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Sprouts vs. Microgreens as Novel Functional Foods Variation of Nutritional Benefits

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I. INTRODUCTION

Sprouts and microgreens we can include it as vegan diet. A vegan diet comprises only products derived from plant sources. A vegan diet excludes eggs, meat, and even dairy products. Being a vegan can be a religious, lifestyle, or dietary choice. Some people who are on a vegan diet also avoid honey. Some also refrain from using clothes, cosmetics, and other products that use animal parts. Some adopt this lifestyle for its sustainable environmental benefits. A vegan diet includes plenty of fruits, beans, seeds, and vegetables. The crux of any vegan diet is the variety of these food items we consume to suffice the requirement of various vitamins, minerals, proteins, and healthy fats. A vegan has to be cautious about nutrients like iron, calcium, vitamin B12, vitamin D, and proteins that we usually get in animal products. People often take veganism and vegetarianism as the same thing. But actually, it is not. Vegetarians, though, do not consume meat, but they consume dairy products like milk, eggs, or both. On the other hand, the vegan diet is more restrictive and relies only on the plant-based nutrient source.

Veganism has a multipronged benefit on heart health. According to a study published in the Journal of the American Heart Association in 2019, higher consumption of plant-based dietary sources and reduced intake of animal foods had significantly decreased the risk of cardiac ailments and mortality in adults. According to the American Heart Association, saturated or harmful fats found in cheese, butter, red meat, and other animal products can elevate "bad" cholesterol levels in your body and make you susceptible to various heart conditions. On the other hand, plant-based sources are rich in dietary fibers that help improve good cholesterol levels in the blood, thus decreasing the risk of heart diseases and stroke. Animal-based food contains little to no dietary fibers. Reduced calorie intake is often associated with lower BMI and reduced risk of obesity.

Microgreens are immature plants produced from the seeds of vegetables, cereals or herbs. They are 5 to 10 cm long and comprise a stem and cotyledons. They are usually harvested at the base of their cotyledons, just after the cotyledons emerge but before true leaves develop. This takes place from 7 to 21 days after germination, depending on the species. The life cycle of microgreens is very short, and they quickly deteriorate after harvest. When stored at room temperature, they can be safely consumed within 1 to 2 days. Contrary to sprouts, the term “microgreens” is not scientific; rather, it is used for marketing purposes. Their production began at the end of 1980s, and in recent years, they have been constantly gaining popularity due to growing interest in functional foods.

Sprouts pack some of nature's most concentrated nutrition into tiny packages. These little germinated seeds are true health powerhouses. Their nutritional makeup changes based on whether you eat them raw or cooked. Raw sprouts are full of enzymes that help your digestion and speed up metabolism. A 100g serving gives you: 30-40 calories, 3-6g protein, 6-8g carbohydrates,1.5-2g fibre, 20-30mg vitamin C, 15-20 IU vitamin A ,15-30mcg vitamin K.

The minerals in sprouts play a big role too. Your bones need manganese to develop properly, and phosphorus keeps your teeth strong. The sprouting process makes these minerals easier for your body to absorb compared to regular seeds or grains. The way sprouts transform during germination makes them special. Complex carbs break down into simpler forms that digest easily. Your body can also use the protein better - great news if you follow a plant-based diet. Raw and cooked sprouts each have their benefits. Cooking might lower some vitamin levels slightly, but it makes the sprouts easier to digest. You can choose either method based on what works best for your health goals.

The number of species that can be consumed as sprouts or microgreens is huge. Their seeds differ in germination rate, taste and chemical composition. The most popular seeds used for the production of sprouts and microgreens include those of cereals, legumes, oilseeds or crucifers, e.g., lentils, soybean, broccoli, alfalfa, radish, sunflower, cress, pumpkin, mung bean or onion (chives).

Germination is a complex stage of plant ontogenesis involving growth initiation but not comprising final growth processes and maturation. The gist of germination is restoring metabolism of dormant seeds not showing any physiological activity. The process activates the seed embryo and allows for seedling growth. Seven- or ten-day-old sprouts are of appropriate size for harvest, allowing for post-harvest handling and commercialization. The material shows higher content of phytochemicals than other vegetables.

Germinating seeds could contain from 2 to 10 times more phytochemicals as compared with commercial adult plants. This content depends on the species; cultivar; environmental conditions; and the time of germination, storage, and processing. So far, sprouts have been more often than micro greens recognized as wellness and health-promoting foods, widely recommended by dietitians due to their high content of nutrients and bioactive compounds, such as flavonoids, hydroxycinnamic acids, vitamins and glucosinolates, minerals, and carotenoids. These phytochemicals seem to play a crucial role in protecting the human body against different types of chronic disorders such as cardiovascular diseases, diabetes, and cancer. Additionally, sprout and microgreen leaves are characterized by a low calorific value (29–128 kcal/100 g) and low glycemic index.

Acoording to Wojdyło et.al. Given the current interest in edible plants, this study notably improved our knowledge on metabolic profile of sprouts and microgreens of dietary species, revealing that they are good sources of bioactive compounds with health-promoting properties. The results of this work show that sprouts have strong antioxidant capacity due to high contents of polyphenols and L-ascorbic acid. Sprouts are also a better source of amino acids, pectins and sugars than microgreens. Microgreens contain high levels of carotenoids, chlorophylls and organic acids but scarce amounts of sugars. They also show higher anti-diabetic and anti-cholinergic activity than sprouts. Selected sprouts (broccoli, radish, lentil) and microgreens (radish, amaranths, kale) should be used daily as superfoods or functional food. Consumption of sprouts and microgreens can be of magnificent importance for humans to stay healthy and avoid civilization diseases associated with oxidative stress.

II. FADS AND FALLACIES ASSOCIATED WITH MICROGREENS:

1. The "Nutrient Bomb" Exaggeration
   - The Claim: Microgreens are up to 40 times more nutritious than mature plants.
   - The Reality: This figure stems from specific studies focusing on select nutrients in specific, nutrient-dense varieties (like red cabbage). This does not mean all microgreens are 40 times more nutritious than their mature counterparts across all nutrients. While they are highly concentrated, you would need to eat massive, impractical amounts of them to replace the nutrition provided by a normal serving of full-grown vegetables.

2. The "Superfood" Myth
   - The Claim: Microgreens are a "superfood" that will radically improve health or cure diseases.

- The Reality: "Superfood" is a marketing term with no formal scientific or FDA definition. While they contain high levels of antioxidants, vitamins, and minerals, they are best understood as a healthy, nutrient-dense addition to a diet, not a miracle cure.

3. The "Easy to Grow" Fallacy
   - The Claim: Anyone can grow large, lush, professional-looking microgreens on their kitchen counter with zero effort.
   - The Reality: While technically easy, growing high-quality, mold-free, and profitable microgreens requires precise environmental management, including proper air circulation, correct watering techniques (like bottom watering), and high-quality seeds. Beginners often face issues like mold, damping off (seedling death), and poor germination.

4. The "Extremely Productive/Profitable" Myth
   - The Claim: You can easily make over with a small, spare-room setup.
   - The Reality: While they can be a profitable business, there are significant hidden costs, including specialized supplies (trays, media, seeds), high labor requirements, and, importantly, a very short shelf life. This makes marketing and logistics challenging.

5. The "Only for Garnish" Misconception
   - The Claim: Microgreens are only used as a tiny, expensive garnish for aesthetic appeal.
   - The Reality: While they began in high-end restaurants, they are increasingly popular as a functional food, acting as a nutritional powerhouse in salads, sandwiches, smoothies, and wraps. Their wide range of flavors—from spicy (radish) to sweet (beetroot)—allows them to be featured heavily in meals, not just on top. ACS Publications +4

6. The “Always Pesticide-Free” Assumption
   - The Claim: Because they are fast-growing, microgreens are always inherently organic and safe to eat.
   - The Reality: While they rarely need pesticides, they can still become contaminated, and their high-humidity, high-density growing conditions make them susceptible to mold and, in some cases, bacterial contamination (like Salmonella), often starting from contaminated seed batches.

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