Growing Microgreens

Fresh Greens to Grow Year-Round

This educational program is brought to you by an Extension Master Gardener Volunteer.

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MASTER GARDENER VOLUNTEER PROGRAM

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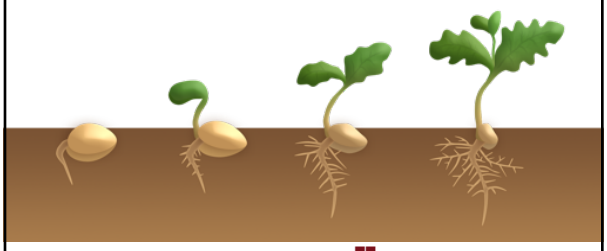
Microgreens Introduction



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Sprouts vs Microgreens vs Baby Greens

Sprouts	Microgreens	Baby Greens
• 2-4 days • White or light green • Grown without soil • Eat the whole thing	• 7-14 days • Mostly green, pale • Grown in potting soil • Eat the stem & seed leaves	• 14-42 days • Green & identifiable • Grown in potting/soil • Eat the mature leaves

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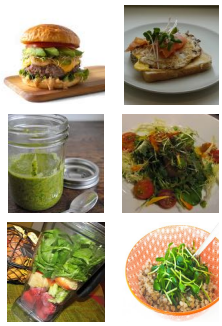
Using Microgreens

- Recommendations
  - Salad ingredient
  - Wherever you use wilted greens (e.g. pasta, omelets)
  - Wherever you would want crunch (e.g. tacos, hamburgers, wraps)
  - Wherever you would use fresh veggie flavors (e.g. soups, stir fries)
  - Pureed to make pesto
  - Blended in "green" smoothies
- Best eaten fresh



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Microgreens Benefits

- Easy to grow
  - Grows well indoors
  - Good for small spaces
  - Few materials needed
  - Fast-growing
- Nutritious
  - Flavor-full
  - Versatile
  - Food Safe

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Growing Costs Comparison

Store Bought

- $6-8 per container
- Limited flavor options

Grown-At-Home

- $1 per container
  - Seeds: $24.70 per pound ($0.30 per container)
  - Potting Soil: $5 for 8-quart bag ($0.40 per container)
  - Container: $0 (variable)
- Lots of flavor options

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Nutrition Claims

- Rumor suggestions that microgreens offer 4x to 40x the nutrition of mature plants; this claim is weakly supported by *only a single* study
  - "Assessment of Vitamin and Carotenoid Concentrations of Emerging Food Products: Edible Microgreens" (Journal of Agricultural & Food Chemistry)
  - https://pubs.acs.org/doi/abs/10.1021/jf300459b
- Better to assume microgreens are equally healthy to their mature vegetable counterpart

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Microgreen Recommendations

Fast Growing
(7-10 days)

- Arugula*
- Broccoli*
- Cabbage*
- Cress
- Kale*
- Mustard Greens*
- Radish*
- Sunflower*

* Denotes varieties that are beginner-friendly

Broccoli microgreen

Swiss Chard microgreen

Slow Growing
(14-28 days)

- Amaranth
- Basil
- Beet
- Carrot
- Cilantro
- Purslane
- Scallion
- Swiss Chard

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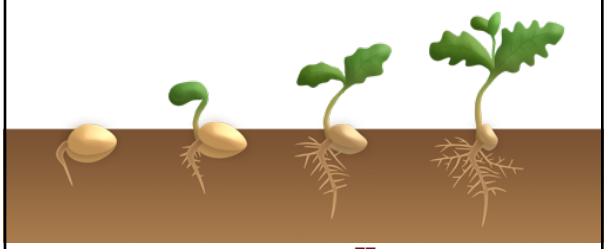
Seed Biology



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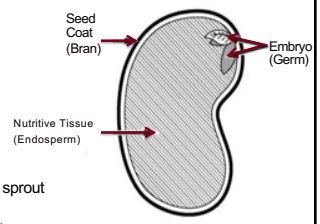
Anatomy of a Seed

- Seed coat ("Bran")
  - Protects against insects & disease before sprouting
- Embryo ("Germ")
  - Undeveloped plant
  - Waiting for ideal conditions to sprout
- Nutritive tissue ("Endosperm")
  - Provides all the food/energy needed for the embryo when it begins to grow



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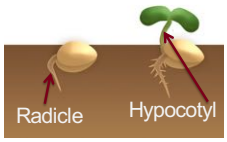
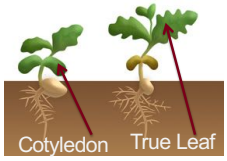
Seed Germination

- Radicle
  - First to emerge from seed
  - All roots develop from the radicle
- Hypocotyl
  - Becomes the part of the stem
- Cotyledons ("Seed leaves")
  - Surround the embryo
  - Look different from the true leaves
  - Starts photosynthesis
- True leaves





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Sprouting Conditions

- Common needs
  - Temperature (above 50º)
  - Moisture
  - Light
- Special needs
  - Soaking
  - Scarifying (scratching the surface)
  - Stratification (submitting to cold temperatures)

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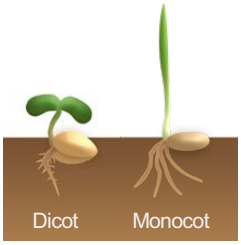
Monocots vs Dicots

Cotyledons ("Seed leaves")

- Monocotyledons
  - Single leaf-like structure
  - Grass-family seeds (e.g. wheat, rye, corn)
- Dicotyledons
  - 2 leaf-like structures
  - Broad-leaf seeds (e.g. radish, sunflower, kale)



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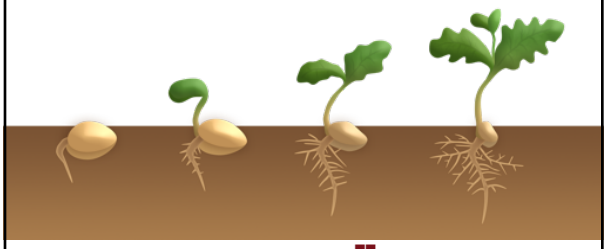
Microgreens Materials



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Choosing Seeds

- Select any vegetable, grain or herb where the plant itself is eaten
  - Plants with large seed leaves or thick stems (e.g. brassicaceae, sunflowers, peas)
  - Avoid plants eaten for the fruit (e.g. tomatoes, squash)
- Choose seeds intended for sprouting
  - Avoid irradiated seeds
  - Look for reputable vendor
- Pick seeds that grow at similar rates if growing a mixture

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Potting Medium

- Characteristics
  - Supports root growth (loose & friable)
  - Holds water
- Potting Medium Examples
  - Use sterilized soil-less potting soil (combinations of peat/sphagnum moss, compost, vermiculite & perlite)
  - Hydroponics
  - Rockwool

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Container Ideas

- Characteristics
  - Broad (example: 4"x4" wide)
  - Shallow (example: 2-3" deep)
  - Drain holes recommended
  - Lid or cover recommended
- Example Containers
  - Traditional garden pots
  - Plastic take-out containers
  - Strawberry clamshells
  - Newspaper origami trays

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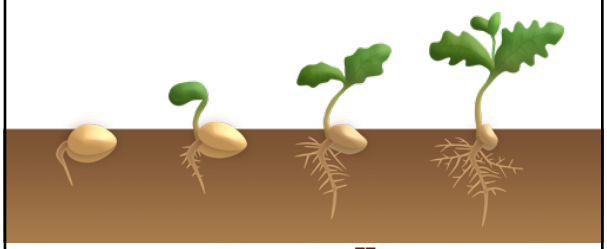
Growing Microgreens



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Step 1: Preparation

- Choose and purchase seeds
- Clean containers
- Hydrate potting soil
- (*Optional*) Soak seeds in water
  - 8-24 hours (overnight works)
  - Recommended for large seeds

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Step 2: Planting

- Drain excess water from seeds
- Add 1-2" potting soil to container
- Spread seeds over soil
  - Small seeds:
    10-12 per square inch
  - Medium & large seeds:
    6-8 per square inch
- Press seeds into soil
- (*Optional*) Cover soil
  - Damp newspaper
  - Plastic lid

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Step 3: Growing

- Keep soil moist
  - Add 2-4 tablespoon of water as needed
  - (*Optional*) Keep soil covered with wet newspaper until seeds sprout
  - (*Optional*) Keep container covered with a lid or enclosed until sprouts reach lid
- Keep soil warm
  - 55-75º (a little warmer than room temp)
- Provide light after sprouting
  - Bright-medium light recommended
  - (*Optional*) Keep sprouts in a darkened space for 3-5 days to germinate and force stem growth

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Normal Growth vs Disease

- Root Hairs
  - White and fuzzy
  - Along soil surface
  - Branching off plant

- Damping-off Disease
  - Gray-white & fuzzy
  - Across soil and plant surfaces
  - Spiderweb-like
  - Foul smelling

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Step 4: Harvesting

- Microgreens are ready when 2-4 inches tall
  - 0-4 true leaves
  - ~7-14 days (depends on plant)
- Harvest just prior to eating
  - Stems & leaves only
  - Cut near base of stems (above soil)
  - Rinse well
  - Cut from the same tray over multiple days
- Store 2-5 days in refrigerator

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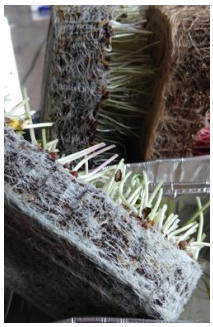
Reusing Materials

- Seeds
  - Can be stored (cool & dry) for 2-4 years depending on variety
- Potting soil
  - Not possible
  - Root growth fills all spaces
  - Compost remainder
- Containers
  - Wash to remove lingering soil
  - Sanitize in 10% bleach solution



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Microgreens Recap

- Microgreens are
  - The stem and seed-leaves from sprouted seeds
  - Fast-growing & inexpensive to grow indoors
  - Versatile & nutritious
- Requirements
  - Use sprouting-quality seeds
  - Grow in a small shallow container filled with potting soil
  - Harvest in 10-14 days

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Learn More

PRO-TIP: Google "site:edu Microgreens" (or site:gov) for research-based advice

Extension Websites

- Iowa State Extension https://hortnews.extension.iastate.edu/2019/03/grow-your-own-microgreens
- University of Maryland Extension https://marylandgrows.umd.edu/2018/02/16/microgreens-tasty-accents-from-small-spaces/
- South Dakota State University Extension https://extension.sdstate.edu/growing-micro-greens
- U of MN Extension: https://extension.umn.edu/yard-and-garden
- Ramsey County Master Gardeners: http://www.ramseymastergardeners.org/

Online References

- Microgreens Nutritional Study https://pubs.acs.org/doi/abs/10.1021/jf300459b
- Johnnys Seeds Company https://www.johnnyseeds.com/vegetables/microgreens/
- True Leaf Market Seed Company https://www.trueleafmarket.com/collections/growingmicrogreens-grow-home

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