

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.

Recipe of the Week: Ultimate Microgreens Detox Drink

This Week: Monday, April 22, 2024

Unlock Your Green Thumb: Innovative Microgreens Growing Kits!”

The future of indoor gardening is in hydroponic growing's role in urban settings. Hydroponic systems' space-saving nature and health benefits offer fresh, organic produce without soil.

If you are starting out with microgreens and want to get a feel for growing them, then check out the article:



[Best Microgreens Growing Kits in 2024 – A Comprehensive Review & Buyer's Guide.](#)

In our review of the best microgreen growing kits in

2024, we found the [HAMAMA kit](#), with its organic and easy-to-grow seeds, to be exceptional.

It is designed for small spaces and equipped with AI assistance for successful growth.

We underscore the potential of hydroponics in diversifying diets with various crops, including microgreens.

Hydroponic gardening is a sustainable and accessible solution for urban dwellers to grow their own nutritious food indoors.



Bem-vindos aos meus amigos no Brasil!

Pink Farms: The Largest Indoor Vertical Farm in South America

Pink Farms, the first vertical farm in **Sao Paulo, Brazil**, adapted to the challenges posed by the coronavirus pandemic by shifting its sales online and introducing a new product line, **microgreens**.

Established in a city where space is limited and produce typically needs to be imported, [Pink Farms](#) utilizes soil-less growing technology, a water-recycling irrigation system, and pink LED lights to yield significantly more food with less water than traditional farming.

Founded in 2018 by engineer Gerardo Maia and his colleagues, the farm initially supplied fresh produce to local restaurants. However, the pandemic and subsequent lockdowns forced them to find

alternative business strategies. Despite the difficulties, Maia remains optimistic about vertical farming as a sustainable alternative to traditional methods, especially in the context of Brazil's environmental challenges.

He emphasizes the benefits of reduced transportation pollution and the absence of toxic chemicals in their produce.

[Dhaka Tribune, 2024-04-21](#)

***Asia Pacific Indoor
Farming Market 2032
Expected Development,
Share, Demand, and Study
of Key Players***

The “Asia Pacific Indoor Farming Market” report by Report Ocean predicts a significant growth in indoor farming from 2024 to 2032.

Indoor farming is becoming more popular because it helps

grow food inside buildings using technologies like vertical farms and hydroponics. This is important as more people live in cities and there's less farmable land.

The report thinks the market will grow by **14.2%** every year because:

- More people need more food.
- There's less land to grow food outside.
- Indoor farming can happen all year round, no matter the weather.
- Governments and businesses are spending money to support it.
- People want to eat healthier, especially since COVID-19.

Key benefits of indoor farming include:

- It doesn't use much land.
- It can be close to where people live, which means fresher food with less transport.

- It's good for the environment because it uses less water and doesn't need pesticides.

The report also talks about different types of crops grown indoors, including **microgreens**.

Microgreens are perfect for indoor farming because they increase in size and don't need much space.

In short, indoor farming is seen as a future solution to help sustainably feed more people, with benefits like less use of land and water, and it's perfect for growing small, nutritious crops like microgreens. [Ocean Report, 2024-04-19](#)



Sulforaphane: The Secret Superpower of Red Cabbage Microgreens

Sulforaphane is a remarkable compound found in **red cabbage** and other cruciferous vegetables, and it has caught the attention of scientists for its health benefits.

Imagine your body as a city and **sulforaphane** as a superhero protecting it from villains like diseases and pollutants. It acts like a shield, **defending your cells and DNA** from damage that could lead to serious health problems.

But how do we know about sulforaphane's superpowers? Through research!

Red cabbage is known for its high vitamin and mineral content, as well as its **antioxidant** properties, particularly **sulforaphane**.

Sulforaphane has been linked to various health benefits, including **anti-cancer** and **anti-arthritis** effects. The sulforaphane content in microgreens, which are young plants, is higher than in mature vegetables. Proper planting media and nutrition are essential for high production and improving the sulforaphane compound in microgreens.

This new research discusses the effects of planting media and nutrition solutions on the growth and sulforaphane content of red cabbage microgreens.

The findings have important implications for the production of microgreens as a functional food for disease prevention through biofortification, something I discuss in my article

[Microgreens or Biofortification: The Race to Feed the World.](#)

Methods

The research used a completely randomized design (CRD) with two factors: *nutrition solution and planting media*. The nutrition solutions tested were **mineral water** and **young coconut water**, and the planting media were **rock wool**, **tissue paper**, **cocopeat**, and **vermiculite**. There were eight treatment combinations with three replications, resulting in 24 units. The height, fresh weight, and sulforaphane content of the microgreens were observed.

Results

The results showed that planting media and nutrition solutions had **significant effects** on the height, fresh weight, and sulforaphane content of the microgreens. The combination of vermiculite as a planting medium and young coconut water as a nutrient solution could increase the growth of

microgreens. Using **cocopeat** in combination with **young coconut water** raised the sulforaphane content of microgreens.

The amount of sulforaphane increased by two-fold with the use of cocopeat and young coconut water.

Growing Methods and Sulforaphane in Disease Prevention

The findings of this research suggest that the combination of cocopeat and young coconut water can significantly enhance the sulforaphane content of red cabbage microgreens. This is important because sulforaphane has been shown to have anti-cancer and anti-arthritis effects. The use of cocopeat as a planting medium provides a suitable environment for the growth of microgreens, as it has good water retention and

aeration properties. Young coconut water is rich in amino acids, including methionine, which is a precursor for sulforaphane production. The combination of these two factors can increase the sulforaphane content in red cabbage microgreens, making them a potentially valuable food source for disease prevention.

Conclusion

The use of **cocopeat** as a planting medium in combination with **young coconut water** as a nutrition solution could **enhance** the amount of **sulforaphane** in red cabbage microgreens. There was a **two-fold increase** in sulforaphane content when using cocopeat with young coconut water in red cabbage microgreens.

T Septirosya, et al. "Sulforaphane Content Enhancement of Red Cabbage Microgreens by Using Different Planting Media and Nutrition Solution." IOP Conference Series. Earth and Environmental Science, vol. 1302, no. 1, IOP Publishing, Feb. 2024, pp. 012016–16, <https://doi.org/10.1088/1755-1315/1302/1/012016>.

Recipe of the Week: Ultimate Microgreens Detox Drink

Red cabbage is complemented well with citrus, nuts, garlic, shelling beans, mushrooms, ginger, fennel, shallots, apples, avocados, farro, quinoa, meats such as chicken, beef, and sausage, eggs, cheeses, and even light-bodied vinegar.

Yes, you have many options to enjoy your **red cabbage microgreens** with.

What do red cabbage microgreens taste like? It tastes similar to mature cabbage, but the taste is much **milder**. This is a good thing, as many people are not keen on the tang that cabbage can leave in your mouth. In fact, red cabbage microgreens have a much **sweeter** taste and are **crunchy**.

In addition to salads, cabbage microgreens make for healthy juices.

Red Cabbage Microgreens & Kiwi Kale Juice Boost!



Ingredients:

- 1 cup red cabbage microgreens

- 2 ripe kiwis, peeled and quartered
- 1 cup kale leaves, stems removed (about 2-3 large leaves)
- 1/2 cup cold water (optional for adjusting consistency)
- 1 tablespoon fresh lemon juice (optional for added zing)
- Ice cubes (optional for serving)

Instructions:

1. **Prepare the Ingredients:**

Start by thoroughly washing the red cabbage microgreens and kale leaves under cold water. Pat them dry with a clean kitchen towel or use a salad spinner to remove excess moisture.

2. Blend the Greens: In a powerful blender, add the red cabbage microgreens and kale leaves. Blend on high speed until the greens are finely chopped and begin to form a smooth mixture. If your blender struggles with leafy greens, you

can add a small amount of cold water to help it along.

3. Add Kiwis and Lemon Juice: Add the quartered kiwis and lemon juice (if using) to the blender. Blend again at high speed until the mixture is smooth. Depending on the ripeness and sweetness of your kiwis, you can adjust the amount of lemon juice to balance the sweetness and tartness to your liking.

4. Adjust Consistency and Taste: If the juice is too thick for your liking, you can add a bit more cold water to reach your desired consistency. Give the juice a taste and adjust the lemon juice, or even add a small amount of natural sweetener if needed.

5. Serve: Pour the juice into a glass over ice cubes (if desired) and serve immediately to enjoy its freshness and nutritional benefits.

Nutritional Note:

This juice combines the health benefits of red cabbage microgreens, which are rich in vitamins C and E, beta-carotene, **sulforaphane**, and other antioxidants, with the fiber and vitamin K found in kale and the vitamin C and dietary fiber from kiwis. It is a refreshing and nutrient-dense drink, perfect for refreshment on a warm day.

Enjoy your healthy and refreshing juices!

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The Featured Article

Growing Under Green Light Can Increase Nutrients?



After I publish your newsletter every Monday morning, I head over to Reddit to answer questions in the **r/microgreens** subreddit.

This week, I **commented** on one topic in particular.

“Should I go with more blue light (9000k) or more red light (5000k), or is there a balance I should get? What is the ideal spectrum for growing microgreens?”

What started as some quick advice turned into a fascinating and informative conversation with **SuperAngryGuy**.

SAG, as he is affectionately known, challenged me on the statement below.

“Microgreens require ample light for healthy growth. The best light for microgreens is full-spectrum, mimicking natural sunlight. Focusing on wavelengths of blue (440-470nm) and red (640-680nm) is crucial for photosynthesis. Light intensity, measured in photosynthetic photon flux density (PPFD), should be around 200-400 $\mu\text{mol}/\text{m}^2/\text{s}$. A photoperiod of 12-16 hours daily is recommended for optimal growth. You can read more here: [Shedding Light on Microgreens: A Comprehensive Guide to Microgreens Lighting Requirements](#).”

I was more focused on the content, but it turns out that SAG was challenging me on the use of the word “crucial” when referring to red and blue light for **photosynthesis**. He was very critical, and rightfully so, “about what is “essential” and “crucial.” He also brought up the point of **green light** in photosynthesis.

Turns out SAG is the moderator for **r/HandsOnComplexity** on Reddit and has done extensive writing and experiments on plant light. While not focused on microgreens, his work is exceptional and beneficial. Plus, I dared him I would cite his work (LOL).

SuperAngryGuy. SAG's Plant Lighting Guide Linked Together. 1 Feb. 2013, www.reddit.com/r/HandsOnComplexity/comments/17nxhd/sags_plant_lighting_guide_linked_together/. Accessed 18 Apr. 2024.

His comments sparked my interest as I could find very few studies on **microgreens and green light**. Here are some notable studies that may be of interest if you're a gardener or commercial grower:

The inclusion of green wavelengths (500–600 nm) to red and blue light promotes the growth (dry weight biomass) ([Kim et al., 2004](#); [Mickens et al., 2018](#)) and the accumulation of bioactive phytochemicals in different species ([Orlando et al., 2022](#)). Microgreens grown under green light displayed higher nutrient content compared to those grown under red and blue light only ([Gerovac et al., 2016](#)). In addition, mineral accumulation was shown to be stimulated by the inclusion of green light in the red and blue recipe. For example, mustard microgreens accumulated 26%, 13%, and 10% more K, Ca, and B, respectively, when grown under a light ratio of R74:G18:B8 compared with those grown under R84:FR7:B9 ([Gerovac et al., 2016](#)). Broccoli microgreens responded with higher nutrient concentration and better yield under RGB light compared to different ratios of red and blue ([Kopsell et al., 2014](#)).

- Garegnani, Marco, et al. "Non-Destructive Real-Time Analysis of Plant Metabolite Accumulation in Radish Microgreens under Different LED Light Recipes." *Frontiers in Plant Science*, vol. 14, Frontiers Media, Jan. 2024, <https://doi.org/10.3389/fpls.2023.1289208>.
- Carvalho, S. D., Folta, K. M. (2016). Green light control of anthocyanin production in microgreens VIII Int. Symposium Light Horticulture. *Acta Hort.* 1134, 13–18. <https://doi.org/10.17660/ActaHortic.2016.1134.2>
- Kong, Y., Zheng, Y. (2020). Growth and morphology responses to narrow-band blue light and its co-action with low-level UVB or green light: A comparison with red light in four microgreen species. *Environ. Exp. Bot.* 178, 104189. doi: [10.1016/j.envexpbot.2020.104189](https://doi.org/10.1016/j.envexpbot.2020.104189).
- Orlando, M., Trivellini, A., Incrocci, L., Ferrante, A., Mensuali, A. (2022). The inclusion of green light in a red and blue light background impacts the growth and functional quality of vegetable and flower microgreen species. *Horticulturae* 8 (3), 217. doi: [10.3390/horticulturae8030217](https://doi.org/10.3390/horticulturae8030217)

LED Grow Lights by Handy Pantry



 Buy at True Leaf Market

I opened a discussion on ResearchGate, hoping to get some interest. We'll see.

What I do know about growing microgreens and light are the **four basic things** that go into producing **optimal growth** of microgreens:

- **Light Level** (amount of light in $\mu\text{mol}/\text{ms}^2/\text{s}$)
- **Light Spectrum** (which is microgreens-specific. High red content for high efficiency)
- **Uniformity** (Uniform light levels across the crop for consistent growth)
- **Time** (the moment of switching on/off; Amount of hours per day)

In the coming weeks, at Microgreens World, we will be conducting experiments on green light in growing microgreens.



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Boost Your Microgreens with Light and CO₂: Surprising Growth Secrets Unveiled!



Microgreens you sprinkle over your salad aren't just cute; they're a super quick and valuable crop for indoor farmers. But how do you get the most out of these little plants?

Researchers dove into this question by experimenting with three microgreen types: spicy **arugula**, mild **mizuna**, and

tangy **mustard**. They wanted to see if playing around with **light levels** and **carbon dioxide (CO₂)** could really make a difference in growth.

It turns out that **light and CO₂ are secret ingredients** for microgreens! The researchers changed the amount of light (measured in something called “daily light integral”) and increased CO₂ levels from what you'd typically find in the air to a much higher amount. They watched how these changes affected the microgreens' growth, their height, and how quickly they were ready to harvest.

For **arugula**, more light meant a lot more growth, but only up to a point. Mizuna and mustard kept beefing up as the light increased. And all three kinds of microgreens grew better with more CO₂, to the point where a bit more CO₂ could even make up for less light.

So, what's the **big takeaway**?

While microgreens don't need as much light as full-grown veggies, giving them more light and CO2 can lead to bigger, quicker harvests.

This info is golden for growers looking to get the most out of their indoor farms without breaking the bank on energy costs. Time to shine a light on microgreens and watch them grow like never before! [E-Gro Edible Alert, Vol 9, No. 4 April 2024](#)

From Living Room to Lush Farms: Courage to Grow Farms



In 2018, a couple from Hillyard, Phillip Moore and Shaneese Dunigan, embarked on an incredible journey that started right in their living room. They began with just **10,000 sprouts of microgreens** and a dream to farm differently.

Inspired by the power of social media and a book called "The Urban Farmer," they decided to try small-scale farming. They first grew microgreens in their kitchen and quickly gained popularity by **connecting with local chefs and farmers' markets**. This success led them to expand outdoors and start farming on borrowed plots around Spokane.

[Courage to Grow Farms](#), the brand they created, focuses on sustainable agriculture. They don't use traditional farming equipment like tractors; instead, they employ eco-friendly methods like water retention and no-till farming. Their

approach also includes turning waste into valuable resources.

The farm operates under a model called [Community Supported Agriculture \(CSA\)](#), where the community funds the farm upfront in exchange for a supply of vegetables. This model has helped them and their mission to inspire and support more small-scale farmers.

The couple also engages with **local schools** to educate kids about the benefits of small-scale farming, highlighting how nutrient-rich microgreens are. They respect large agriculture businesses but believe in the importance of **community-supported**, sustainable farming. Currently, they manage eight small-scale farms and a homestead, advocating for the integration of small-scale farming in various community spaces.

Their story is not just about farming but about building a healthier, happier community through sustainable practices. [The Gonzaga Bulletin, Spokane, WA, 2024-04-18](#)

FDA Food Safety Rules and How It May Impact Microgreens Growers



Responding to the proposed FDA Rule update, [Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption Relating to Agricultural Water](#), a group of volunteers from members of the International Fresh Produce Association (IFPA) Food Safety Council, IFPA has published an [industry](#)

guidance on preharvest agricultural water.

This rule primarily focuses on standards for agricultural water concerning covered produce other than sprouts. While it doesn't directly address sprouts and microgreens, it underscores the broader concern for food safety across various types of produce.

However, as sprouts and microgreens are also considered to produce, adherence to standards for agricultural water could indirectly impact their safety by mitigating potential contamination risks.

Specifically, the rule aims to minimize the risk of severe adverse health consequences or death by setting standards for agricultural water that apply to covered produce other than sprouts.

Thus, by enhancing overall food safety practices, including those related to water quality, the rule indirectly contributes to the safety of sprouts and microgreens along with other types of produce.

The materials are intended to help stakeholders comply with the U.S. Food and Drug Administration's (FDA's) Food Safety Modernization Act (FSMA) Produce Safety Rule (PSR), Subpart E requirements for agricultural water.

While sections of the rule relating to preharvest agricultural water were under revision by the FDA during the preparation of the guidance document, the resulting briefs and other communications rely on scientific evidence that is applicable to many different cropping systems, recognizing that **the rule is relevant to**

any produce that is likely to be consumed raw, regardless of where or how it was grown.

Learn all the essential aspects of managing fertilizers and plant nutrition.



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**

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