Micro greens as a culinary trend in Modern Kitchens an Exploratory Study

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Abstract
As the global hospitality is changing every day so is the demand of the people. Now a day’s nationally and internationally people are asking for a more attractive, tasty and healthy food. Food production is not only preparation of food, the modern kitchen has changed which is not only serving delectable food but is also looking after the aesthetic appeal of the food therefore both the taste and the presentation play a vital role for the success of a modern Kitchen. Today a chef is not only person who is cooking food in the kitchen he is also an artist who by his creativity brings the whole plate alive. As it is said food is first eaten from eyes, thus Chefs all around the world are using innovative techniques and different ingredients to make their food look presentable and attractive.

Micro Greens is a trend in the hospitality industry, chefs are using micro greens on their plates along with edible flowers so that the whole dish looks attractive. These micro greens are not only savoured for their valued looks but are also full of essential vitamins and minerals and are being used for garnishing soups, salads, plate presentation. The aim of the study is to identify the various Micro greens that contribute to the aesthetic appeal of a chef’s food and to understand the need and importance of using micro greens by chefs of a modern kitchen.

Key Words: Microgreens, Gourmet Chef

Introduction
It is thought provoking process when we ask ourselves what did our ancestors eat and how did we evolve from a cave man to a modern man. If we look in the era of Palaeolithic period we come across the caveman’s diet. It is true that the cavemen were meat eaters, but that was also the era of agriculture and domestication. The caveman practised and learned new techniques of growing plants and vegetables and made them an important part of their diet. As the time evolved so did the nutritional needs of a human being. The modern man is educated and has the full knowledge of the nutritional aspects that his/her body demands. In order to meet the challenges’ of life the modern man has made significant changes in his/her living style thus nutrition becomes an important aspect of a daily diet.

Over the past few years an increase in food and beverage industry has been observed across the world. The Indian food and beverage sector is growing at the rate of 23 to 24%. At present the Indian food service industry is of INR 247,680 crore and is projected to grow to INR 408,040 crore by 2018 at 11%. As far as business sector portions, Quick Service Restaurants(QSR) and Casual Dine in organizations represent 74% of the aggregate chain business sector, while Bistros compensate for 12% with Fine Feasting and Bar Bars Club & Lounges (PBCL) involving the rest. It is estimated that by the year 2018 the chain and licensed standalone industry will contribute an INR of Rs 24,600 to 25,000 Crore and it is projected that from unorganised sector the government will collect an additional 17000, to 2600 crore as tax. (FICCI, 2015)

Hospitality industry is changing and growing every day, today is the time when a customer is not only looking a good bed to sleep or good food to eat but is also searching for places where healthy and nutritious food is served? Fine dining restaurants are coming up with creative ideas to lure the customers towards their food. To meet the continuous demand of healthy foods, microgreens came into the picture. Due to the delicate texture and distinct flavours the chefs of fine dining restaurants are using micro greens to bring freshness on the plate. These colourful baby greens not only impart freshness to the plate but also give a variety of leafy flavours such as sweet or spicy to the dish.

There is no legal definition to micro greens or baby greens but they can be identified by its unique structure which has three parts a central stem, cotyledon leaf and a true leaf. Due to different
atmospheric condition the size and length of these plants will vary. The ideal size of a micro green is from 1 inch to 1.5 inch in total length. If the plant grows past this length it does not come under the category of a microgreen. Instead they will be covered under the category of petit green.

Microgreens have a single stem which is cut just above the soil line during harvesting. They have a fully developed cotyledon leaves and has one pair of partially developed true leaves. Depending upon the seeds the average harvest time for a micro green is 10 to 14 days. (Egan, 2014)

2. Objectives of the Study

There is not much of the literature found in relation to Microgreens, the objectives of the current study is to

1. To investigate the use of Microgreens as a culinary trend
2. Identify the various microgreens that are used by gourmet chefs in food production
3. To understand the production process of microgreens

3. Methodology

The present study has been based on conceptual review of microgreens. The main focus of the paper is to develop a conceptual framework for the further empirical researches in the less explored area of use of microgreens in modern gourmet cuisines.

4. Review of Literature

In spite of India's incredible convention of nourishment, eating out was not as normal as in the West as of not long ago. Presently, eating out is a customary type of excitement, particularly in the metros, driven by ascend in salary, more prominent number of nuclear families, working ladies, and urbanization. Advertising by brands, with more accentuation on the menu, is likewise drawing in clients, just like the spread of culinary ideas and inclinations through print and TV media.

Firmly connected to these improvements is the change of cooking from straightforward and well known offerings to a menu that offers differences in taste, style and starting points. At the client end, a more prominent eagerness to explore different avenues regarding oddities, introduction to global cooking styles, and a quick paced way of life have added to changing food inclinations. Fixings like truffles, artichokes, asparagus, Australian sheep, Norwegian salmon, dark bean sauce and so forth have discovered their way to the Indian F&B space. Mixing of cooking styles, e.g. Italian with Thai is another client decision.

The pattern is expanding for clients to pick foods that mirror their way of life, and in the process dismiss the customary alternatives. Subsequently, industry-side patterns are additionally changing, with global players. Then again, clients are likewise being charmed with "road nourishment" alternatives served in a hygienic setting and great mood. Another industry development is the double organization, e.g., bistro + bar, bistro + barbecue, bar + lounge, and so forth. While these give more decision to clients and can likewise make more benefits for the brands, they should be obviously situated to maintain a strategic distance from any disarray in the clients' brains.

Multi-cooking eateries, which offer a non-particular feel, are however losing ground to master players with clients willing to pay all the more yet unwilling to trade off on quality. The path forward is prone to be a reception of both lesser known Indian flavors from the Himalayan and tribal belts and additionally other worldwide foods. While South Indian, Punjabi and Mughlai cooking styles had a tendency to overwhelm the Indian offerings, there is currently additionally interest for such dishes as Andhra Chicken Pepper Broil. Essentially, Bhutanese, African and Korean cooking styles can likewise discover acknowledgment among clients. Along these lines, there is open door for F&B players to blend the conventional and new Indian flavours while offering both exclusively. Further, while a specialty fragment may be made around particular worldwide cooking styles, customization may be expected to guarantee that they suit the Indian sense of taste. (Inderpreet Kaur, 2012)

There appears to be a revolution among Indians in relation to the Food and Beverage Sector. People do not wait for special occasions to eat out, now a day's more and more Indian consumers are eating. The youth of India has accepted and cherished the international cuisine. An Indian spends
approximately 8 to 10 percent of their budget to eat outside the home in different Food and Beverage establishment (Adam Branson, 2014)

Microgreens are becoming increasingly popular and have potential to attract a significant portion of a $500 million sprouts market (Uchanski, 2014) (Brentlinger, 2007). In the past 20 years Organic farming and local produce has picked up among agriculturists. Due to health consciousness the people are rediscovering the importance of locally grown food as a result the farmers market has moved towards delivering of clean and fresh food. This movement has shown that it is not only the farmers that are being benefited by local produce but also the general public are benefited who are health conscious. (Richardson, 2009)

Due to the high nutritional value and contrasting colours Micro greens have a place in the growing interest of our food. Harvested very early in their lives Micro greens are tender, delicate and high in flavour. Microgreens are crisp in texture and have a wide variety of flavours which range from sweet to savoury due to which they have become an integral part of modern diet. Micro greens can be eaten alone or can be added in salads, soups or they can be used as garnishes no matter how you use these greens they will always beautify the food. (Richardson, 2009)

Micro greens are the plants which are grown and harvested at a younger stage. They are different from sprouts yet they are new to the modern chefs. Micro greens as a term was officially coined in the year 1998 (Farm, 2014). Due to high temperatures and suitable environmental condition the farming of micorgreens was introduced in southern California in the mid 1990. (Winchester, 2012). The first recorded varieties grown specifically as MicroGreens were arugula, beets, kale, basil, cilantro, and a medley called Rainbow Mix (We like to call our mix the Healthy Mix! ) Today there is an ever increasing number of varieties being grown as MicroGreens. (Farm, 2014)

Microgreens also known as small immature seedlings of common vegetables are sprouts packed with intense flavour and high nutritional value. A recent study conducted by the University of Maryland found that microgreens typically range from 4 to 40 percent higher in vitamin content including vitamin K, vitamin C, vitamin E, lutein, and beta-carotene (Delisle, 2015)

In 2012 USDA got a research conducted by agriculture research services to find nutritional values and shelf life of microgreens in this research 25 most popular microgreens were used which gained the attention of radio and media and suddenly it captured the interests of people. In the process microgreens not only evolved as a beautiful and flavourful addition to the palate but as a powerful nutritional supplement as well (Farm, 2014)

Since early 2014 Various published researches done by USDA Agricultural Research Services have identified the nutritional value and shelf life of microgreen. Around twenty five varieties were tested during the research and it was found microgreens are a source of vitamin A, C, E ,K and other related carotenoids. Among the 25 microgreens tested, red cabbage, cilantro, garnet amaranth, and green daikon radish had the highest concentrations of vitamin C, carotenoids, vitamin K, and vitamin E, respectively. In summer 2012 a nutritional study was done on microgreens by the Department of Nutrition and Food Science, University of Maryland and it was observed that as compared to their mature counter parts microgreens have a higher concentration (about five times higher) of vitamins and carotenoids. Vegetable and Fruit Improvement Center at Texas A&M University, agree that microgreens may potentially have higher levels of nutrients than mature vegetables. All these studies indicate that instead of using the mature parts of the plants microgreens can be used to substitute the nutritional needs of a human body. Due to its vast variety and complexity of textures and flavours microgreens have caught the attention of national media and newspapers. Now day’s micro greens can often be seen on a chef’s plate and on the walls of a grocery store. (http://en.wikipedia.org/wiki/Microgreen, 2014)

Due to the pressure of modern day life and lack of time consumers are looking for foods which are convenient to eat. Ready to eat food sales are increasing day by day. On the shelves of general stores packets of fresh foods can be seen very often. For health conscious people ready to eat salad boxes are now a common option among consumers. Higher end salad boxes will typically include a selection of salad leaves, an accompaniment such as cold meat and possibly a dressing sachet. According to the recognized market research body IGD (Institute of Grocery Distribution) an average
consumer in Britain spent an average of £4.11 a week on fruit and vegetables in 2008, which corresponds to 16% of the weekly spend on food to eat at home. (Hughe, 2010)

The long term trend in vegetable sector shows that far less is being bought today compared to the seventies. Between 1978 and 2008, a decrease of 49% was seen in the consumption of green vegetables, with cabbage (down 73%) and sprouts (down 79%) being the main victims. However, salad produce was the only part of this sector that saw an increase, with sales having increased by 33% compared to 1978. (Hughe, 2010)

According to IGD, the number of people eating their ‘5 a day’ (fruit and veg) have increased from 32% in 2006 to 41% in 2009. 84% of customers allege that they do something every day to promote their health, be it physical exercise or healthy eating. The importance of food in terms of health can be seen in people’s responses to the question “what do they do to keep healthy? (Hughe, 2010)”

- 41% of responses – Eat 5 portions of fruit/veg a day
- 37% of responses – More physical exercise
- 37% of responses – Eat low fat foods
- 37% of responses – Eat low sugar foods


In the recent years Micro greens has gained popularity as a culinary trend. Chefs all around the world have been enjoying these power packed greens as a new way to creatively accentuate plates on food and add new depths of flavours to their dishes (Richardson, 2009). Steven De Bruyn, executive chef and wine director of the Garden City Hotel, who has been using micro greens since the 1980s, explains that Because of their intense taste, micro-vegetables must be used with care. (Isabel, 2008)

It’s a very old saying that “Good things come in small packages”. The same old principle is being followed by top Indian culinary chefs. Indain chefs are putting their wisdom of knowledge and their money on a petite but a flavourful ingredient “microgreens” that are now considered to be kitchen staples. Be it an ordinary salad or an exotic dish , chefs are using these small wonders to create magic on their plate and in their food. Today the chef’s garden is a laboratory seed bank and research and development centre with food safety among its primary concern. (Berg, 1955). Therfore in many commercial kitchens microgreens can be seen grown in small trays inside the kitchen so that they are handy for the chefs whenever they require them. (Papnai, 2014)

As per an article published by the telegraph it can be seen that many indian hotels in delhi are using microgreens in their dishes as per the according to Neeraj Tyagi, executive chef, The Claridges, New Delhi, these greens are becoming a hit with modern day professionals who are looking for quick and healthy bites. At Shangri-La’s - Eros Hotel, New Delhi, executive chef Martin Braecker uses micro greens to enhance the salads on the hotels buffet. Areyya says that apart from the presentation, micro greens impart a subtle range of flavours in their pairing with the main ingredients of a dish. At The hotel claridges, Chef Tyagi uses creative ideas with these delicious greens. The 1911 restaurant at The Imperial New Delhi we can see a buffet replete with special platters of Micro greens. Chef Sharad Dawan, area director, food production, The Park, Calcutta, uses a mix of microgreens in to give a delectabe difference in Indian food for like mixed lentil micro greens fresh spring rolls, ginger tofu with mixed micro greens and a healthy and light, rosemary tossed summer greens salad. (Papnai, 2014)

Therefore it can be seen that the demand for the powerful bomb shells has increased as these small shoots which are full of nutrients can take the whole dish to another level.

5. Production of Microgreens
Microgreens contrast from sprouts they are developed in daylight and soil. They can be grown inside on a sunny window rack or outside on a secured deck or in a shade house. There are a wide assortment of product seed accessible in the business from which microgreens can be created all round the year. The harvest period for microgreens is 7 to 14 days in this way there is no need of manures or pesticides
later consequently you get a natural produce of microgreens. Either at home or on rooftop top or financially for production of microgreens the following should be considered.

5.1 Containers:
Since microgreens do not grow more than one to 1 to 1.5 inch long it becomes very easy to grow the greens in small plastic containers which are compact in size and can be placed at in a very small area. It is best to use a flat tray with good drainage. Containers can be recycled but should be well washed.

5.2 Soil:
A good potting soil can be used for producing microgreens. A potting soil is a mix of peat, composted bark, sand, perlite and recycled mushroom compost. Coconut coir is a renewable resource made from the husks of coconuts. It’s a great growing medium because it is free of bacteria and fungal spores, is easier to work with than soil, and has everything that your microgreens need to grow healthy and strong. Before placing the soil in the plastic trays check that the soil should be free from any foreign objects like leaves, stems, stones etc.. the soil should be filled upto the brim of the containers and should not be tightly packed.

5.3 Seeds:
There are a wide variety of seeds that are available in the market from which microgreens can be produced. Any vegetable from which we can obtain sprouts can be grown into a microgreens. Choose organic seeds to get the best produce of micro greens. The seeds should be layed flat on the soil evenly which will give enough room to the plants for breathing. Seeds can touch each other but in no case they should lay on top of each other. It is necessary to firmly press them in soil but the soil should not cover the seeds completely.

5.4 Water:
Avoid using chlorinated water. Microgreens tend to grow best if the pH value of the water is a bit acidic ranging from 5.5 to 6.0. use a spray bottle for watering the seeds of microgreens. It is important to maintain the moisture in the seeds therefore cover the seeds with a damp kitchen towel or cotton swabs. Once the sprouts reach the height of the container, it will become difficult to spray water from the top as all the water will stick on the leaves and the roots will not get any. Thus to water the plants let the plastic containers sit on a water basin a let the soil absorb water from the basin this way the roots get ample amount of water. This process needs to be repeated at least twice a day or as required by the plant

5.5 Light
Sunlight: Any plant needs sunlight for its growth so is the case with microgreens, some microgreens may require a direct sunlight some may require indirect light. But in the process of growing microgreens one should not forget that microgreens require only 5 hours of light daily else they will have longer stems and lesser leaves whereas a good harvest needs to have more leaves.
Artificial Light: Artificial light promotes clearly measurable plant growth even when its colour temperature varies widely from sunlight. Contrary to most folks’ assumptions, seedlings grow just as well when illuminated with standard cool white fluorescent lamps as with full-spectrum grow lights of equal wattage. A fuller spectrum is necessary to spark flowering and to fertilize seeds and to nurture fruits, but not to promote the growth of young seedlings. (Braunstein, 2015)

6. Types of Microgreen grown commercially
There are a wide variety of seeds available in the market by which microgreen can be grown. Below is the list of most commonly used microgreens
Conclusion

Going through the Literature Review it can without much of a stretch be seen that microgreens have turned into a piece of cutting edge diet. These power packed nutritious greens frame a piece of either a plate of mixed greens or soup or they are utilized as garnishes. Every one of the five star or more class hotels claim that they have been utilizing microgreens in their kitchen and are also growing the same in their kitchen garden. As per numerous national and worldwide gourmet specialists Microgreens not just upgrade the flavor and composition of the dish yet they likewise build the eye appeal and increase the value of the dish. In this way it can be concluded, from the study that microgreens have shaped a piece of cutting edge diet which are utilized as a part of mixed bag of dishes as toppings or as a piece of the dishes. Thus microgreens have shaped a piece of the culinary pattern in the advanced kitchen of numerous gourmet experts.

8. Further Research

The researcher had to depend on the literature from the websites and articles written in newspapers and magazines as there is a very less research done on microgreens. The researcher suggests that a primary research can be conducted in the field of microgreens to get the in depth knowledge of the use of microgreens in the commercial kitchens.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Commercial name</th>
<th>Family</th>
<th>Genus and species</th>
<th>Plant colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Arugula</td>
<td>Brassicaceae</td>
<td>Eruca sativa Mill.</td>
<td>Green</td>
</tr>
<tr>
<td>2</td>
<td>Bull’s blood beet</td>
<td>Chenopodiaceae</td>
<td>Beta vulgaris L.</td>
<td>Reddish-green</td>
</tr>
<tr>
<td>3</td>
<td>Celery</td>
<td>Apiaceae</td>
<td>Apium graveolens L.</td>
<td>Green</td>
</tr>
<tr>
<td>4</td>
<td>China rose radish</td>
<td>Brassicaceae</td>
<td>Raphanus sativus L.</td>
<td>Purlrish-green</td>
</tr>
<tr>
<td>5</td>
<td>Cilantro</td>
<td>Apiaceae</td>
<td>Coriandrum sativum L.</td>
<td>Green</td>
</tr>
<tr>
<td>6</td>
<td>Garnet amaranth</td>
<td>Amaranthaceae</td>
<td>Amaranthus hypochondriacus L.</td>
<td>Red</td>
</tr>
<tr>
<td>7</td>
<td>Golden pea tendrils</td>
<td>Fabaceae</td>
<td>Pism sativum L.</td>
<td>Yellow</td>
</tr>
<tr>
<td>8</td>
<td>Green basil</td>
<td>Lamiaceae</td>
<td>Ocimum basilicium L.</td>
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</tr>
<tr>
<td>9</td>
<td>Green daikon radish</td>
<td>Brassicaceae</td>
<td>Raphanus sativus L. var. longipinnatus</td>
<td>Green</td>
</tr>
<tr>
<td>10</td>
<td>Magenta spinach</td>
<td>Chenopodiaceae</td>
<td>Spinacia oleracea L.</td>
<td>Red</td>
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<tr>
<td>11</td>
<td>Mizuna</td>
<td>Brassicaceae</td>
<td>Brassica rapa L. ssp. nipposinica</td>
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</tr>
<tr>
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<td>Opal basil</td>
<td>Lamiaceae</td>
<td>Ocimum basilicium L.</td>
<td>Greenish-Purple</td>
</tr>
<tr>
<td>13</td>
<td>Opal radish</td>
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<td>Greenish-Purple</td>
</tr>
<tr>
<td>14</td>
<td>Pea tendrils</td>
<td>Fabaceae</td>
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<td>Green</td>
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<tr>
<td>15</td>
<td>Peppercress</td>
<td>Brassicaceae</td>
<td>Lepidium bonariense L.</td>
<td>Green</td>
</tr>
<tr>
<td>16</td>
<td>Popcorn shoots</td>
<td>Poaceae</td>
<td>Zea mays L.</td>
<td>Yellow</td>
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<tr>
<td>17</td>
<td>Nutrient purple kohlra</td>
<td>Brassicaceae</td>
<td>Brassica oleracea L. var. gonglyodes</td>
<td>Purlrish-green</td>
</tr>
<tr>
<td>18</td>
<td>Purple mustard</td>
<td>Brassicaceae</td>
<td>Brassica juncea (L.) Czern.</td>
<td>Purrish-green</td>
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<tr>
<td>19</td>
<td>Red beet</td>
<td>Chenopodiaceae</td>
<td>Beta vulgaris L.</td>
<td>Reddish-green</td>
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<tr>
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<td>Brassica oleracea L. var. capitata</td>
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<tr>
<td>21</td>
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<td>Purrish-green</td>
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<tr>
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<td>Red orach</td>
<td>Chenopodiaceae</td>
<td>Atriplex hortensis L.</td>
<td>Red</td>
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<tr>
<td>23</td>
<td>Red sorrel</td>
<td>Polygonaceae</td>
<td>Rumex acetosa L.</td>
<td>Reddish-green</td>
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<tr>
<td>24</td>
<td>Sorrel</td>
<td>Polygonaceae</td>
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<td>Green</td>
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<tr>
<td>25</td>
<td>Wasabi</td>
<td>Brassicaceae</td>
<td>Wasabia japonica Matsum.</td>
<td>Green</td>
</tr>
</tbody>
</table>

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