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Development and sensory evaluation of food products prepared from wheatgrass

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Abstract

Shoot of *Triticum aestivum* Linn. (Hindi Name-Gehun, Kanak, Sanskrit name-Godhuma) is called as a wheatgrass, belonging to family: Gramineae. This Project report is aimed for Developing Nutritionally Valuable Products with Wheatgrass to common products enhancing their Acceptability. Wheatgrass has been one of the leading sources of Protein, Fat, Carbohydrates, Calcium, Magnesium, and Phosphorus & Potassium. The Present study was carried out with the objectives i) To develop acceptable product from wheatgrass. ii) To find out the nutritive value of food product prepared by wheatgrass. iii) To assess the organoleptic evaluation of product prepared by wheatgrass. Different Products were developed with wheatgrass. Five recipes namely Idli, Soup, Chutney, Nimki and Cookies were prepared. The sensory evaluation was carried out by Five judges by using 9 point hedonic scale assigning scores 9 (like extremely) to 1 (dislike extremely). Acceptability was also evaluated with respect to Colour, Texture, Flavor, Taste and overall acceptability. The judges were mainly asked to indicate the presence or absence of wheatgrass aroma in these selected formulated recipes. After that data was compiled and analyzed statistically. The Colour, Texture and Flavor of Idli and cookies were liked very much. Taste and overall acceptability of all the products were liked very much except nimki. On applying of ANOVA test Non-significant difference was found regarding Colour, Texture, Taste, and Flavor and overall acceptability between all five recipes prepared from wheatgrass. Protein, Magnesium, Potassium and Calcium content was high in Idli, Nimki was rich in carbohydrates, fat & Phosphorus, Vitamin C was high in soup. All the products prepared from wheatgrass contain acceptable nutrients.

Keywords: CHO-Carbohydrates, ANOVA-Analysis of Variance, S.E-Standard error Vit-Vitamin, gm-Gram, mg-Milligram

Introduction

Shoot of *Triticum aestivum* Linn. (Hindi Name-Gehun, Kanak, Sanskrit name-Godhuma) is called as a wheatgrass, belonging to family: Gramineae. In the developing countries, many low-income families rely on a simple diet which mainly consists of staple food crops such as wheat, maize and rice that are poor sources of various nutrients and minerals. To provide a wholesome nutrition for a healthy and rejuvenating body, green foods could be very useful in providing nutrients like Vitamins, Proteins, Minerals and Antioxidants which are researched for numerous health benefits in USA, East Asian countries and Central Europe¹⁻³. Cereal grasses (young shoots of grain-bearing plants) including barley grass, wheatgrass are one such type of Green foods which are very beneficial for a healthy body. In Asia and Europe, wheatgrass and wheatgrass based products are consumed in the form of juices, powders and extracts for healthy growth of human body although limited scientific literature is available. At present, the wheatgrass is available in the form of products such as health supplements (powders, extracts) and medicines (tablets)^[1].

Wheatgrass can be traced back in history over 5000 years, to ancient Egypt and perhaps even early Mesopotamian civilizations. It is purported that ancient Egyptians found sacred the young leafy blades of wheat and prized them for their positive effect on their health and vitality^[2]. The consumption of wheatgrass in the Western world began in the 1930s as a result of experiments conducted by Charles Schnabel in his attempts to popularize the plant^[3]. By 1940, cans of Schnabel's powdered grass were on sale in major drug stores throughout the United States and Canada^[4].

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Tender wheatgrass is 8 to 10 days plant grown from bold wheat seeds. Which posses high chlorophyll content and essential vitamins, minerals, vital enzymes, dietary fibre, amino acid. Wheatgrass has been shown to posse's anti-cancer activity, anti-ulcer activity, anti-oxidant activity, anti-arthritis activity, and blood building activity in Thalassemia major. The major clinical utility of wheatgrass in disease conditions might be due to the presence of biologically active compounds and minerals in it and due to its antioxidant potential which is derived from its high content of bioflavonoids such as apigenine, quercitin, luteoline. Furthermore, indole compounds namely choline and laetrile present in it might be also responsible for its therapeutic potential. The presence of 70% chlorophyll, which is almost chemically identical to Hemoglobin, in wheatgrass, makes it more useful in various clinical conditions involving hemoglobin deficiency and other chronic disorders [5]. It has maximum health benefits like an advance therapy for cancer as well as Thalassemia disease. However its benefits are limited to those individuals who grow it daily and consume in fresh form or by juicing it immediately after cutting of the tender wheatgrass. In order to ease the adaptability of tender wheatgrass, the wheatgrass was grown in multi shelves rack, which has an advantage in terms of multifold utility of space available and efficient use of water [8].

Wheatgrass has twice the amount of vitamin A as carrot and higher in vitamin C than orange. It contains the full spectrum of B vitamins, as well as calcium, phosphorus, magnesium, sodium, and potassium in a balance ratio. Wheatgrass is a complete source of protein, supplying all of the essential amino acids, and more. It has about 20% of total calories coming from protein. This protein is in the form of poly peptides, simpler and shorter chains of amino acids that the body uses more efficiently in the blood stream and tissues. In addition to flooding the body with therapeutic dosages of vitamins, minerals, antioxidants, enzymes, and phytonutrients, wheatgrass is also a powerful detoxifier, especially of the liver and blood. It helps neutralize toxins and environmental pollutants in the body.

This is because wheatgrass contains beneficial enzymes that help protect us from carcinogens, including superoxide dismutase (SOD) that lessens the effects of radiation and digest toxins in the body. It cleanses the body from head to toe of any heavy metals, pollutants and other toxins that may be stored in the body's tissues and organs [9]. Wheatgrass juice has been used clinically to treat ulcerative colitis, aid breast cancer patients undergoing chemotherapy, and act as a potent antioxidant [6]. Wheatgrass has been identified as a complete

food providing all the nutrients than provided by any other foods [7].

The Present study was conducted with following objectives:

1. To develop acceptable product from wheatgrass.
2. To find out the nutritive value of food product prepared from wheatgrass.
3. To assess the organoleptic evaluation of product prepared from wheatgrass.

Nutritional Value of Wheatgrass per 100 gm [10]

Nutrients	100gm
Energy (Kcal)	30 kcal
Protein	1.4 gm
Fat	0.2 gm
carbohydrates	5 gm
Fiber	2 gm
Vitamin A	2000 IU
Folate	50 µg

USDA Food Composition Database

Material and Methods

The present investigation entitled "Development and sensory evaluation of products prepared from wheatgrass" was carried out in the University Department of Clinical Nutrition & Dietetics Vinoba Bhave University, Hazaribag. Fresh Wheatgrass shoot were collected which was cultivated in my home garden. The Wheatgrass shoot were separated and washed under running tap water and chopped. Base products of Wheatgrass were developed.

Recepies formulation

Five recepies namely Idli, Soup, Chutney, Nimki and Cookies were prepared.

Sensory evaluation

The recipes (Idli, Soup, Chutney, Nimki and Cookies) were evaluated to find out the overall acceptability. The sensory evaluation was carried out by a panel of Five judges by using 9 point hedonic scale assigning scores 9 (like extremely) to 1 (dislike extremely). Acceptability was also evaluated with respect to color, texture, flavor, taste, and over all acceptability. The judges were mainly asked to indicate the presence or absence of wheatgrass aroma in these formulated recipes. All the Recepies were replicated five times. After that data was compiled and analyzed statistically.

Wheatgrass Products	Replication
Idli	5
Soup	5
Chutney	5
Nimki	5
Cookies	5

Statically Analysis

The data were tabulated & subjected to analysis at the end of the study. The statistical techniques used were as described by Prasad (2006) & included the following four tests.

- Standard deviation
- Standard error
- Mean
- Analysis of Variance (ANOVA).

Results and Discussion

The result obtained from the present study has been illustrated as follows:

Table 1: Effect on color due to different techniques of cooking on different products prepared from Wheatgrass

Replication and Product	Sensory Score					Mean \pm S.E
	R1	R2	R3	R4	R5	
Idli	9	8.7	8.8	9	9	8.9 \pm 0.06
Soup	8.7	8.6	8.8	9	9	8.8 \pm 0.07
Chutney	8.8	8.7	8.8	8.8	9	8.8 \pm 0.04
Nimki	8.6	8.6	8.8	9	9	8.7 \pm 0.1
Cookies	9	8.7	8.8	9	9	8.9 \pm 0.06

F=3.01(4, 16) non-significant ($p \leq 0.05$)

Table 1 shows that mean score of colour was maximum for Idli and Cookies (8.9) followed by Soup and Chutney (8.8) & Nimki (8.7) scored the last. ANOVA Table shows non-significant difference between colour of different 5 products. So, it can be concluded that the color of different products were liked very much.

Table 2: Effect on texture due to different techniques of cooking on different products prepared from Wheatgrass

Replication and Product	Sensory Score					Mean \pm S.E.
	R1	R2	R3	R4	R5	
Idli	9	8.7	8.8	9	9	8.9 \pm 0.06
Soup	8.8	8.6	8.8	8.8	9	8.8 \pm 0.06
Chutney	8.8	8.7	8.8	8.8	9	8.8 \pm 0.05
Nimki	8.7	8.6	8.7	8.8	9	8.7 \pm 0.07
Cookies	9	8.7	8.8	9	9	8.9 \pm 0.06

F=3.01 (4, 16) non-significant ($p \leq 0.05$)

The Table 2, shows that mean scores based on the hedonic scale for texture of different products. Mean of texture was maximum for Idli and Cookies (8.9) followed by Soup and Chutney (8.8) & Nimki (8.7) scored the last. ANOVA table shows non-significant difference between textures of different products. So, it can be concluded that the texture of different products were liked very much. The Table 3 shows that mean scores based on the hedonic scale for flavour of different products. Mean of flavour was maximum for Idli and Cookies (8.9) & Soup, Chutney and Nimki (8.8) scored the same. ANOVA table shows non-significant difference between flavour of different products. So, it can be concluded that the flavour of different products were liked very much. The Table 4 shows that mean scores based on the hedonic scale

Table 6: Nutritive value of products prepared from wheatgrass (100gm)

Product	Carbohydrates (Gm)	Protein (Gm)	Fat (Gm)	Vit C. (Mg)	Magnesium (Mg)	Potassium (Mg)	Phosphorus (Mg)	Calcium (Mg)
Idli	71.4	14.05	1.76	3.64	156	462	123.2	379.2
Soup	11.47	3.09	7.22	17.14	33.3	251.5	112.4	47.9
Chutney	11.63	2.27	5.06	3.74	26.05	147	75.2	37.3
Nimki	75.9	12.95	15.96	3.64	77	277	196.2	47.2
Cookies	47.06	12.04	10.07	3.94	25.7	157.7	127.2	75.6

Table 6, shows that maximum protein, magnesium, potassium and calcium was found in Idli., maximum Vitamin C was found in Soup., CHO, Fat and Phosphorus rich in Nimki

for taste of different products. Mean of taste was maximum for Idli, Soup chutney and Cookies (8.8) & Nimki (8.7) scored the last. ANOVA table shows non-significant difference between tastes of different 5 products. So, it can be concluded that the taste of different products were liked very much.

Table 3: Effect on flavor due to different techniques of cooking on different products prepared from Wheatgrass

Replication and Product	Sensory Score					Mean \pm S.E
	R1	R2	R3	R4	R5	
Idli	9	8.7	8.8	9	9	8.9 \pm 0.06
Soup	8.7	8.6	8.8	9	9	8.8 \pm 0.08
Chutney	8.8	8.7	8.8	8.8	9	8.8 \pm 0.05
Nimki	8.8	8.7	8.8	8.8	9	8.8 \pm 0.05
Cookies	9	8.7	8.8	9	9	8.9 \pm 0.06

F=3.01 (4, 16) non-significant ($p \leq 0.05$)

Table 4: Effect on taste due to different techniques of cooking on different products prepared from Wheatgrass

Replication and Product	Sensory Score					Mean \pm S.E
	R1	R2	R3	R4	R5	
Idli	8.7	8.7	8.8	9	9	8.8 \pm 0.1
Soup	8.7	8.6	8.8	9	9	8.8 \pm 0.06
Chutney	8.8	8.7	8.8	8.8	9	8.8 \pm 0.06
Nimki	8.6	8.6	8.7	8.8	9	8.7 \pm 0.06
Cookies	8.7	8.7	8.8	9	9	8.8 \pm 0.1

F=3.01 (4, 16) non-significant ($p \leq 0.05$)

Table 5: Effect on over acceptability due to different techniques of cooking on different products prepared from Wheatgrass

Replication and Product	Sensory score					Mean \pm S.E
	R1	R2	R3	R4	R5	
Idli	8.7	8.7	8.8	9	9	8.8 \pm 0.07
Soup	8.7	8.6	8.8	9	9	8.8 \pm 0.08
Chutney	8.8	8.7	8.8	8.8	9	8.8 \pm 0.05
Nimki	8.7	8.6	8.7	8.8	9	8.7 \pm 0.07
Cookies	8.7	8.7	8.8	9	9	8.8 \pm 0.07

F=3.01 (4, 16) non-significant ($p \leq 0.05$)

The Tab 5 shows that mean scores based on the hedonic scale for over all acceptability of different products. Mean of overall acceptability was maximum for Idli, Soup, Chutney and Cookies (8.8) & Nimki (8.7) scored the last. ANOVA table shows non-significant difference overall acceptability of different 5 products. So, it can be concluded that the overall acceptability of different products were liked very much.

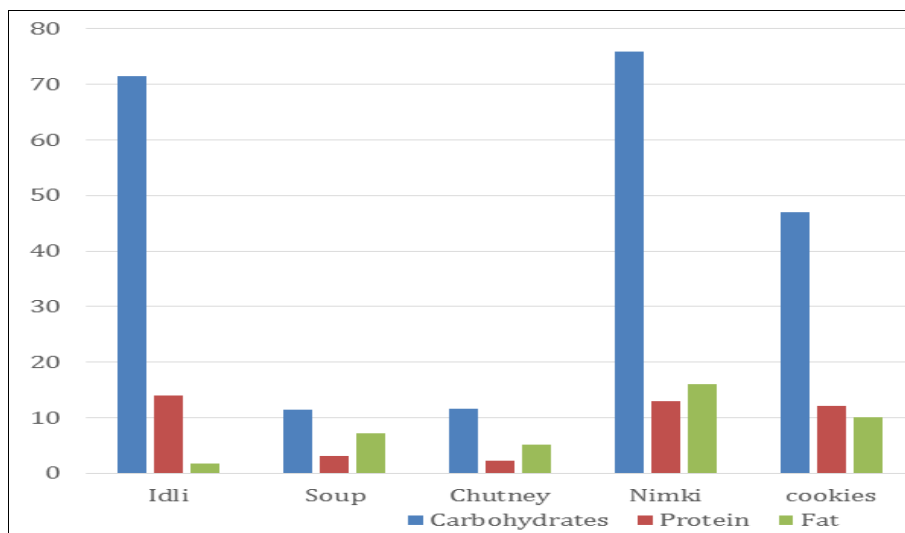


Fig 1: Carbohydrates, protein and fat content of different products prepared from wheatgrass

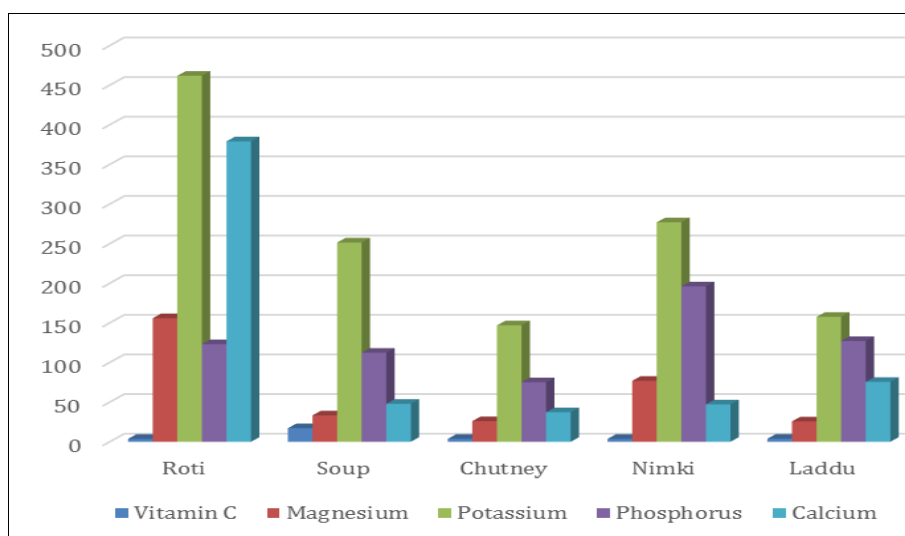


Fig 2: Vitamin C, magnesium, potassium, phosphorus and calcium content of different products prepared from wheatgrass

Conclusion

It was concluded that all the products prepared from wheatgrass were acceptable. Good amount of nutrients were present like Carbohydrates, Protein, Fat, Vitamin C, Magnesium, Potassium, Phosphorus and Calcium in different products prepared from wheatgrass. Wheatgrass is a very cost effective medicinal plant. The presence of 70% chlorophyll, which is almost chemically identical to hemoglobin, in wheatgrass makes it more useful in various clinical conditions involving hemoglobin deficiency and other chronic disorders. The knowledge should be spread to people that introduce regular consumption of Wheatgrass or Wheatgrass products in Diet for improving their nutritional status as well as quality & Diversity of food intake.

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