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NOVAL CHARACTERS AND CULTIVATION PRACTICES OF MICROGREENS: TINY PLANTS

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Introduction:

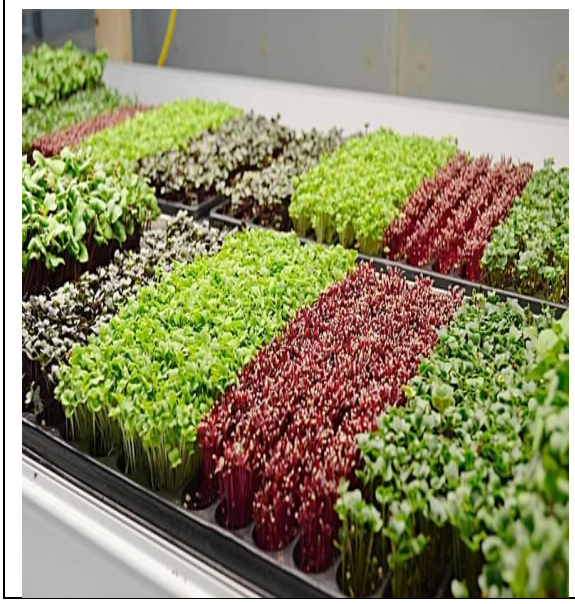
Diet-related diseases such as cardiovascular disease, diabetes, obesity, hypertension, stroke, canceroccurance is more due to imbalanced food consumption patterns and non-availability of fresh and pesticide residue free vegetables for consumption, changing lifestyle in developing and developed countries. Microgreens are emerging as good option to prevent this because rich in minerals, vitamins and antioxidants, it can easily be grown in urban or peri urban areas, it has short growth cycle and can be grown with or without soil.

Microgreens are vegetable greens (not sprouts or shoots) harvested just after the cotyledon leaves havedeveloped (and mostly, with one set of true leaves).Microgreens (seedlings of edible vegetables, herbsand other plants) are smaller than “baby greens” because they are consumed very soon after sprouting, rather than after the plant matured to produce multiple leaves. Although smallin size (8-10 cm in height,7-21 days old), microgreens can provide crisp textures, vivid colours, and intense flavors and canbe served as an edible garnish or a new salad ingredient.

Microgreens gain immense potential for improving the nutritional value of the human diet, considering their high content of healthy compounds. They gain more interest not only for their nutritional value but also for their interesting flavours and commercial potential.People also callmicrogreensa superfood.

The wide number of species and cultivars can be grown as microgreens. Microgreens can be grown in a very simple way, even in very small spaces, suitable for urban agriculture, as well as a component of space life support systems. It can be grown without soil and without external inputs like pesticides and fertilizers, inside or around residential areas.

Microgreens Production



Rich Source of Nutrients:

There is no concern about loss or degradation of micronutrients through food processing because microgreens are usually consumed right after they are harvested. The nutritional value of microgreens varies according to their type and growth stages of the plant.However, there are many studies that show seedling (microgreens) may contain a higher concentration of many nutrients, than their mature or fully developed stage. With their high nutritional value (upto 40 times more than their mature counterparts), microgreens are also considered as functional foods (great content of phenolics, antioxidants, minerals, and vitamins) with particular health-promoting or disease-preventing properties.

Example:

- Lettuce microgreens (7 days after germination) have the highest total phenolic concentration and antioxidant capacity in comparison to the mature plants.
- Spinach microgreens generally have higher levels of phytonutrients and the carotenoids than mature leaves.

Health Benefits:

Heart Disease: Risk of heart disease can be reduced by microgreens consumption because these are rich in antioxidant e.g. polyphenols. Different animal studies show that microgreens may reduce the level of triglyceride and “bad” LDL cholesterol.

Diabetes: Microgreens have great content of antioxidants which can lower down the risk type-2 diabetes. As per different laboratory experiments it is clear that microgreens may increase cellular sugar uptake by 25–44%.

Certain type of cancers: Antioxidant-rich foods, including polyphenols, may reduce risk of different kinds of cancer.

Alzheimer's disease: Presence of antioxidants (including polyphenols) can reduce probability of memory related disease such as Alzheimer.

Microgreens reduce risk of eye diseases, constipation. It protects the body from harmful effects of free radicals, also helpful to maintain strong and healthy bones and cure anaemia.

Microgreens Production: Microgreens are produced in different environments (protected environment, open air, indoor) and growing systems (soilless, soil), depending on the scale of production. Mainly postharvest quality and safety of microgreens have more importance but some pre harvest practices also affect the shelf life, food safety, and postharvest nutrition profile of microgreens.

Microgreen selection: Microgreens can be grown from different types of seeds. Plant families most commonly known for microgreens**:**

S. N.	Family	Crops
1.	Amaranthaceae	Amaranths, spinach
2.	Amaryllidaceae	Garlic, leek, and Onion
3.	Apiaceae	Carrot, celery, coriander and fennel
4.	Asteraceae	Lettuce
5.	Brassicaceae	Arugula, Broccoli, cabbage, cauliflower, kale, mustard and radish
6.	Cucurbitaceae	cucumber, melon, and squash
7.	Fabaceae	Sweet pea, alfalfa, fenugreek
8.	Lamiaceae	Mint, basil

Soil: Microgreens grown in soil, works the best. The soil should be free from any chemical or pesticide quantities, to obtain organic and healthy produce.

Pot/Tray: A container required to grow microgreens. A seed tray from any hardware store or a nursery, a regular planting pot or a baking dish with 4-5 inches depth will also solve the purpose.

Light Source: At least 3-4 hours a day essential amount of sunlight natural light required for microgreens. Greenhouse growers often supplement the natural light with "grow lights".

Water: Most important element is water for microgreens. The soil which used should be moist at all times. Hand sprinkler works best for plant, due to its micro outlets that do not let open a huge downpour of water. Use of fresh tap water instead of any chemically treated water is best for Microgreens.

Harvesting:

Most species are harvested at the appearance of the first true leaves, with fully expanded cotyledons, still turgid, retaining their typical colour, and seedlings having a height of 5-10 cm. Seedlings should be cut down manually or mechanically few millimeters above the growing media surface. Focus should be placed to exclude growing media particles and

seed integuments which in some species retain with the cotyledons. Some types will re-grow and can be cut several times.

Microgreens After Harvesting

Post Harvest Management:

Microgreens have a short shelf life. Hence, require better methods of storing and transporting. Commercial microgreens are most often stored in plastic clamshell containers and refrigeration @2.5-3.5 °C up to 7 days. Biodegradable Clamshell containers also used.

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