

Hydroponics: The Easy Ways for Year-Round Gardening

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Overview

- A method to grow plants in a water-based medium—no soil
- Two methods for starting seedlings
 - Peat and Perlite
 - Sterile Potting Soil
- Three set-ups for year-round growing
 - Indoors, Outdoors
- Grow and eat veggies and herbs all year

Perspective

- Hydroponic Systems
 - Commercial, expensive, elaborate, production
- SE Asia
 - Singapore schools, community gardens
- UMINN-MG field test, trial-evaluation
- Modified for school, home, office use
 - Minimal costs, easy, simple, expandable
 - No aeration needed







**Singapore: Schoolyard Garden – Cherry Tomatoes
Aeration method (air pump)**



Downsizing

- Commercial is dandy, but in-home is handy
- Simplified options for you
 - Lower costs
 - Lower maintenance
 - Smaller footprint
 - Flexibility to expand as you want, need
 - Portability: inside, outside

Hydroponic Advantages

- No soil preparation
- No soil diseases
- No worries about clay, sandy, poor soil
- No weeding
- No rabbits, woodchucks, chippies, deer
- No slugs, earwigs
- No extra fertilizing
- No (surface) watering
- Minimal maintenance

Basic Materials and Supplies

- Small drill and 2" Hole saw (or sharp knife)
- 10 gallon tubs (dark-23.9"L x15.9"W x8.7W")
 - 2 tubs = 18 plants per lighting unit (18"x48")
 - 4 tubs = 36 plants with two lights (30"x48")
- 2" Net Pots –one for each hole/plant
- Growing Media: Water and fertilizer



2" Hole Saw

Materials: Indoor Lighting

- Fluorescent Unit – 4' (2-10 Gallon tubs)
- 1- Warm/Soft bulbs (3000K)
- 1- Cool bulbs (4100K)
- Or, 2 Gro-Lights
- Keep lights 2-3" above seedlings

Project: Build a Table?

- **Build it: Woodworking Project**
 - Tables: a 30" x 60" table (ID) allows for 2 sets of lights and 4 storage tubs
 - Materials: Wood, screws, drill, hammer, screw driver, saw, ruler, T-Square, (option: attach wheels for mobility), liner to protect the wood
 - Storage tubs with lids to support net pots
 - **Or Not:** Use an existing table, counter



One idea for a Table

Project: Build a PVC Frame?

- **Build it: Portable PVC frame**
- Frame supports 1-4' Fluorescent fixture and two 10-gallon tubs = 18 plants
- Materials: 3-10' PVC pipe, tees, elbows, PVC glue, pipe cutter/hacksaw, storage tubs
- Hang the fixture on the top PVC pipe
 - See handout for design, instructions



Project: Don't Build, Hang it

- Unfinished basement?
- Unfinished garage (heated)?
- Hang lights from ceiling rafters
- Materials: 2-sets of chains for each light, 4-6', 2-hooks for each light, storage tubs
- Raise-lower lights by adjusting chains



2009 LEA
GARDEN

Seed Starting: Option One

- Pre-mix Perlite and Peat Moss (moist)
 - Perlite – 80%
 - Peat Moss – 20%
- Add Perlite/Peat to each Net Pot
- Add 2-4 seeds directly into Net Pot
- Thin to best seedling

Direct Seeding into Perlite-Peat-Net Pot



Seed Starting: Option Two

- Fill tray with sterile potting soil
- Plant seeds in rows
- Label rows
- Transplant best seedlings to Perlite, Peat mix in Net Pots



Start Seeds in Sterile Potting Mix





Seedlings ready for Table or Tub



Root system, three weeks: Radicchio

Growing Media

- Water and fertilizer (powder)
- Supernatural Brand (Gro Aqua: 11-6-16)
 - @ \$22 for a 14.1 ounces
- No other fertilizer needed
- **Aquaponics (do you have fish?)**
 - **(Optional) Add waste water to tubs as needed**

Mixing and Adding Media

- Mix fertilizer in 5 gal. bucket
- Ratio: 1.5 teaspoons/gallon
- Add solution to tubs
- Keep at least 1" of air between liquid and bottom of tub cover (aeration not needed)*
- Bottom of net pot should be in solution
- Can top water plants until roots reach solution
- Top off tubs 2-4 times/year

- * Aeration with small fish pump

Indoor-Outdoor Storage Tubs



10 Gallon plastic-resin tubs with net pots



Plants in net pots set in tub covers



Harvest micro-greens



Harvest when plants are larger



Harvest mature plant – 1-2" above net pot





And you can grow Outside

- Home in the summer? Not much?
- Think hydroponics
- Storage tubs on a table, saw horses
- Same materials, same growing media
- Sunlight vs. Fluorescent lighting
- Low maintenance, no weeding
- Top off tubs once during summer (2X?)

The image shows three blue plastic trays, likely used for seedling propagation, arranged on a table. Each tray has a grid of circular holes. The trays are resting on a blue tarp that covers the table. The table is supported by black saw horses. The background shows a wooden deck and some outdoor plants.

Plywood (or 2x4" boards), saw horses



Optional: Styrofoam over individual tubs



Styrofoam 4'x8' sheet over multiple tubs



Label varieties so you don't forget!!





Grow Turnips, Beets, Kohlrabi

Summary

- Hydroponic gardening is easy
 - No weeding, no critters, no soil diseases
- Indoors or Outdoors
- One-time costs (lights, tubs, table, etc.)
- On-going costs (growing medium)
- Fresh Veggies and Herbs all year long
- Great kiddie, mommy-daddy project
- Align food production with consumption

Thank you very much!

- Questions?

