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How to Make Your Own Kratky Hydroponics System

A step-by-step guide for building a low-cost system for year-round indoor growing/food production

- DIY
- Hydroponic growing
- Small-space friendly

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How to Make Your Own Hydroponics System

By Joshua Dusci

VSU's indoor ag expert

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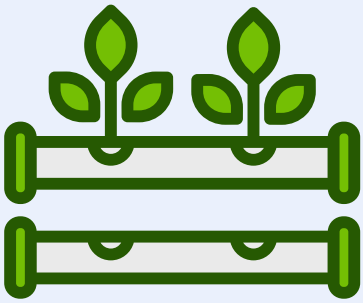
How to Make Your Own Hydroponics System

Who this guide is for

- Small farmers
- Hobbyists
- Home vegetable producers



What you will learn

In this guide, you will learn everything you need to build your own DIY Kratky hydroponics system through a step-by-step process using readily available materials. This guide will also provide recommendations for using your new DIY hydroponic system.

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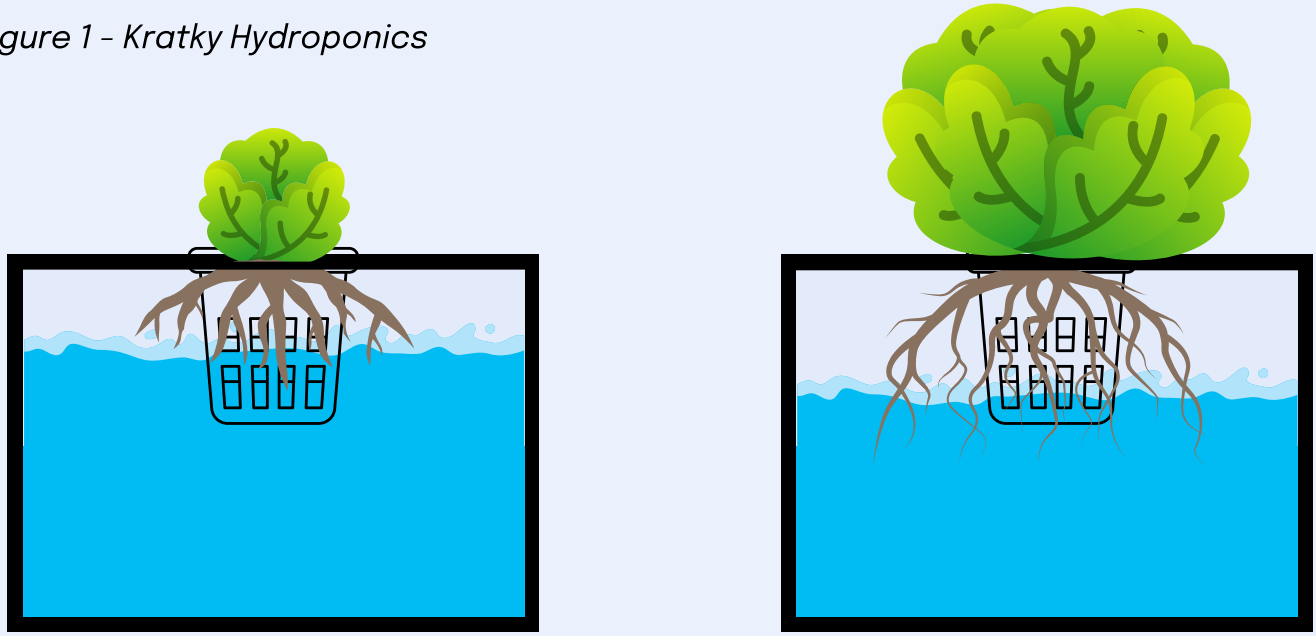
The Kratky Method of Hydroponics

The Kratky hydroponics method is a non-circulating technique that uses passive aeration to grow plants suspended over a water nutrient solution.

With this method, young plants start with their roots fully submerged in a basin of nutrient-rich water. As the plants grow and absorb this nutrient-rich water, their roots are gradually exposed to air (passive aeration) in the space created by water absorption.

This allows a grower to maintain optimal plant growth while minimizing electrical inputs like air and water pumps.

Figure 1 - Kratky Hydroponics



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What You'll Need

14-gal HDPE plastic tote with fitted lid

measuring tape

sharpie

safety goggles

safety gloves

3/16" drill bit

power drill with 2" hole saw

PVC cutters

(15) 2" net pots

checkvalve
(3/16" inlet)

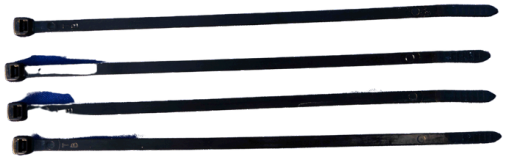
air stone
(3/16" inlet)

(6) 3/4" diameter Schedule 40 PVC 90deg elbow slip fitting

(2) 3/4" diameter Schedule 40 PVC tee slip fitting

6' of' 3/4“ airline tubing

air pump



(4) zip ties

What You'll Need

Other materials

(2) 30" pieces of 3/4" Schedule 40 PVC pipe*
(1) 25" piece of 3/4" Schedule 40 PVC pipe
(4) 1/4" pieces of 3/4" Schedule 40 PVC pipe
(4) 3" pieces of 3/4" Schedule 40 PVC pipe

Total of 126" of Schedule 40 PVC pipe

*If you want a taller light rack, use pieces longer than 30"

- You can find these materials at your local hardware store
- Raw materials costs range from $50.00-$80.00.
- Tools and additional supplies like nutrients, lights and a light timer, etc., can cost between $250 - $500.

QUICK TIPS

How to Build Your System

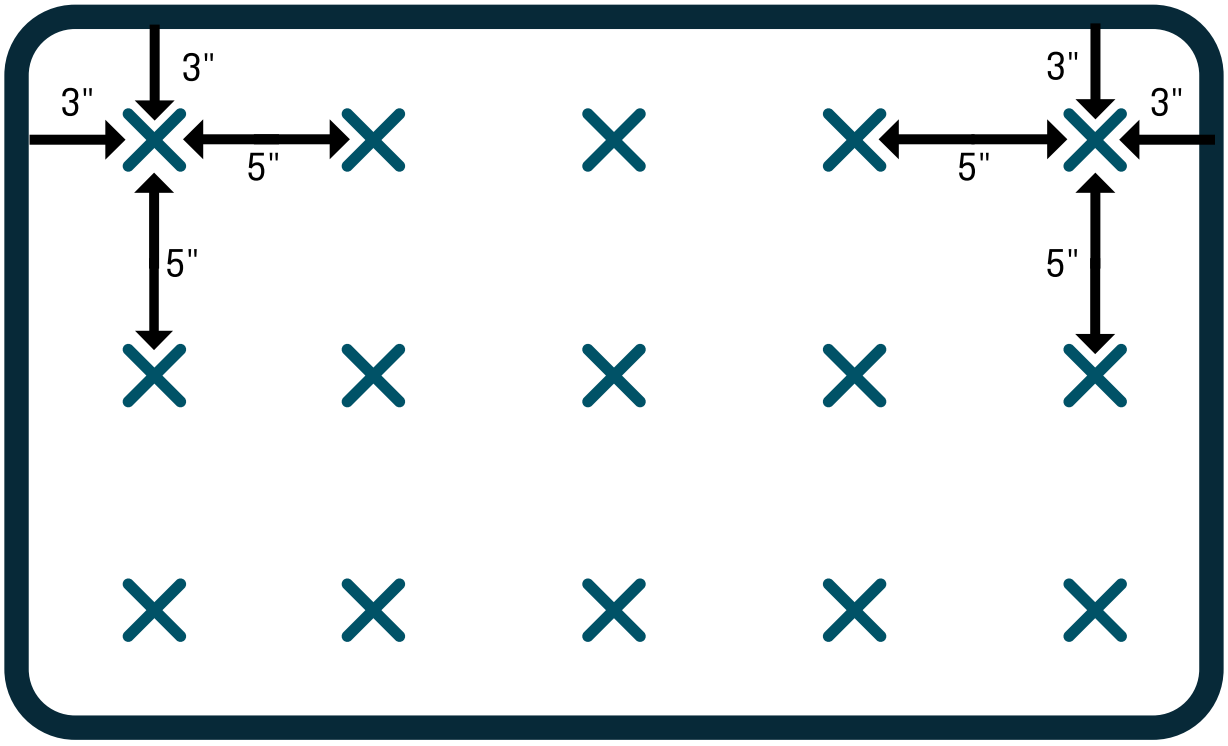
Before you get started

Wear personal protective equipment like safety goggles and gloves (not pictured)

How to Build Your System

Step 1 - Marking plant placements

Place your bin on a flat, sturdy surface. Using your measuring tape and sharpie, begin by marking where you will place your plant holes in the lid. This is where you will drill. Make sure your holes are evenly spaced across the lid.

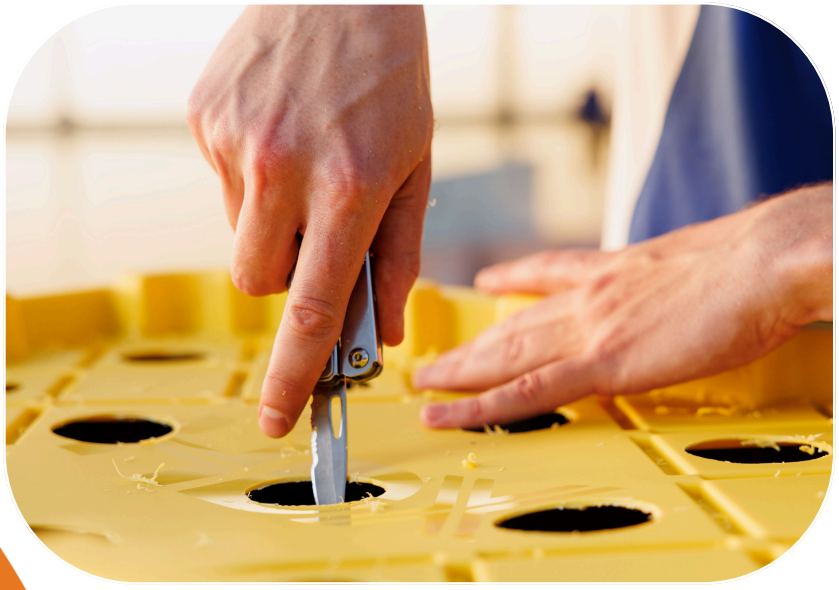


We recommend placing no more than 15 holes in this size tote.

How to Build Your System

Step 2 - Drilling holes for plants

Use a drill fitted with a hole saw bit to carefully cut holes for your plants where you made your marks.



Use a blade or sandpaper to smooth the edges of the holes. Be careful not to remove too much plastic, as your net pots may no longer fit.

How to Build Your System

Step 3- Marking airline hole

Next, mark the location for your airline hole using a sharpie. The hole should align with the lip of the lid, and no more than 2“ from the top of the lid to prevent water leakage.

Step 4 - Drilling airline hole

Fit your drill with the 3/4" drill bit. Drill into the lid where you marked it in step 3 to ceate the airline hole in the lid. This will provide a crucial connection for aeration.

How to Build Your System

Step 5 - Mark light rack PVC

Measure and mark the PVC for your light rack, using the sizes listed on page 3. Ensure precision for a stable and even support structure.

Step 6 - Cut light rack PVC

Use PVC cutters to make clean, accurate cuts along the marked lines for your light rack.

How to Build Your System

Step 7- Placing net pots, airline and check valve

7.1 Fit your net pots into the holes in your lid.

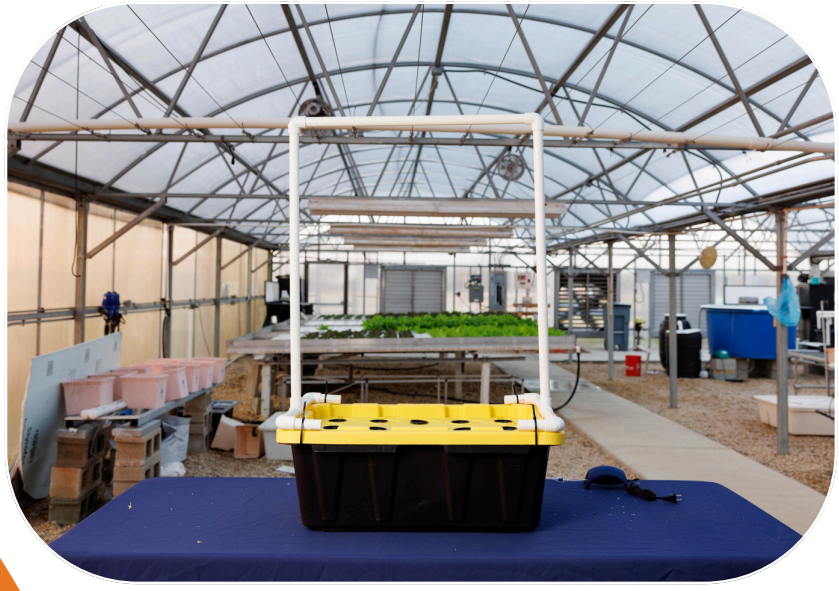
7.2 Feed your airline pipe through the tote and connect your air stone to the end of the tubing.

7.3 Connect your check valve.

How to Build Your System

Step 8 - Light rack assembly

Assemble your light rack by securely connecting the PVC pieces together. Zip ties should only attach to the lid.



Now, you will have essential support for your grow lights.

Learn More About Hydroponics

Want to watch the step by step guide?

Check out our instructional video by scanning the QR code below with your smartphone or visit:
https://shorturl.at/zNRWX

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Other Materials to Consider

Grow lights*

LED lights are best.
Adjustable dimmer built-in light pulleys are useful.
Select only grow lights that have a PAR map with a description (see example, below). These are higher-quality lights.

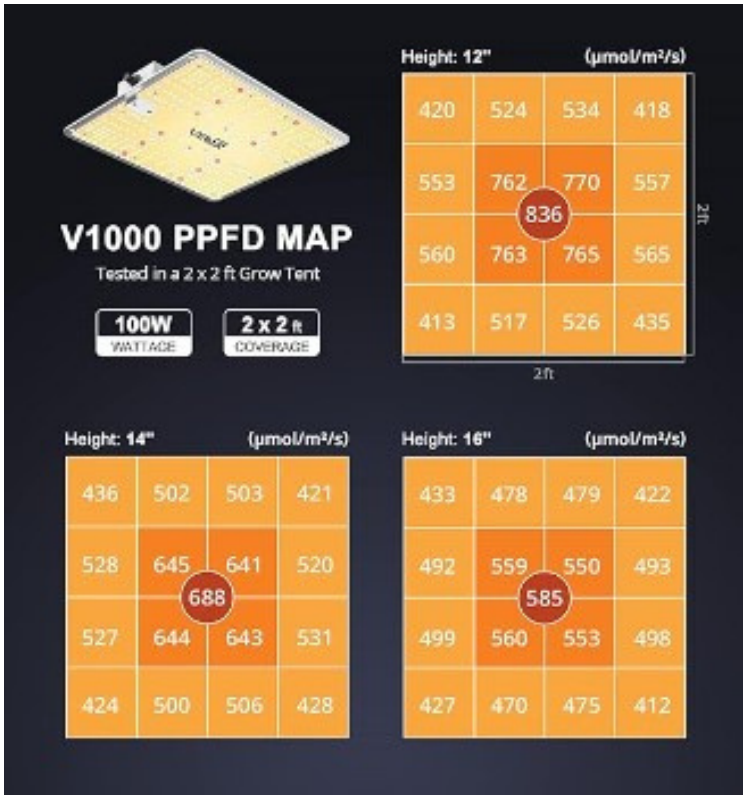


Image courtesy of ViparSpectra

Other Materials to Consider

Hydroponic nutrients*

Premixed liquid fertilizer is easier and less complicated but is more expensive than dry powder fertilizer. Your needs will vary depending on the type of plant growing in your system.

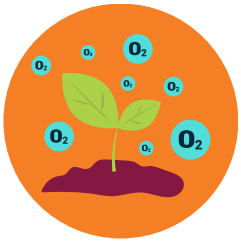
pH/EC meter*

You can use pH test strips for a cheap rough estimate of pH. Make sure you use a trusted source for meters, and consider storage and calibration. Remember, heaper does not always mean better!

Other Materials to Consider

Air Pump*

You will also need to purchase airline tubing and an airstone that will fit your air pump (3/16” diameter is typical for most aquarium air pumps). A 10-gal aquarium air pump will likely be sufficient for any tubs smaller than 30 gal.



Light timer*

A three-prong outlet is ideal for most lights. A standard plug-in mechanical timer is sufficient in most scenarios.

Other Materials to Consider

Harvesting/cleaning supplies

You might need harvesting shears, a 5-gal bucket for draining and filling your system and Isopropyl alcohol or hydrogen peroxide as cleaning agents for your system.

Seed starting supplies

Rockwool, coco coir, regular potting soil, or even media (such as hydroton) can be used to start seeds. You will likely need a germination tray/kit. A cool/dark area is ideal for seed germination. Once germinated, move the seeds under light until ready for transplantation.

Other Materials to Consider

Measuring cups

10-50 mL measuring containers with increments of 1 or 5 mL will likely be sufficient for measuring nutrients for your system. If you're using powder nutrients, a measuring scale may be useful.

Possible options for items noted with *

- pH/EC Meter - Vivosun, Bluelab, Hanna, YSI, Milwaukee, Oakton
- Lights - MARS Hydro, Viparspectra, Vivosun, Spiderfarmer
- Hydroponic Nutrients - General Hydroponics, Foxfarm, Vivosun, Natural Hyroponics
- Light timer - GE Mechanical 1-plug timer, Bn-link Indoor 24-hr Mechanical outlet timer
- Air pump - Tetra, Active Aqua, Marina, Aqueon

Trade names in this publication are solely to provide specific information. Such use is not a guarantee or warranty of the named products and does not signify they are approved to the exclusion of others. Mention of a proprietary product does not constitute an endorsement, nor does it imply a lack of efficacy of similar products not mentioned.

VSU's Hydroponic Crops: What We're Growing

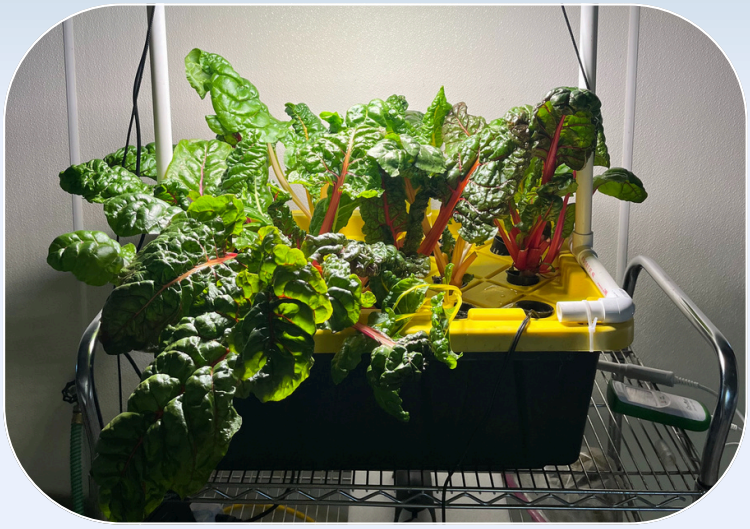
Salanova bibb lettuce

Encore lettuce blend

Sweet summer crisp lettuce

VSU's Hydroponic Crops: What We're Growing

Genovese basil



Swiss chard

Kale

Recommended Reading and Resources

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Recommended Reading and Resources

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VSU's Indoor Agriculture Program

VSU's College of Agriculture Aquaculture/Indoor Ag Program and Cooperative Extension Unit work to provide you with high-quality learning materials and opportunities. We provide information and technical assistance to vegetable growers to increase their profits by raising commercial vegetables through various methods such as greenhouses and high tunnels to get a head start on production and benefit from the advantages of indoor growing.

We focus on producing, harvesting, and marketing farm products within the context of sustainability and are here to support farmers and other stakeholders. In addition to hydroponics, our team can teach you about aquaponics, indoor agriculture, aquaculture and more!

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Learn how to build your own Kratky hydroponics system for easy, at-home food production. This guide includes step-by-step instructions, a materials list, ways to learn more about hydroponic food production and Extension resources to answer all your questions.

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