

Popular Article

Microgreens - An Emerging Trend in Urban Agriculture

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Abstract

According to the United Nations, by 2050 the world's population will grow to almost 10 billion people, which will put enormous pressure on the possibilities of modern agriculture. With projections and scenarios for a population growth of more than 9 billion by 2050, it becomes necessary to focus our attention and efforts on finding innovative tools that can help solve the problem of malnutrition and ensure food security for the population. To meet the need for fresh, nutrient-rich and high quality - phytochemicals in the diet for healthy body development, the vegetable industry is exploring the prospects of the time-tested concept of the 'microgreens. Microgreens can be seen as a concept innovation in vegetable growing in general, with the potential to change the whole idea of vegetables. Since the introduction of microgreens to the Californian restaurants in the 1980s, it has gained popularity. The microgreens are also known as micro-herbs or vegetable confetti. Interest has been in the rise on nutraceutical, fresh and functional foods in healthy eating. Presently consumers are looking for foods which improves their health. Due to the presence of the various phyto-constituents and minerals in abundance, it opens up a huge prospect for the researchers in the field of health and nutrition.

Keywords: Microgreens, nutritious value, health benefits, urban agriculture, production.

Microgreens In Urban Agriculture

Urban agriculture means the production, distribution, and marketing of food and other products within the geographical limits of a metropolitan area. Urban agriculture increases the access to healthy, affordable, fresh produce and provides communities with opportunities to learn about nutrition and growing healthy food. There are various techniques employed for food production in urban agriculture like vertical farming, hydroponics, aquaponics, aeroponics, rooftop farming, microgreens, etc., Among these, growing microgreens is a technique requiring very low inputs and little technical expertise. The microgreens would be one of the best options to grow anywhere in the home, workplace, garage, shed, in living rooms with shade or even in window sills. With lots of nutritious benefits microgreens fill the diet plates of the fast-working world as a hand-full of seeds can produce a bag-full of nutritious greens.



Introduction

Microgreens are the emerging sector in vegetable products which are gaining popularity and increased attention in the modern agriculture (urban agriculture). Microgreens are young vegetable greens which are generally 1-2 inch tall. These are immature shoots germinated from seeds of herbs, vegetables or grains and harvested two weeks after germination. They are considered plants, falling somewhere between a sprout and baby green. Interest in microgreens has gained importance due to their unique colour, texture and taste which can be either sweet or spicy. Microgreens consists of three parts which are stem, cotyledons and the true type leaves. The basic concept of growing microgreens is collecting plants while they are still young. The scientists hypothesized that producing microgreens from local varieties of traditional vegetables and wild types of vegetables would be more profitable due to their higher nutrient content compared to commercial improved varieties.

Types of Microgreens

The microgreens of the crops belonging to the following families are popularly produced.

- **Brassicaceae family:** Cauliflower, broccoli, cabbage, watercress, radish and arugula
- **Asteraceae family:** Lettuce, endive and radicchio
- **Apiaceae family:** Dill, carrot, fennel and celery
- **Amaryllidaceae family:** Amaranthus, quinoa swiss chard, beet and spinach
- **Cucurbitaceae family:** Melon, cucumber and squash

Cereals such as rice, oats, wheat, corn and barley as well as legumes like chickpeas, beans and lentils, are also grown as microgreens.

Microgreens vary in taste, which can range from neutral to spicy, slightly sour or even bitter, depending on the variety. In general, the flavor of microgreens is considered as strong and concentrated.

Crops With Nutritional Value and Health Benefits

Microgreens are packed with nutrients. They vary according to the variety but most of them are rich in potassium. They also contain vitamins, minerals and have some antioxidant properties. Research also shows that they contain a wide variety of polyphenols. Although microgreens generally appear to contain higher nutrient levels than more mature plants, this may vary based on the species at hand.



Nutritional benefits of microgreens



Different types of microgreens contain different amounts of functional compounds such as antioxidants, minerals, vitamins, and phenols. Growing, harvesting and storage conditions can have a significant impact on nutrient content. Researchers estimated the concentration of vitamins and carotenoids were found in 25 microgreens. The highest concentrations of vitamin C, carotenoids, phylloquinone and tocopherols were found in red cabbage, cilantro, pomegranate amaranth and daikon green radish. The microgreen cotyledon leaves have higher nutritional value than mature leaves. The vitamin levels in microgreens are about five times higher than in their mature plants.

Researchers at the Laboratory for Food Quality and the Laboratory for Crop Production Systems and Global Change, USDA-ARS, conducted a study that analyzed the concentrations of macronutrients (calcium, magnesium, phosphorus, sodium, potassium) and micronutrients (copper, iron, manganese and zinc) in 30 microgreen species from 10 genera of the Brassicaceae family. The Brassicaceae microgreens are a good source of macronutrients (such as potassium and calcium) and micronutrients (such as iron and zinc).

The protective effect against oxidative stress exhibited by Brassicaceae (broccoli, Brussels sprouts, cabbage, cauliflower) is provided by glucosinolates, which are sulfur-containing glucosides. For example, broccoli contains: sinigrin, glucoraphanin, and progoitrin; Chinese cabbage has indolyl glucosinolate glucobrassicin, and glucoraphanin is one of the most common glucosinolates found in broccoli. Vegetables of the Brassicaceae family are also known to contain high concentrations

of polyphenols associated with human health: anthocyanins, flavonol glycosides, hydroxycinnamic acids, etc.

CROPS	HEALTH BENEFITS
Broccoli	Stimulate immune system
Cress	Good source of fiber
Fenugreek	Stimulate appetite
	Effective against anemia and fatigue
Kale	Rich in anti-oxidants
	Prevent macular degeneration
Linseed	Rich in omega-3 fatty acids
Fennel	Decrease risk of heart attack
Mustard	Effective against fever and cold

How To Grow Microgreens?

- Microgreens are easy and convenient to grow, as they don't require much equipment and time. They can be grown year-round, both indoors and outdoors.
- Materials required are good quality seeds, a growing medium, such as a container filled with potting soil or vermiculite, peat and more.
- Alternatively, we can use a single-use growing mat specifically designed for growing microgreens.
- The microgreens are grown in 25 × 50 cm flats or blocks of nearly inert materials like growing on flat jute, cannabis fibers, coco hair, and polystyrene sheets or it can be grown on blocks that are filled with peat and vermiculite or perlite alone, together or mixed with other fine commercial ready substrates mixtures.
- Proper lightning is required at least 12-16 hours per day.
- Now fill the container with soil gently, do not over compress it.
- The growing blocks is filled only to a depth of about 2–3 cm.
- Currently, the sowing process is still done manually, hand seeding may be the most efficient method for small operations.
- Sprinkle the seeds on the top of the soil evenly with light sprinkle of water on top of it.



- Cover the container with a plastic lid.
- Check the tray daily and water it as needed to keep it moist once in a day is sufficient.
- After 7-10 days, the microgreens are ready to harvest.



Conclusion

Despite their small size, microgreens pack a nutritional punch, often containing higher nutrient levels than their mature counterparts, making them an excellent addition to any diet. They have the combination of flavor, nutrient content and come with a variety of colours and textures. They can be grown from various seeds. Their taste can vary greatly depending on the variety. Microgreens are rich in nutrients. Microgreens deliver a concentrated dose of nutrients and beneficial plant compounds. As a result, they may reduce the risk of certain diseases. Microgreens are generally safe to eat. It can be eaten raw, juiced or blended and incorporated into a variety of cold and warm dishes. In addition to the nutritional and environmental benefits, microgreens have major impacts in urban areas by making fresh produce more easily available to areas considered food deserts. As more farmers look to avoid unpredictable weather and leave less of a carbon footprint, experts predict microgreen consumption will continue growing worldwide.

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