Volume 2024 Monday, April 08, 2024 Edition 12

THE MICROGREENS WEEKLY

"Delivered to Your Inbox Every Monday," your summary digest of the latest microgreens, urban, vertical farming, and new trends and exciting startup stories from around the world.

Root Hairs? Mold? How Can I Tell?

This Week: Monday, April 08, 2024

The Easiest Thing Microgreen Beginners Should Plant?

One gardening expert recommends that beginners start by growing cress. **Watercress** is an ideal option due to its guaranteed germination and simplicity in cultivation.

Additionally, cress is rich in nutrients like **calcium**, vitamin C, and **folate**, making it a healthy addition to your diet.

Furthermore, the expert mentions that learning how to grow microgreens, like cress, is gaining popularity due to their nutritional benefits and **ease of cultivation**, which can be especially advantageous for those with limited gardening space. But you already knew that!

> As another member of the Brassicaceae family, cress is a phenomenal plant. (*Azarpazhooh, Elham, et al., May 2023*).

Nutritional Profile of Watercress Microgreens

Watercress microgreens, like their mature counterparts, are highly nutritious and known for their rich content of vitamins, minerals, and phytonutrients.

They are particularly noted for **high levels of vitamin C, vitamin K, vitamin A, and calcium**, along with significant amounts of folate, iron, and antioxidants.

These microgreens also contain **glucosinolates**, compounds that can transform into **isothiocyanates**, which have been studied for their cancer-preventive properties.

Aroma and Flavor Profile of Watercress

Watercress is characterized by its **peppery, slightly spicy flavor**, which is more pronounced in the mature leaves but can also be detected in the microgreens.

Its aroma is **fresh and green, with mustard-like notes** due to the presence of glucosinolates. This unique combination of spicy and fresh makes watercress a versatile ingredient that can enhance the flavor profile of various dishes.

David Domoney is a well-known celebrity gardener and English chartered horticulturist. His

advice emphasizes the ease of gardening and the benefits of growing your own food, promoting healthier lifestyles and environmental awareness. Ideal Home, 2024-03-31

Recipe: Watercress Microgreens Pesto-Stuffed Chicken Breast

This recipe combines the nutritional benefits of watercress microgreens with the juiciness of chicken breast, creating a dish that is rich in proteins, vitamins, and minerals.

The watercress pesto provides a **spicy and aromatic flavor** that complements the chicken beautifully, making for a visually appealing, tasty, and nutritious meal that is far from the typical salad.

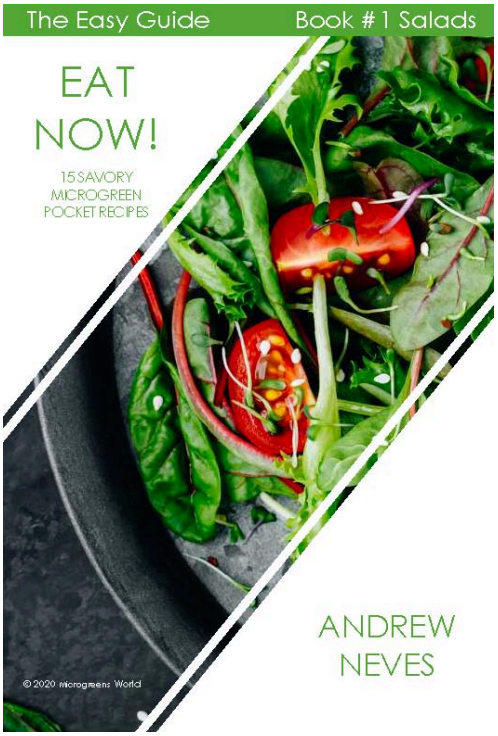
Ingredients:

- 2 large chicken breasts (or your favorite protein)
- 1/4 cup walnuts, toasted

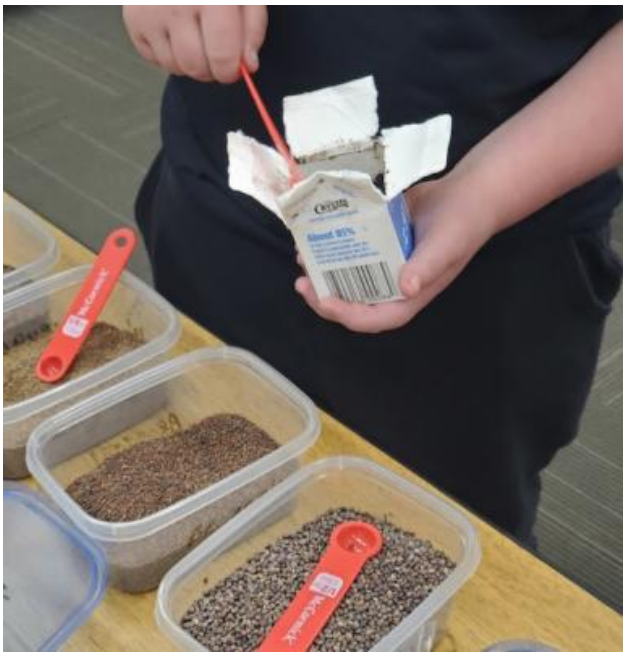
- 1 cup watercress microgreens, tightly packed
- 1/4 cup parmesan cheese, grated
- 2 cloves garlic
- 1/3 cup olive oil
- Salt and pepper to taste
- 1 tablespoon lemon juice
- 2 tablespoons cream cheese (optional for a creamier filling)

Instructions:

1. Make the Watercress Microgreens Pesto (or watch video):
   - In a food processor, blend the watercress microgreens, walnuts, parmesan cheese, garlic, and lemon juice until coarsely ground.
   - While the processor is running, gradually add the olive oil until the mixture becomes smooth. Season with salt and pepper to taste. For a creamier texture, blend in the cream cheese.
2. Prepare the Chicken:
   - Preheat your oven to 375°F (190°C).
   - Butterfly the chicken breasts to create a pocket. Season both sides with salt and pepper.
   - Stuff each chicken breast with the watercress microgreens pesto, then secure the opening with toothpicks.
3. Cook the Chicken:
   - Heat a skillet over medium heat and sear the chicken breasts for about 2 minutes on each side until golden.
   - Transfer the skillet to the oven and bake for 20-25 minutes or until the chicken is cooked through.
4. Serve:
   - Let the chicken rest for a few minutes before slicing.
   - Serve with a side of roasted vegetables or **a light-grain salad** for a complete meal.



Master Gardeners news: Teaching students to grow microgreens; Grow-Your-Own Festival



Read how UCCE Master Gardeners of Lake Tahoe (LTMG) taught microgreen cultivation to **third graders at local schools** and hosted the Grow-Your-Own Festival to promote edible gardening.

Microgreens, rich in nutrients, are easy to grow and can be cultivated using various media.

This educational initiative aims to raise awareness about the health benefits of microgreens and involve the community in gardening activities. The festival offers seedling sales and gardening demonstrations, fostering community engagement and knowledge sharing on sustainable gardening practices. Overall, by **educating the community**, particularly students, about microgreens, the initiative promotes **healthier eating habits** and environmental stewardship. [South Tahoe Now, 2024-04-03]

Mighty Microgreens: Jackie Grow gardens in her garage

Jackie Grow, an Erie, Michigan resident, has ventured into the realm of microgreen farming within her garage, focusing on hydroponic systems—a soilless cultivation method using water-based nutrient solutions.

With a **background in horticulture landscape** and design from Michigan State University, Grow started this endeavor as a hobby, which has since evolved into a **home-based business** named "Jackie Grows Plants."

Her operation is geared towards producing a variety of microgreens, recognized for their enhanced vitamin and mineral content compared to their mature counterparts.

Grow's initiative also aims to provide a healthy dietary option for herself, her husband, and the broader Monroe community.

She **actively participates** in the Monroe Farmers Market, offering a range of microgreens that include both spicy and basic salad mixes, broccoli, and others. The microgreens, packed with potent flavors and nutritional benefits, are intended for consumption within a week of purchase.

Grow has found success and developed a **loyal customer base** within her first year at the market, signaling a positive reception to microgreens in her locality. Monroe News 2024-03-28

How A Woman From Lutsk, Ukraine, Started Her Own Business

Meet Oksana Cheremisina from Lutsk, who transitioned from **working in a greenhouse** to starting her own microgreens business. Cheremisina shared that her journey began when she decided to **lose weight** and started consuming microgreens. Encouraged by her husband, she began growing them herself.

Despite facing challenges during a period away from the business, they quickly regained momentum due to high demand, particularly during times of food scarcity.

Cheremisina's business growth allowed her to **employ additional staff** and expand her offerings to include edible flowers and vitamin juice.

Oksana underscores the benefits of microgreens for weight loss, highlighting their **nutrient density**, **low-calorie content**, and role in promoting healthy eating habits. Volyn News, 2024-03-14.

The Featured Article

Root Hairs? Mold? How Can I Tell?

This week, I spent a bit more time answering questions on Reddit than I usually do. Why? There were so many questions, from people learning to grow microgreens, about whether the photos they were sharing were root hairs or mold.

Secret #2: Root Bubbles

As the microgreens grow, the body of the roots becomes covered with tiny bubbles of air, preventing the entrance of water. That is why we water the microgreens from the bottom, not the top. The feeding roots are at the base of the container.

FIGURE 1 COURTESY: KRZYSZTOF ZIARNEK, KENRAIZ - CARDUS UTANS (SEEDLING)

So, in this week's section on Cultivation Techniques, I want to share some good agricultural practices (GAP), whether you're a gardener or grower or you just bought your first microgreen growing kit. And if you are a consumer, there are some things you should be asking if you are buying locally.

Root Hairs

I have not written much about root hairs except in my book "Children of the Soil." Water is essential to plant life and growth. Water moves sideways towards root hairs and upwards from below as the plant's demand increases, either through growth or **evaporation**. Here is an excerpt from my book:

Roots gather food for the microgreens. We find the other elements free in the soil or in various combinations, and it is the business of the roots to go out and gather them in. Root structures are like the structure of branches and leaves. They grow by cell multiplication at the tips. They form a network that pushes its way, searching for air and water that contains nutrients.

> Covering the smallest rootlets are millions of microscopic hairs—tiny thread-like filaments called root hairs.

These growing rootlets and root hairs absorb water and minerals solution at their tips.

Now you know just enough about the functions and habits of the roots to understand how interesting and important they are to growing microgreens.

By knowing the root movement, when you water microgreens, you will know where they want water.

However, the roots are not only **food providers** of the plant, they are the **water carriers** as well.

You supply the water, and these workers gather the raw material, build canals, and supply the water for the food factory.

Without water, nutrients cannot get inside the microgreen plant. The roots are the only way in.

Mold

In my post, "Proper Microgreens Airflow: Without it, They Wilt and Mold," I talk a lot about mold and preventing it. This was back in early 2019 when we started to scale our business. We learned that even though the room was cool, it was drier than the environment inside the microgreens' cells!

Plants emit water vapor throughout the day, which increases the humidity. Moisture was leaving the microgreen cells and moving into the air in the room. The process, called transpiration, was what was causing the microgreens to dehydrate and wilt.

Not only did we have to control the **temperature**, but we also had to control the **high humidity**.

So, we decided to turn off the air conditioning vent and get a dehumidifier, like this one from Amazon.

And this time, we decided to create a "real" microgreen indoor grow room. We bought some panda plastic film to cover the walls. We got a 5.5 Mil 10′ x 100′ roll from Amazon.

What we learned was **mold is in the air around us**. Mold can **remain dormant within an extensive range of temperatures**.

It starts growing when it has a food source and air that is **moist, warm, and not circulating**.

If not controlled, most temperatures above 70oF will cause their rapid growth. Also, because of the water in the room for growing the microgreens, the humidity was closer to 70%. After germination, it took us weeks to keep the humidity **between 50 and 55%**.

We lost a lot of crops to mold and some to root rot. It was a balancing act as the dehumidifier pulled water from the surrounding air and returned it back dry.

Here's what you can do differently.

===

Here are a few guidelines and some good advice from the Product Safety Council.

Clean equipment isn't necessarily sanitary. Cleaning and sanitizing are two distinct steps for ensuring that your microgreens are safe to eat. First, we clean, and then we sanitize our equipment, tools, and surfaces before using them and reusing them.

- Cleaning removes soil and plant matter from tools like cutters and storage equipment like trays. Use detergent to scrub them and rinse with clean water.
- Sanitizing treats an already clean surface to destroy harmful microorganisms and prevent their transfer to the microgreens. We need to choose a sanitizer that is "food safe." Hydrogen Peroxide (H_2O_2) is the most commonly used in small microgreen farms.

So, what I do, and I encourage everyone who grows, is to create an **SOP** or standard operating procedure. It can be as simple as a **10-step checklist**. You do this before every planting and keep a record. When you do this, you are following GAP or good agricultural practices, and you keep yourself and your customers safe.

We can use food grade H_2O_2 to:

- Sanitize
- Treat Water
- Spray on Produce (before seeding, during growing, and at harvesting)

We can use H_2O_2 to clean metal and polymeric plastic food surfaces with a 35% solution to kill microbes and bacteria. The solution should contain no more than 35% H_2O_2. So here, this would be 1 part H_2O_2 to 3 parts water (H_2O), for example.

> For treating roots, water, seeds, and leaves, we use a lower concentration, 3-5%.

However, a 12% H_2O_2 solution is not the same as a 3-5% solution. And not all products/brands are the same. But 2-3 tsp (0.33-0.5 fl oz) per gallon of H_2O is in the "safe zone."

Take an H_2O_2 product with, say, 22% hydrogen peroxide. The label might say, "Use 0.8-1.6 fl. oz. of this product per five gallons of clean water" to treat your harvest. **0.8-1.6 fl. oz. is 4.8-9.6 teaspoons. So, that's 1-2 teaspoons per gallon or 1/4 teaspoon for a 16oz sprayer.**

So know the concentration, and when cleaning and sanitizing, READ THE LABEL!

If you go here: [PSA EPA-Labeled Sanitizers for Produce (cornell.edu)], you will find a list of EPA-approved cleaners and sanitizers. They are a little pricy, but a good investment for the long run. Most are a 15% or 22% solution. But in my book, [Children of the Soil], I show you how to use good old CVS H_2O_2, which is a 3% solution and $2.39, I think. So, no mixing; pour some into a little spray bottle.

So now you know and can spot root hairs, tell the difference between them and mold, and how to prevent and treat mold. All the best, and keep practicing GAP. It pays off in the long run.

Researchers Achieve Significant Reduction of Mycotoxins on Grains Using Cold Plasma Treatment

The University of Alberta researchers have developed a method using atmospheric cold plasma (ACP) technology to significantly reduce **mycotoxin contamination** in grains, specifically barley and wheat.

Mycotoxins are harmful compounds found in agricultural commodities, posing risks to human and animal health. The ACP treatment reduced levels of two prevalent mycotoxins, zearalenone and deoxynivalenol, by 54 percent. This technology is rapid, chemical-free, and sustainable, with potential applications in various food safety sectors.

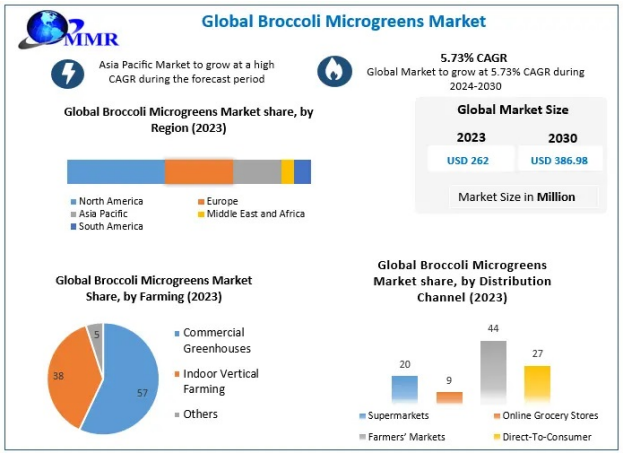
Now, how does this relate to microgreens and microgreen seeds?

While the study focuses on grains, the principles of cold plasma treatment could potentially be applied to microgreen seeds to reduce mycotoxin contamination (*Yangjin Jung, 2023*), ensuring safer and healthier microgreen production.

Additionally, the plasma-steeping technology developed for barley malting could have implications for **microgreen seed treatment**, potentially improving seed germination rates and overall crop quality. Further research and adaptation of this technology could benefit

the microgreens industry by enhancing food safety standards and crop yield. [Food Safety Magazine, 2024-03-29]

Farmers' Markets are Still The Best Channels To Build Your Microgreens Business



The Broccoli Microgreens Market, valued at USD 262 million in 2023, is forecasted to grow at a 5.73% CAGR to USD 386.98 million by 2030. This growth is propelled by **increasing health consciousness** and the surge in the popularity of **nutrient-dense foods** among consumers. Broccoli microgreens, rich in vitamins C, K, A, potassium, and iron, are becoming a staple for health-focused diets, recognized for their nutritional benefits and muscle-building protein content.

Urban agriculture's rise and the **culinary industry's embrace** of microgreens for their vibrant colors, tender texture, and concentrated flavor contribute significantly to the market's expansion.

The **ease of cultivating** these greens in small indoor spaces has made them a favorite among small-scale growers and specialty farms, responding to the demand for locally sourced, sustainable food options.

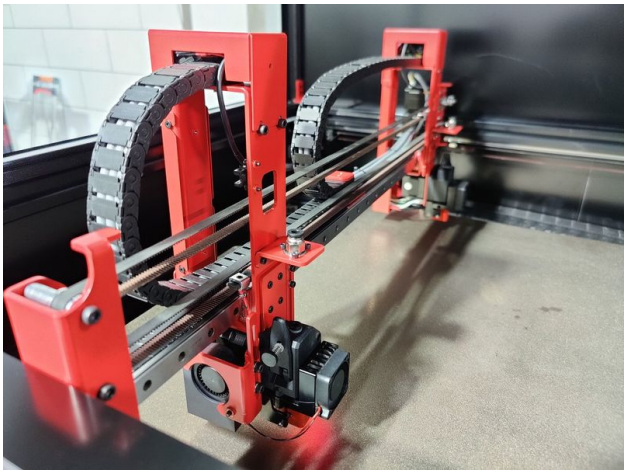
Despite challenges like perishability and market fragmentation, the market is ripe with **opportunities for differentiation** through innovative packaging, quality control, and strong distribution networks.

The **distribution through Farmers' Markets** remains crucial, offering a direct connection between growers and consumers and reinforcing the value of fresh, locally produced, and sustainable food choices.

> It also should encourage you, if you are looking to sell commercially, that the farmers' market channel is still the best bet for growing your microgreens business.

Advancements in indoor and vertical farming are expected to improve production efficiency, ensuring a consistent, year-round supply. The Broccoli Microgreens Market's future looks promising, with potential for new hybrid varieties and increased grower-researcher collaboration to enhance yield and taste, catering to the expanding consumer awareness of microgreens' benefits. MMR Market Research 2024-04-01

An Innovative Startup Looking for Funding



If you're anywhere near Bristol, England, then check out **Simply Grow Ltd**, "our aim is to revolutionize microgreens production by leveraging innovative technology and sustainable farming practices."

Simply Grow Ltd aims to **revolutionize microgreens production** using innovative technology and sustainable farming practices. Microgreens,

packed with nutrients and flavor, face challenges in traditional farming due to space constraints and unpredictable weather. Simply Grow's solution involves **3D printing technology** and **hydroponic farming** methods, maximizing space efficiency, conserving water, and ensuring year-round production of high-quality microgreens.

Their system utilizes **vertical farming techniques** to maximize space and a **closed-loop water recirculation system** to minimize water usage. By controlling environmental factors, they ensure consistent quality and yield regardless of seasonal variations. Moreover, their approach is eco-friendly, eliminating the need for soil and pesticides while reducing carbon emissions.

Supporting Simply Grow means investing in a more sustainable future. Contributions will enhance product development, scale up manufacturing, boost marketing efforts, provide education and training, and create job opportunities.

Backers receive rewards like exclusive access to products, recipe e-books, starter packs, personalized grow kits, subscription boxes, VIP tours, and even customized hydroponic systems.

Join Simply Grow in revolutionizing microgreens production and promoting sustainable agriculture. Together, we can make a tangible difference, one microgreen at a time. CrowdFunder UK, 2024-04-01

Farm-to-table food in Las Vegas: Frontier Farms opens farmers market at indoor warehouse

A new farmers market has opened at Frontier Farms in Henderson, Las Vegas. Previously an indoor farm supplying retailers and restaurants, the site now offers direct sales to customers.

The market features a variety of farm-fresh herbs, microgreens, and edible flowers, appealing to locals seeking homegrown alternatives.

Notably, the farm aims to **address issues of food deserts** by providing locally sourced food, aiming to reduce reliance on imported goods.

Prices are competitive, with fresh-cut salads notably cheaper than traditional grocery stores, emphasizing the benefits of **pesticide-free, locally grown ingredients**. [KTVN News 13, Las vegas, 2024-04-01]

Learn all the important aspects of growing through organic hydroponics.

Instructor: M.S. Karla Garcia

- Master in Plant Sciences from The University of Arizona
- Recognition by ISHS in strawberry hydroponic research
- Editor: Book Roadmap to Growing Leafy Greens and Herbs
- CEO at Microgreens FLN

REGISTER

Brought to you by **Doc Green**, Andrew Neves' personally trained AI assistant. "You may ask me anything about microgreens."