

Microgreens as Functional Food

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Plants that lie in between a sprout and a baby green are called microgreens. They are the edible plant seedlings that are harvested 7–14 days after sowing, or when the first genuine leaves appear. Microgreens, are also termed as “vegetable confetti” as they are derived from a variety of commercial food crops, including herbs, grains, and vegetables, which have completely grown cotyledons and either partially or fully blown true leaves. These sensitive young greens are attractive because of their variety of colours, textures, aromas and flavours. These are considered the next wave of “superfoods” or “functional foods” due to the numerous health-promoting phytonutrients that can be detected in them, such as antioxidants, vitamins, minerals, phenolic compounds, and many others. They are considered as functional foods and appreciated as a source of raw meals by picky vegans who eat only nutrient-dense foods. Microgreens have an extremely uncommon growth pattern in that they can be grown in restricted spaces without the need for professional maintenance, allowing anyone to adapt them without requiring a large amount of land. Growing microgreens in these areas could provide a balanced diet for those who live in isolated and higher altitude areas where access to fresh veggies could be severely hampered by transportation. People's focus has shifted from these items to the safe, biological processes of microgreen cultivation and harvesting due to the long-term toxicity of fruits and vegetables cultivated utilizing present farming practices.

Microgreens possess a high concentration of nutrients despite their small size. The reason behind this could be the process of germination, which includes numerous metabolic processes and the synthesis of nutrients from scratch, from dry seeds to developing plants. Both the protein content and the ratio of necessary amino acids may rise when the seeds sprout and grow into seedlings. Compared to mature greens or seeds, microgreens offer higher concentrations of functional components including vitamins, minerals and antioxidants. This is only one of the numerous advantages microgreens have over mature greens. Microgreens are a great idea for growing in space because of their short growing season and high nutritional value, which came about



as a result of extensive research and observation of astronauts to learn about the adaptation of human life in space. Due to their constant travel and exposure to a variety of climatic conditions, astronauts are claimed to suffer from a number of health problems, including psychological stress, eye health problems, impairments to their central nervous systems, weight loss from a lack of nutrient-dense diet and more. They looked at the different factors that influence microgreen growth and the potential for optimizing them for improved outcomes in an effort to address these deficiencies. The research found that under specific conditions, microgreens may be cultivated for astronauts to fulfill their dietary needs.

Many types of regularly grown vegetables are employed to raise microgreens from different families, like Amaranthaceae (amaranthus, beet, quinoa, spinach, buckwheat, chard), Amaryllidaceae (garlic, onion, leek), Asteraceae (lettuce, radicchio, chicory, endive, tarragon, common dandelion), Brassicaceae (radish, watercress, arugula, broccoli, cauliflower, cabbage, chicory, wild-rocket), Cucurbitaceae (melon, cucumber, squash), Leguminosae (chickpea, alfalfa, bean, green bean, fenugreek, fava bean, lentil, pea, clover), Amaranthaceae (amaranth, beet, quinoa, spinach, buckwheat, chard), Amaryllidaceae (garlic, onion, leek), Poaceae (corn, lemongrass, rice, wheat, barley), Lamiaceae (chia) and Portulacaceae (common purslane, moss-ross purslane). Depending on the kind, microgreens might have a flavour that is mildly acidic, peppery, neutral or even bitter.

How to incorporate microgreens into our diet

Microgreens have a high nutritional content and may even lower chance of various disease. There are various ways by which we can add them to our diet as it can be consumed raw or with various warm and cold dishes.

- Adding microgreens to the noodles will enhance flavor, texture and its nutritive value.
- They can be used in a number of recipes, such as salads, wraps and sandwiches.
- Another choice is to add them as garnish to warm dishes like curries, omelettes, soups and pizzas.
- Microgreens can also be juiced or mixed into smoothies or protein shake drinks. One well-known type of juiced microgreen is wheatgrass juice.
- It can be used to stir fry dishes.

Health benefits of microgreens

Despite their diminutive size, these little greens are packed full of potent vitamins, minerals, and other health-promoting ingredients. Their consumption as foods helps in the prevention of diet-based diseases like obesity, diabetes 2, cancer and heart diseases.

- **Microgreens can support gut health:** Consuming foods high in dietary fibre, such as microgreens, as part of a nutritious, well-balanced diet, can help alleviate constipation and other digestive issues. Studies also reveal that dietary fibre functions as a "prebiotic," meaning that it creates an environment that is perfect for the "good" bacteria in the human microbiome to thrive in.
- **Microgreens are known to reduce blood pressure:** Foods strong in fibre and vitamin K, together with other vitamins and minerals, can assist to maintain a healthy blood pressure. Microgreens are rich in these two essential nutrients.
- **Prevent Alzheimer's disease:** Plant-based compounds called polyphenols have antioxidant qualities. There are numerous health benefits associated with microgreens. Based on scientific research, polyphenols may enhance cognitive function, including thinking and reasoning, and may even prevent or postpone the onset of neurodegenerative disorders like Alzheimer's disease.

- **Reduce the chance of heart disease:** A lower risk of heart disease has also been connected to polyphenols. More precisely, laboratory research indicates that the addition of red cabbage microgreens to a high-fat diet lowers body weight, triglycerides, and LDL (bad) cholesterol, all of which are heart disease risk factors.
- **Lower the chance of anaemia:** The most common cause of anaemia worldwide is iron deficiency. Iron-rich microgreens include lettuce and members of the Brassicaceae family. Yet research indicates that the microgreens made from fenugreek have the highest iron content.
- **Reduce the chance of heart disease:** Microgreens from the Brassicaceae family contain sulforaphane. Cancer protection is just one of sulforaphane's numerous health advantages. According to research, using microgreens from the Brassicaceae family in a balanced diet may help stop, prevent, or even reverse the progression of cancer. According to one study, this family of microgreens is particularly helpful in avoiding colon cancer.
- **Keep your eyes safe:** Strong antioxidant lutein is abundant in microgreens such cress, dandelion, spinach, and broccoli. It could be especially beneficial for eye health in older adults. Studies suggest that lutein may help prevent age-related macular degeneration.
- **Prevention of type 2 diabetes:** Individuals who have Type 2 diabetes are unable to regulate the level of sugar, or glucose, in their blood because their cells do not eliminate sugar from the blood as they should. However, microgreens can support blood sugar regulation.

Cultivation of microgreens

Microgreens are simple to cultivate in little spaces and to grow. They can be cultivated in soil or soilless media, inside or outdoors, and in natural or artificial light sources. Growers can cultivate microgreens on a small scale in their kitchens or on a larger scale in industrial production systems for commercial purposes. The most common way to raise microgreens is in greenhouses using growing flats filled with potting mixes, peat-based mixes, hydroponic growing media, or even recycled textile fibre mats. A large amount of neutral to slightly acidic water is needed for their production. Certain types of

seeds that are soaked for the entire night promote germination. During germination, flats can be covered or kept in a low light environment. The plants are watered every day and exposed to light after about three days, or until the first set of genuine leaves appear. The development and breakdown of phytonutrients in microgreens may be significantly impacted by aspects of cultivation, harvesting, and postharvest treatment.

Challenges faced by microgreens

Fresh microgreens eaten soon after harvest have the highest nutritional value. After washing, we can also dry them and put them in your refrigerator wrapped in paper. But rapid postharvest quality decline is a significant barrier to the microgreen industry's expansion. Harvesting at optimal maturity, minimising handling damage, lowering microbial infection through appropriate sanitation and maintaining ideal temperature and humidity are all crucial steps in sustaining postharvest quality. Microgreens are challenging to store because of their high respiration rate, high surface area to volume

ratio, fragile leaves that quickly wither, rapid postharvest degradation transpiration, nutrient-rich exudate leakage, tissue injury and early senescence.

Conclusion

Microgreens have enormous potential to improve the nutritional value of the human diet, change gastronomic trends, and adapt the production of leafy vegetables to a microscale. They are harvested as seedlings after 7–14 days of germination and contain a wealth of phytochemicals, including essential minerals, polyphenols, carotenoids, chlorophyll, anthocyanins, glucosinolates and others. These phytochemicals have been shown to have high levels of antioxidant, anti-inflammatory, and anti-diabetic effects, making them a useful food that may prevent or mitigate chronic conditions. Growing microgreens is quite easy because they may be done so in a number of settings, such as windows, greenhouses, and even outside. They are an affordable approach to increase our nutrient intake without having to buy a lot of veggies because they are simple to cultivate at home.

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