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Nutritional and Functional Quality of Mustard and Coriander Greens at Different Phases of Development

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Abstract

Micronutrient deficiencies are a significant global health issue. More than 2 billion individuals worldwide are estimated to still be lacking in important vitamins and minerals today. The majority of these folks reside in developing countries and typically lack many micronutrients. Microgreens are immature edible vegetables has lots of potential health benefits, can grow easily. Mustard (*Brassica nigra*) and coriander (*Corindrum sativum*) greens are very common in India and can grow in Indian climate. People of both urban and rural population can afford and grow these. The focus of the present study is to analyze nutritional and functional quality of mustard and coriander greens at different phases of development. For this mustard and coriander greens were grown and collected at different phases of development (microgreen, babygreen and maturegreen) and their nutritional (macronutrients & micronutrients) and phyto-chemicals analysis were performed. Functional properties (anti-oxidant & anti-microbial) of mustard and coriander green were also evaluated. Results showed that micronutrients like iron (100%), phosphorus(47%), calcium (28%), ascorbic acid(>100%) and beta carotene (66%) level were higher in mustard microgreen compared to the mature green. In case of coriander green also micronutrients like iron (90%), phosphorus(34%), calcium (15%), ascorbic acid (>100%), beta carotene (86%) level were also higher in microgreen compared to mature green. Strong anti-microbial activity was also observed by mustard and coriander microgreens against Escherichia coli and *Bacillus subtilis*. Being a dense source of nutrients and phyto-chemicals mustard and coriander microgreens may be considered as super food and can be used to combat malnutrition and major disorders that occur in the human body.

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Introduction

Micronutrient malnutrition, often known as hidden hunger, hinders growth, weakens the immune system, diminishes productivity, increases the risk of mortality, causes a number of pregnancy issues, including blindness and goitre, and lowers working capacity. The main causes of micronutrient deficiencies are a lack of dietary variety (i.e., monotonous diets), low mineral bioavailability, the prevalence of illness and disease, and higher physiological demands. Over two billion people are at danger of iron, vitamin A, or iodine deficiencies, according to the WHO (World Health Organization), with developing nations seeing the worst issues.[1]

Microgreens are juvinile vegetable greens picked/ collected after cotyledonary leaves are developed. Over the past ten years, microgreens have grown in popularity due to their fresh flavour and nutritional advantages. Southern California has been producing them since the 1990s.Since, in developed countries attraction towards healthy eating, gourmet cooking and indoor gardening has been increased and thereby microgreens have now attained recognition there. There is increased popularity of microgreens because of it has high nutritional sources.[2]

Microgreens can be defined as immature greens, tender and soft in texture, produced from the seeds of any plant or vegetable, having two totally developed cotyledon leaves, it can be harvested with a primitive pair of true leaves. The general height of the microgreens is 2.5-7.6 cm (1-3 inches), it is harvested only with the stem and attached cotyledons (seed leaves) and tiny, young true leaves without root. The harvesting time defers depending on the species from 7-14 days after germination.[3]

According to research, microgreens have far higher levels of minerals, vitamins, and photochemicals than mature greens do, and they are also richer in both micronutrients and macronutrients.[4,5,6] Compared to matured green, scientist demonstrated that microgreens of broccoli (Brassica oleracea L. var. italica Plenck), radish (Raphanus sativus L.) and green curly kale (Brassica oleracea var. sabellica L.) contains higher levels of total antioxidant capacity, total carotenoids, total isothiocyanates, total anthocyanins, macro- (K, Ca, Mg) and oligo-elements (Fe, Zn).[7] Again compared to matured green, macro- and microminerals like iron (Fe), copper (Cu), and manganese (Mn), sulfur (S), zinc (Zn), potassium (K), calcium (Ca), nitrogen (N), phosphorus (P), sodium (Na) levels were much higher in celery (Apium graveolens L.) microgreen.[8] Scientists also demonstrated that minerals, total ascorbic acid, carotenoids, total chlorophylls, polyphenols, and antioxidant activity were much higher in the microgreen of four Apiaceae species [Pimpinella anisum L. (anise), Anthriscus cerefolium L. (chervil), Carum carvi L. (caraway), and Anethum graveolens L. (dill)] compared to mature greens.[9] In comparison to mature greens, research also revealed that quinoa microgreens and sprouts were high in nutrients (protein, amino acids, vital minerals, and omega-3 fatty acids.)[10]

Mature black mustard and coriander greens are popular food of India, used in most of the households. It can be grown in Indian climate with minimum requirements and space. The focus of the present study was to estimate nutritional and functional characteristics of black mustard microgreens (*Brassica nigra*) and coriander microgreens (*Corindrum sativum*) at the different phases of their development (microgreen, baby green, mature green).

Materials and Method

Growing of Greens

The seeds used are black mustard (*Brassica nigra*) and coriander (*Corindrum sativum*) brought from local nursery of Kolkata. The greens were grown in plastic trays, seeds were sprinkled and it was kept covered till germination takes place. Trays were watered occasionally. The microgreens were harvested after it becomes 2.5−7.6 cm (1−3 inches.) in height and two fully developed cotyledon leaves. The baby greens were harvested after it becomes 10 cm in height and one or two pairs of true leaves were appeared. Mature greens were harvested after at 5-6 inches height or till when it develops mature leaves without cotyledon leaves.[11]

Sample Preparation

Harvested leaves were shade dried for 7 days. The leaves were powdered and stored in zip lock packets at cool and dry place.

To make extract 5gm of dried sample was taken in conical flasks. 20 ml of ethanol was added to

it. It was kept for 2 days with occasional stirring in a dark, cool place along. After 2 days, the extract was filtered into sterilized tubes. The extract was stored in refrigerator for further study. For microbiological methods, extracts were further diluted with water (1:1 ratio).

Samples for the estimation of protein, crude fibre, and carbohydrates were combined with water (5gm in 20mL) and refrigerated overnight. It was filtered the following day and put into sterile tubes for estimate.

Determination of Macronutrients

Carbohydrate was estimated by Anthrone method.[12] Biuret method was used for protein estimation.[13] Crude fiber was estimated by AOAC, 2005 official method.[14]

Beta Carotene Estimation

Five gram of each sample were taken, crushed with the help of pestle and mortar in 10-15 ml of acetone and few crystals of anhydrous sodium sulphate were added. The solution was centrifuged at 3000 rpm for 3-4 minutes. The supernatant was transferred to a test tube, 10-15 ml of petroleum ether mixed thoroughly with it and kept undisturbed. From the separated two layers upper layer was collected in a test tube and the lower layer was discarded. Using petroleum ether as blank optical density was measured at 452 nm.[15]

Vitamin C Estimation

Ascorbic acid was estimated by Acid base titration method.[16]

Determination of Ash & Mineral Content

To estimate ash content, weight of silicon crucible was measured and noted. 3 gm of test samples were weighed and kept on crucibles. The crucible was placed in muffle furnace at 600°C for 3 hours. Measured ash content was noted.

Obtained ash from different test samples were dissolved in 6 N HCL and heated on a hot water bath for 30 mins or till white fumes were formed. The ash mixture was then cooled and filtered and a clear liquid was obtained. These ash solutions were used for the estimation of Iron, Calcium and Phosphorus. Testing kit of iron, calcium, phosphorus manufactured by Tulip Diagnostics (P) Ltd., Gitanjali, Tulip Block, Goa - 403 202, India was used.

Qualitative Analysis of Phyto-Chemicals

The extracts of were analyzed for the revelation of different phyto-nutrients using standard methodology. Seven chemical groups (phenols, alkaloids, anthroquinones, flavanoid, saponin, Triterpenes, tanins) were tested. Decolorized ethanolic extract was used to determine the phyto-chemicals.[17]

Phenol Estimation

0.5 gm of the sample was grinded in motar and pestle in 80% ethanol (10 times volume of sample). The homogenate was centrifuged at 10000 rpm speed for 20 minutes. The supernatant was taken the sediment was re-extracted with 80% ethanol (five time volume) and supernatant was collected. It was ten evaporated till dried. And dissolved with known volume of distilled water. 0.2-2 ml of solution was taken in test tube and the volume was made 3 ml with water. 3 minutes after adding the Fc reagent, 2 ml of 20% Na_2CO_3 was added in each tube. Then the it was mixed and placed in boiling water bath for 1 min and at 650 nm wave length the absorbance was measured.[17]

DPPH Free Radical Scavenging Activity

The antioxidant potential of different greens were estimated by measuring their capability to decolorize methanol solution of DPPH.[18] In brief, 0.2 mM DPPH methanol solution was added to the extracts and incubated for 30 min at 25^0C. The absorbance of the mixture was recorded against blank at 516 nm.

Antimicrobial Activity

The antimicrobial activity of the extract of different greens were estimated against two different categories of microbes: Gram positive bacterial strain (*Bacillus subtilis*) [MTCC No: 441], Gram negative bacterial strain (*Escherichia coli*) [MTCC No: 1696].

Colony Counting the Presence of Different Green Extracts

For each test, five petri plates were used, of which one was used as 'Control' plate (only vehicle was used), while the remaning were used as 'Test' plates containing different amounts of extracts (100µl, 200µl, 300µl, 400µl) which is equivalent to 12.5 mg, 25 mg, 37.5 mg, 50 mg of greens respectively. The petri plates were inoculated (streak) with the mentioned bacterial strains and were kept at 37ºC. Microbial growths were observed after 24 hours.[19]

Statistical Analysis

The results of chemical analysis were expressed as mean ± standard deviation of triplicate analyses. The results were analyzed by using SPSS version 18 (IBM Corporation, SPSS Inc., Chicago, IL, USA). To generate tables Microsoft word and Excel were used.

Result & Discussion

Macronutrient Estimation

Macronutrients are important in order to body growth, maintenance and tissue rapier.[20] Carbohydrate, protein and crude fiber content of microgreen, baby green and mature greens were measured. It was seen that macronutrient content increases when plant is mature (Fig 1).

Vitamin C & Beta Carotene Estimation

Vitamins are organic substances that the body needs in little amounts for normal development and function. All bodily tissues need vitamin C, commonly known as ascorbic acid, to grow, develop, and heal. It plays a role in a variety of bodily processes, such as the production of collagen, iron absorption, healthy immune system operation, and wound healing. Naturally many foods contain vitamin A, a fat-soluble vitamin.[21] Our heart, lungs, and other organs function normally with the aid of vitamin A. The human body transforms beta carotene, which is a precursor to vitamin A, into vitamin A. Beta carotene and vitamin C was estimated in both of the greens.[22] Result showed beta carotene and vitamin C concentration was much higher in microgreens compared to the baby green and mature green. Microgreens contains almost double amount of beta carotene and vitamin C compared to mature greens (Table 1). Research data also showed that beta carotene and vitamin C content is higher in microgreen of celery & four Apiaceae species and compared to mature green.[8,9]

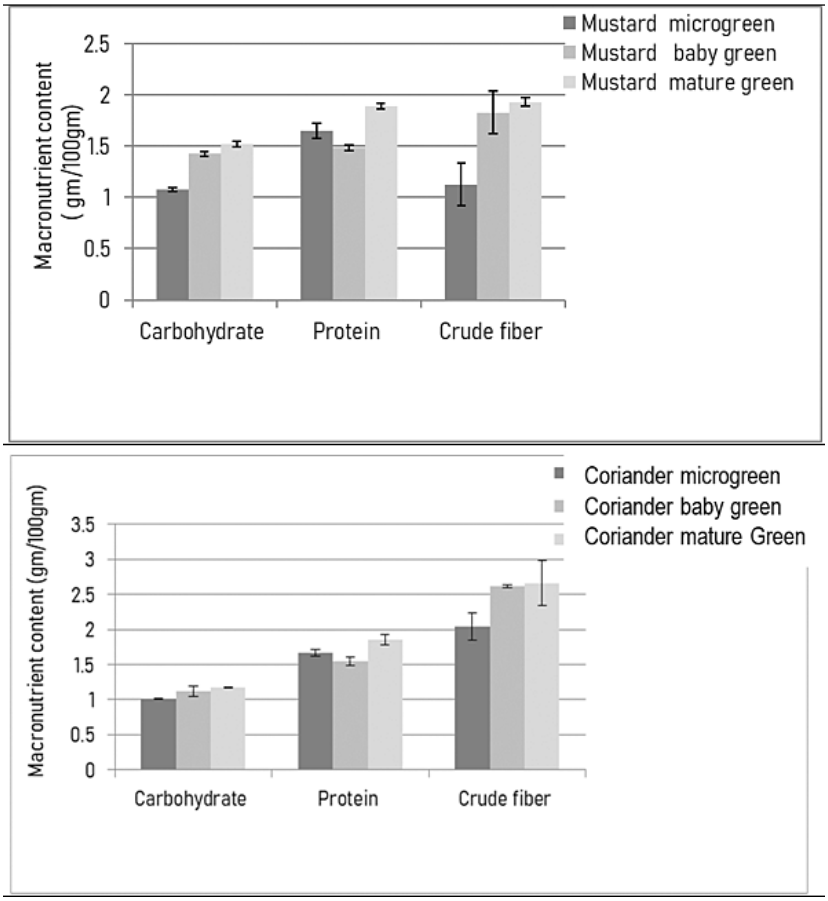

Fig. 1: Macronutrient content of mustard and coriander green at different phases of development (micro, baby & mature green). [Values are mean ± SD].

Table 1: Amount of beta-carotene and Vitamin C in mustard and coriander green at different phases of development (micro, baby & mature green). [Values are mean ± SD. *P< 0.05 vs Mature mustard green, #P< 0.05 vs Mature coriander green]

	Mustard greens			Coriander greens		
Parameters (mg/100g)	**Micro green**	**Baby green**	**Mature green**	**Micro green**	**Baby green**	**Mature green**
Beta- carotene	4.0 ± 0.7*	3.4 ± 0.3	2.4 ± 0.5	6.7 ± 0.6#	4.7 ± 0.5	3.6 ± 0.7
Ascorbic Acid (Vitamin C)	47.2± 3.9*	28.5± 3.5	20.5 ± 1.7	48.3 ± 3.7#	31.5± 4.1	22.2 ± 1.7

Ash & Mineral Estimation

Ash content was estimated for all the stages of greens. It was found that mustard and coriander microgreens have highest ash content compared to bay and mature green, which clearly denotes that microgreens are good source of minerals.

Minerals are considered as essential as our need for oxygen to sustain life. Though needed in small amount but the activity of minerals ranges from bone development to proper brain function.[4] Almost all living things require iron because it is involved in a range of metabolic activities, such as the transfer of oxygen, the production of DNA, and the movement of electrons. Anemia, iron overload, and possibly neurological illnesses are only a few of the diverse clinical symptoms of disorders of iron metabolism, which are among the most prevalent diseases affecting people today.[23] In addition to performing a variety of biological tasks in the human body, calcium is a micronutrient that is crucial for maintaining human health and wellbeing.

The contraction of muscles, the development of healthy bones and teeth, the transmission of nerve impulses, the regulation of heartbeat, and the fluid balance within cells all depend heavily on calcium. The most important times to meet these needs are during periods of growth, such as pregnancy, breast-feeding and childhood. Long-term calcium insufficiency can cause osteoporosis, a condition where the bone deteriorates and fractures are more likely. The right nutrients can be obtained from a balanced diet, which can also help prevent calcium shortage.[24]

A mineral called phosphorus is found in many foods naturally and can also be taken as a supplement. It has a number of functions in the body. It is a crucial component of cell membranes, bones, and teeth. It maintains a normal range of blood pH and aids in the activation of enzymes. As a component of DNA, RNA, and ATP, the body's primary energy source, phosphorus also plays a role in maintaining appropriate nerve and muscle function, particularly that of the heart. It also serves as a building block for our genes.[25]

The iron, calcium and phosphorus content were evaluated in mustard and coriander greens. The result showed mustard and coriander microgreens have highest amount of these three minerals followed by baby greens and mature greens. Iron content was double in microgreens compared to mature greens. Coriander microgreens contains higher amount of iron than mustard microgreens. Calcium content was also highest in microgreens however, mustard microgreens contain higher amount of calcium than coriander microgreens. Microgreens showed highest phosphorus content compared to baby greens and mature greens. Phosphorus content of mustard microgreen was much higher than coriander microgreen. (Table 2).

Compared to matured green, scientist demonstrated that microgreens of broccoli (Brassica oleracea L. var. italica Plenck), radish (Raphanus sativus L.) and green curly kale (Brassica oleracea var. sabellica L.) contains higher levels of total antioxidant capacity, total carotenoids, total isothiocyanates, total anthocyanins , macro- (K, Ca, Mg) and oligo-

elements (Fe, Zn).[7] Again compared to matured green, macro- and microminerals like iron (Fe), copper (Cu), and manganese (Mn), sulfur (S), zinc (Zn), potassium (K), calcium (Ca), nitrogen (N), phosphorus (P), sodium (Na) levels were much higher in celery (Apium graveolens L.) microgreen.[8]

Table 2: Amount of iron, calcium and phosphorus in mustard and coriander green at different phases of development (micro, baby & mature green). [Values are mean ± SD. *P< 0.05 vs Mature mustard green, #P< 0.05 vs Mature coriander green]

Parameters	Mustard greens			Coriander greens		
	Micro green	Baby green	Mature green	Micro green	Baby green	Mature green
Iron (mg/100g)	6.48 ± 1.0*	4.19 ± 0.9	3.23 ± 0.8	8.72 ± 1.2 #	6.63 ± 0.7	4.53 ± 0.8
Calcium (mg/100g)	263.6± 6.5*	246.5± 4.3	204.6 ± 5.2	192.9 ± 5.8#	178.8± 4.2	166.7 ± 4.9
Phosphorus (mg/100g)	103.5 ± 6.5*	78.5 ± 3.4	70 ± 3.9	91.3 ± 5.7#	78.2 ± 4.2	68.1 ± 3.6
Ash (%)	1.86 ± 0.28*	1.74 ± 0.21	1.67 ± 0.11	1.58 ± 0.11#	1.34 ± 0.09	0.96 ± 0.21

Qualitative Analysis of Phyto-Chemical

Phytonutrients, sometimes referred to as phytochemicals, are substances derived from plants that have a positive impact on health and may be used to treat and even prevent a variety of ailments. Due to their positive impacts on human health and significant health benefits for consumers, phytochemicals are of great interest and have significant antioxidant potential. Consuming whole grains, fruits, and vegetables on a regular basis may lower your chance of developing a number of diseases associated with oxidative stress, according to epidemiological research and animal studies.[26, 27] In the current study it was observed that microgreens contain higher amount phenol, alkaloids, saponins, triterpens and saponin compared to baby and mature greens (Table 3). Except anti-oxidant property, phytochemical like saponin, phenol possess anti-bacterial properties.[28] Scientists also demonstrated that minerals, total ascorbic acid, carotenoids, total chlorophylls, polyphenols, and antioxidant activity were much higher in the microgreen of four Apiaceae species[Pimpinella anisum L. (anise), Anthriscus cerefolium L. (chervil), Carum carvi L. (caraway), and Anethum graveolens L. (dill)] compared to mature greens.[9]

Table 3: Phytochemical content of mustard and coriander green at different phases of development (micro, baby & mature green).

Parameters	Mustard greens			Coriander greens		
	Micro green	Baby green	Mature green	Micro green	Baby green	Mature green
Phenol	+++	++	+	+++	++	+
Alkaloids	+	+	+	+	+	+
Flavonoids	+	+	+	+	+	+
Saponins	+++	++	++	+++	++	++
Triterpenes	++	+	+	++	+	+
Tannins	-	-	-	-	-	-

+++: Strong, ++: moderate, + : Low; −: Not Detected

Quantitative Analysis of Total Phenolic Compound

The chemical compounds known as polyphenols, which are abundant in plants, have gained more attention in recent years in the area of nutrition. Consuming polyphenols may be crucial for preserving good health through regulating metabolism, weight, chronic disease, and cell proliferation, according to an increasing body of research. Although there are over 8,000 polyphenols, their short- and long-term health consequences have not yet been adequately described.[29] Numerous polyphenols have antioxidant and anti-inflammatory characteristics, according to research in animals, people, and epidemiology. These properties may help prevent or treat obesity, cancer, neurological illnesses, and cardiovascular disease.[30,31] In qualitative analysis it was found microgreens are rich source of phenolic compound. Quantitative analysis also showed high concentration of phenol in microgreens compared to baby green and mature greens. For mustard greens phenol content was higher compare to coriander greens. In case of coriander greens not much difference were seen in between micro green or baby green but when compared with mature greens it was seen that microgreens contains three times more phenol compared to mature greens (Fig 2). Many experimental data showed that microgreens are rich in phenol and phytochemical compared to mature green.[4,7,9]

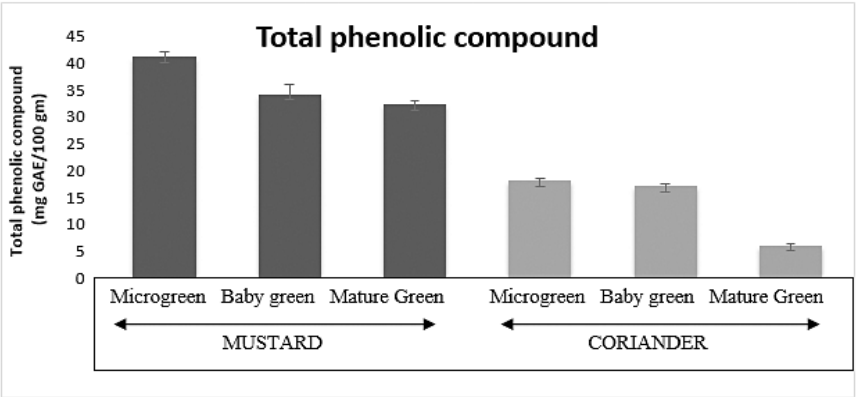

Fig 2: Amount of total phenol in mustard and coriander green at different phases of development (micro, baby & mature green). [Values are mean ± SD. *P< 0.05 vs Mature mustard green, #P< 0.05 vs Mature coriander green]

DPPH Free Radical Scavenging Property

The body normally produces free radicals as a consequence of normal metabolism or when exposed to environmental pollutants like cigarette smoke and UV light. Free radicals are extremely reactive and unstable molecules. Free radicals can harm DNA, sometimes leading to mutations that can cause a number of diseases, such as cancer, inflammatory disease, and heart disease. By limiting the creation of radicals, scavenging them, or stimulating their breakdown, antioxidants reduce the risk of tissue damage caused by free radicals.[32] Dietary antioxidants help disarm unstable molecules, lowering the chance of injury. In this present investigation, microgreens showed high anti-oxidant/ radical scavenging property compared to baby and mature green. Mustard microgreen shower higher radical scavenging property compared to coriander green. High concentration of phenol of the microgreen can be the most probable cause of the antioxidant property of these microgreens. (Table: 4) In this present investigation a strong co-relation was also observed between the antioxidant property and phenolic content of the greens (Mustard and coriander). The redox characteristics of phenolic compounds, which can be useful in quenching singlet and triplet oxygen or dissolving peroxides, are primarily responsible for the antioxidant action of these compounds.

Antimicrobial Activity

Mustard Greens & Coriander Greens showed anti-microbial property against two microbial strains: *Bacillus subtilis* (Gram positive bacterial strain)

[MTCC No: 441], *Escherichia coli* [MTCC No: 1696] (Gram negative bacterial strain).Abundant growth (but less than control) was observed in the plate treated with 25 mg, 50mg,75mg micro, baby and mature green, the plate with same doses of microgreen extract shows low growth as well as less colony count. But 100mg microgreen showed complete inhibition of the growth microorganisms, whereas baby green and mature green did not show complete inhibition. Hence it can be concluded that mustard microgreens showed strong anti-microbial activity against *Bacillus subtilis* & *E. Coli* compared to baby green and mature green (Table 5). Compared to mature greens red Spinach and kale microgreens also showed strong anti-microbial activity compared to mature greens.[33]

Table 4: Anti oxidant property of mustard and coriander green at different phases of development (micro, baby & mature green). [Values are mean ± SD. *P< 0.05 vs Mature mustard green, #P< 0.05 vs Mature coriander green]

	DPPH Free Radical scavenging property [mg TE/g]	
Mustard Green	Micro Green	1.8 ± 0.6 *
	Baby Green	1.5 ± 0.5
	Matured Green	1.2 ± 0.5
Coriander Green	Micro Green	1.3 ± 0.6 #
	Baby Green	1.0 ± 0.5
	Matured Green	0.8 ± 0.4

Table 5: Colony count of Bacillus subtilis (A) and Escherichia coli (B) In presence or absence of mustard and coriander green (micro, baby & mature green). [*P< 0.05 vs Mature mustard green, #P< 0.05 vs Mature coriander green]

A	**Doses**	**12.5 mg**	**25 mg**	**37.5 mg**	**50 mg**	**Control**
MUSTARD GREEN	Micro Green	16.00×10^5	12.30×10^5	8.00×10^5*	No growth detected	31.25×10^5
(CFU/ml)	Baby Green	22.50×10^5	22.00×10^5	19.20×10^	12.60×10^	
	Mature Green	25.25×10^5	23.25×10^5	19.05×10^	14.25×10^	
CORIENDR GREEN	Micro Green	12.5×10^5	5.15×10^5	2.6×10^5 #	No growth detected	
(CFU/ml)	Baby Green	21.50×10^5	18.45×10^5	15.00×10^	5.30×10^5	
	Mature Green	25.00×10^5	23.40×10^5	17.75×10^	11.75×10^	
B	**Doses**	**12.5 mg**	**25 mg**	**37.5 mg**	**50 mg**	**Control**
MUSTARD GREENS	Micro Greens	16.00×10^5	12.30×10^5	8.00×10^5*	No growth detected	31.25×10^5
(CFU/ml)	Baby Greens	22.50×10^5	22.00×10^5	19.20×10^5	12.60×10^5	
	Mature Greens	25.25×10^5	23.25×10^5	19.05×10^5	14.25×10^5	
CORIENDR GREENS	Micro Greens	12.5×10^5	5.15×10^5	2.6×10^5 #	No growth detected	
(CFU/ml)	Baby Greens	21.50×10^5	18.45×10^5	15.00×10^5	5.30×10^5	
	Mature Greens	25.00×10^5	23.40×10^5	17.75×10^5	11.75×10^5	

In addition to their well-known antioxidant properties, several phenolic compounds may also have strong antibacterial properties. Phenols cause this anti-microbial activity by altering the permeability of cell membranes, altering various intracellular processes brought on by the phenolic compounds' hydrogen bonding to enzymes, or altering the rigidity of the cell wall with integrity losses brought on by various interactions with the cell membrane.[34,35] Contrarily, saponins severely injured bacteria by degrading their cell walls, causing the cytoplasmic membrane and membrane proteins to rupture, allowing cell contents to flow out and ultimately leading to cell death.[35,36] Microgreens were shown to be abundant in phenol and saponin in this experiment, and they may be the most likely source of the anti-microbial activity.

Conclusion

Despite the use of methods to combat micronutrient deficiency, developing nations have made only modest progress. Supplementation and food fortification are the most traditional and often used methods of treating micronutrient deficiency. However, due of food insecurity, these measures may not be the most acceptable, accessible, or useful for rural and/or impoverished households, and they may not address the root cause of poor micronutrient status and inadequate dietary intake. In these situations, complementary initiatives are required to assist dietary adjustment that is culturally relevant and agriculture-based interventions.

Microgreens are renowned now for their high nutritional content, simple cultivation, and delicate flavor in a wide range of meals around the globe. People are using various kinds of microgreens in their diets in various nations throughout the world. Mustard (*Brassica nigra*) and coriander (*Corindrum sativum*) greens are very common in India and can grow in Indian climate. People of both urban and rural population can afford and grow these and can get the nutritional benefits.

In this present investigation, it was found that microgreens (mustard and coriander) are rich in vitamin C, beta-carotene and minerals (iron, calcium and phosphorus) compared to baby and mature greens. Microgreens also possess strong anti-oxidant and anti- microbial property compared to adult and baby greens. High concentration of polyphenols in the microgreens is the probable cause of the strong antioxidant and anti-microbial property of the microgreens. So, it can be concluded that microgreens (mustard and coriander) are not only rich in nutrients and phytochemical, they also possess strong ant-oxidant and anti-microbial property. Microgreens are a potential treatment for micronutrient deficiencies due to their high nutrient content, which also gives them an appealing look, tender and crispy texture, powerful flavor, and nice taste. Microgreens are a rich source of polyphenols that can help prevent numerous diseases, such as cancer, cardiovascular disease (CVD), and neurological illnesses. So, including microgreens in our diet on a regular basis helps prevent and treat numerous ailments as well as fight malnutrition. The urban and rural populations will benefit from education and training programmers regarding the nutritional advantages of microgreens as well as the growing, harvesting, and handling conditions of the microgreens.

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Conflict of Interest

The authors declare no conflict of interests.

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