants), http://noisywater.whatcom.edu/site_0809/pages_0809/3essay.html

Organic Farming vs Hydroponics,
<http://ezgrogarden.com/hydroponics/organic-farming-vs-hydroponics/>

If you want a lighter or larger tray, the best 1020 plastic tray I have been able to find are made by Mondi, a Canadian Company, <http://www.mondiproducts.com/new> . With these, the inner white tray is at least made in of virgin resin while the outer black tray is not. However, it is not food-grade, but let me explain further.

I spoke with the technical person at Mondi Products. He was quite informative. They designed and make the trays right there in Canada – i.e. they do not just import them from China like some other companies. During the design phase their goal was to make a food-safe 1020 tray. As they developed it, they found out that it is not only the ingredients and resin that is needed, but the actual machinery needed to be different from what they had. This

would make the manufacturing cost \$11 per tray and retail price much higher than anything else on the market. They made a marketing decision that it would not sell. Instead they made the best tray they could with the machinery they had, making it far better than anything else on the market, however, it cannot be legally called food-grade. Basically you cannot put hot soup in it because it is not BPA free. The manufacturer feels very comfortable that for if used for the intended purpose, i.e. growing plants or microgreens, it is perfectly safe, because they control all the ingredients and strive for food safety. And the standard hydroponic pad size will fit it perfectly.

mondi™

Clean & Strong Premium Propagation Tray
1020 No Holes

MSRP: \$4.95
Street Price: \$3.50

- Premium grade virgin materials for cleanliness and durability
- Premium white plastic for increased light reflectivity
- Reinforced outside shell made from recycled materials provide strongest support to date
- Black base prevents light penetration to the root zone and reduces the chance of root disease
- Best design 1020 flat (standard propagation tray) on the market
- Perfectly fits all Mond Mini Greenhouses

Download as PDF

MODEL	TITLE	DESCRIPTION
G170	Clean & Strong Premium Propagation Tray 1020	No Holes

That being said, another point of view is that all plastics - without exception - release 'endocrine disrupting compounds' (EDCs), including food grade plastics. See this research document for proof, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3222987/> which concludes no matter what plastic you use, some endocrine disruptors are released and are extractable even under non-stress conditions, i.e. alcohol solution or salt solution at room temperature. Just trace amounts of endocrine disruptors can cause harm – it doesn't take much.

Also, do not believe the "BPA-Free" marketing gimmick. BPA is not the only compound that has endocrine disrupting activity. In "BPA-Free" products they substitute another chemical which has equal or worse endocrine disrupting activity, but at least they can say it is "BPA-Free" and a lot of people are fooled. This alternative chemical is technically termed a "regrettable substitution". See, <http://theconversation.com/what-that-bpa-free-label-isnt-telling-you-34725> and <http://www.edf.org/health/four-reasons-bpa-free-wont-protect-you> .

These Mond trays are available here:

\$3.50, <http://www.wormsway.com> (has 5 stores in USA, March 2015 special: free shipping)

\$3.51, <http://www.horticulturesource.com>

\$3.60, <http://www.greenerhydroponics.com>



Another plastic choice is a white sturdy 18" x 12" x 3 1/2" HDPE tray used in the food service industry. It is NSF Listed for food use. NSF (National Sanitation Foundation) is the highest standard available. Available here for \$8, <http://www.webstaurantstore.com/white-carlisle-1063002-storplus-food-storage-box-18-x-12-x-3-1-2/700181203WH.html> . The standard size 10" x 20" hydroponic pads will not fill the entire width.

White Carlisle 1063002 StorPlus Food Storage Box - 18" x 12" x 3 1/2"



Dimensions:

Length: 18"
 Width: 12"
 Depth: 3 1/2"
 Capacity: 2 gallons

QUANTITY DISCOUNTS!

Buy in lots of 6:

\$8.24/Each

Regularly: **\$8.59/Each**

1 **ADD TO CART**

The Carlisle StorPlus food storage box stacks for easy, efficient storage on shelves and carts.

The white Carlisle food storage box is made of polyethylene which can withstand temperatures from -40 to 212 degrees Fahrenheit. NSF Listed.



Still another plastic tray is made of Melamine. It is also NSF Listed for food use. It is larger than the above trays at 13"x21"x2.5" and costs \$18. The standard size 10" x 20" hydroponic pads will not fill the entire width.

Carlisle 5552237 2 1/2" Deep Bavarian Cream Balsam Displayware Full Size Food Pan 6 / Case

Overall Dimensions:

Length: 20 7/8"

Width: 12 3/4"

Height: 2 1/2"



Each only

\$109.99/Case

1

ADD TO CART

- ✓ Made from 50% sustainable natural resources
- ✓ Biodegradable in a compostable environment
- ✓ Safe for temperatures up to 212 degrees Fahrenheit
- ✓ Dishwasher safe
- ✓ NSF Listed

commercial grade melamine

Like all of the pieces in the Balsam collection, this food pan features clean lines and a simple shape, yet is designed to withstand the rigors of commercial foodservice dishwasher use, maintaining its appearance after one year of dishwasher testing. Safe for temperatures up to 212 degrees Fahrenheit, this food pan is great for hot or cold foods. NSF Listed.

durable stain, scratch, and break-resistant design. It's made from 50% sustainable natural resources versus 20% in standard melamine and contains a material that will begin to biodegrade in 90 days in a compostable environment.

So there is a choice between the heavier glass tray and the lighter plastic trays of different sizes. The glass will have no contaminants, while the plastic will have some, including endocrine disrupting compounds which are dangerous in even trace amounts. Personally, I am use the Pyrex glass.