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Nutritional Composition, Phytochemical Analysis and Product Development from Green Food Triticum Aestivum

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Abstract

Wheat grass (***Triticum aestivum***) is one of the so-called green foods that are valued by health-conscious individuals as a great natural source of nutrients. This can be consumed in juice form and in powdered form. Considering its nutritional completeness and possible health implications of being blood builder, antioxidant, antiager, cell rejuvenator, cancer inhibitor, immune system supporter the study was undertaken to estimate nutritional composition and qualitative phytochemical analysis of wheat grass powder. About 100gm wheat grass powder was obtained from 1 kg of fresh wheat grass. Nutrient composition of wheat grass powder (WGP) was found to be impressive with protein content 25g per cent, fiber 30g per cent. Values of mineral ash, carbohydrate, moisture and fat were recorded as 4.8g, 33.7g, 6.3g and 0.2g respectively. Preliminary phytochemicals screening indicated the presence of Terpenoids, alkaloids, tannins, saponins, and sterols. The chlorophyll estimation indicated wheat grass powder contains 525 mg of chlorophyll in 100 g of *T. aestivum* powder . Thus it can be concluded that plant based wheat grass is an ideal supplement for general health and well being with therapeutic uses. It has an immense potential in the main stream of food processing industries as a health benefactor which proves to be beneficial for the society in prevention from life threatening diseases.

Keywords: Triticum aestivum; Green food; Nutritional composition; Phytochemicals; Wheat grass powder (WGP).

Introduction

Wheatgrass is a food prepared from the cotyledons of the common wheat plant, *Triticum aestivum.* It is sold either as a juice or powder concentrate. Diet occupies an important place during sickness and healthy condition. Our body has the inbuilt ability to heal itself if provided proper nutrition, environment and exercise. Wheatgrass is renowned for its therapeutic value since ancient times. The beneficial nutrients naturally obtained from wheatgrass helps to promote health and healing.

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In today's modern times, making the availability of triticum aestivum powder popularly known as wheatgrass powder has made its benefits accessible to needy people worldwide. A natural powder created from fresh wheatgrass is 100 per cent organically grown. No chemical fertilizer and pesticide is added and is perfect for health . Frequent consumption of Wheat Grass powder can help to eliminate toxins from body, reduces cholesterol and improves digestion. Chlorophyll of Wheat grass balances blood sugar. A nourishing and refreshing drink that best quenches thirst is suitable for both young and old. Wheatgrass has the amazing ability to concentrate maximum nutrients from the soil. Scientists have established that it has to be cultivated carefully and harvested at the 'jointing' stage (6 to 7 days in tropical climate) when its nutritional content is at its peak. Wheatgrass is a naturally rich source of Vitamins, Minerals, Amino acids, Enzymes, Chlorophyll and Dietary Fibre. In juice form it contains 70% chlorophyll, which is often referred to as the blood of plant life. It closely

resembles the molecules of human red blood cells. Chlorophyll has been shown to produce an unfavourable environment for bacterial growth in the body and therefore effective in increasing the body's resistance to illness.

Growing wheatgrass to about seven inches tall is optimum for its health benefits. Simply place selected grain in about one-inch of organic soil to enjoy one of the most cleansing and nutritious juices available. Wheat grass is easy to cultivate at home level and is not so popular in India therefore to create awareness about this "Sanjivini Buti" present study was undertaken to study nutrient composition and phytochemicals content of wheat grass powder.

Materials and Methods

Methodological aspects related to present study are discussed in three phases:

Phase I: Cultivation and Processing of Wheat Grass

The wheat grass (T. aestivum) used in this study was grown indoors until required for experiments. Earthen pot of 12 x12 inches and about 33 depth was filled with ½ inch soil. Overnight soaked *T. aestivum* seeds were then evenly spread over it and further covered with ½3 soil. Small quantities of water were sprinkled evenly over soil and 3-4 hours indirect sunlight was allowed daily for growth of grass. On the tenth day, when grass is about 7 inch tall, it is cut ½ inch above the surface of soil and shade dried and powdered.

Phase II: Analysis of Proximate Principles

This phase dealt with the analysis of the nutrient composition of wheat grass powder. Wheat grass powder was subjected to the determination of moistures, ash, crude fibers, proteins, fats, Irons, Calcium and vitamin C.[1]

Phase III: Analysis of Phytochemicals and Chlorophyll

Phytochemical analysis for major phytoconstituents like steroids, glycosides, terpenoids, saponins, tannins and flavonoids was undertaken. Fresh *T. aestivum* grass was subjected to qualitative tests by standard methods as described by Handa (1995) for preliminary phytochemical analysis.[2]

The chlorophylls are the essential components for photo synthesis, and occur in chloroplasts as green pigments in all photosynthetic plant tissues.[3] They are bound loosely to proteins but are readily extracted in organic solvents such as acetone of ether. Chlorophyll is extracted in 80 per cent acetone and the absorption is read in spectrophotometer.

Phase IV: Product Development and Sensory Evaluation

In the present study two baked products Muffins and Cookies were developed with variations in each recipe. One standard recipe (S) and its four variation were made by incorporating the wheat grass powder with the concentration of 0.5%, 1.0%, 1.5%, and 2.0% assigned as A, B, C and D respectively . Sensory evaluation of the recipes were carried out using 9-point hedonic rating scale with respect to various attributes namely appearance, color , texture, taste and over all acceptability of different product.

Results and Discussion

The results obtained from the present investigation have been discussed in the following subheads:

Processing of Wheat Grass (T. aestivum):

100 g Wheatgrass Powder, obtained from 1 kg of fresh Wheatgrass, can supply nourishment equal to that obtained from 23

kg of selected vegetables. Wheatgrass Powder is high in dietary fiber and thus helps maintain blood sugar level, cholesterol level and prevents constipation.The super energy, enzymes, and fresh juice of wheatgrass is a high quality nutition, health and energy boost.

Wheat grass is one of the so-called green foods that are valued by health-conscious individuals as a great natural source of nutrients. Wheatgrass is considered to be a complete food in itself. Due to its fibrous nature, which is indigestible by humans, wheatgrass must be liquefied before it can be consumed.

Nutritional Composition of Wheat Grass Powder

Nutrition composition of wheat grass powder are presented in Table 1 and results revealed that moisture content of wheat grass powder was 6.30 gm. Protein content of Wheat grass powder was 25 gm. It is a complete protein containing over 20 essential and non-essential amino acids. Fat content of wheat grass powder is 0.90 gm which contains essential fatty acids: Linolenic Acid and Linoleic Acid. Carbohydrate content was

Table 1: Nutrient Composition of Wheat Grass Powder

S. No.	Nutrient composition	Per 2 gm serving	Per 100 gm
1	Moisture (gm)	0.13	6.30
2	Protein (gm)	0.50	25.00
3	Fat (gm)	0.02	0.90
4	Carbohydrates(gm)	0.67	33.00
5	Mineral Ash (gm)	0.10	4.80
6	Fiber (gm)	0.6	30.00
7	Vitamin C(mg)	1.26	63.00
8	Calcium (mg)	1.48	73.80
9	Iron (mg)	1.04	52.00

Table 2: Preliminary Phytochemical Analysis of Wheat Grass

S No	Phytochemicals	Presence
1	Terpenoids	+ ve
2	Sterols	+ ve
3	Tanins	+ ve
4	Saponins	-ve
5	Glycoside	- ve
6	Flavonoids	- ve

Table 3: Chlorophyll Composition in Wheat Grass powder

Phytochemical	Per 2 gm	Per 100 gm
Cholorophyll	10.27mg	513.50 mg

calculated by different method results showed that it contain about 33 gm. Fiber content is very high (30 gm). Vitamin C content was 63 mg. Most of the Vitamin c is lost during drying process of green grass powder.

It is also a good source of total mineral (4.80 mg). Mineral composition of wheat grass powder indicated that calcium and iron found to be 73.8 and 52 mg respectively per 100 gm of wheat grass powder. Wheatgrass is an excellent source for all major and minor minerals, containing 92 of the 102 minerals found in the soil. It is especially high in calcium, magnesium, manganese, phosphorus and potassium, as well as trace minerals such as zinc and selenium.

Wheat grass is a good source of crude fiber, protein and vitamin c which are essential factors for maintenance of good health.[4]

Phytochemical Composition of Wheat Grass Powder

Phytochemicals are nutritive plant chemicals that contain protective and disease preventing compounds. They are often lumped together under the term "Phytochemicals" – "Phyto" from the greek word for plant, denoting their plant origins. Pharmacologically active plant phytochemicals include flavonoids, saponins, lignans and tannins. Preliminary phytochemical analysis of wheat grass powder showed that terpenoids, steroids and tanins were detected and whereas rest of the phytochemicals like saponins, glycosides and flavonoids were not found.

The amount of chlorophyll was 513.5 mg/ 100g. This establish that wheat grass is a healer, blood regenator also helpfull in reverse mutagenic activity.[5] Chlorophyll found in wheatgrass can prevent the growth of harmful bacteria. A number of studies have shown the ability of chlorophyll to retard the growth of bacteria in wounds, as well as confirming its

Table 4: Acceptability Evaluation of Muffins Supplemented with Wheat Grass Powder

Attributes	Standard	Supplemented with 0.5% WGP	Supplemented with 1.0% WGP	Supplemented with 1.5% WGP	Supplemented with 2.0% WGP
Appearance	9.0 ± 0	8.5 ± 0.52	8.1 ± 0.35	7.8 ± 0.66	6.9 ± 0.45
Color	9.0± 0.00	8.5 ± 0.45	7.9 ± 0.33	7.8 ± 0.79	6.9 ± 1.20
Odour	8.6± 0.52	8.4 ± 0.51	7.9 ± 0.36	7.4 ± 0.36	6.7 ± 1.20
Texture	8.6± 0.48	8.4 ± 0.51	7.8 ± 0.66	7.3 ± 0.5	6.7 ± 1.10
Taste	9.0± 0.00	8.7 ± 0.45	7.5 ± 0.84	7.4 ± 0.32	6.8 ± 0.90
Overall acceptability	8.7±0.23	8.5 ± 0.52	7.8 ± 0.66	7.2 ± 1.40	6.7 ± 0.98

Table 5: Acceptability Evaluation of Cookies Supplemented with Wheat Grass Powder

Attributes	Standard	Supplemented with 0.5% WGP	Supplemented with 1.0% WGP	Supplemented with 1.5% WGP	Supplemented with 2.0% WGP
Appearance	9.0 ± 0	8.6± 0.50	8.2 ± 0.44	7.9 ± 1.0	6.9 ± 0.95
Color	9.0 ± 0	8.2± 0.42	8.0 ± 0.00	7.9 ± 0.99	6.3 ± 1.4
Odour	8.8±0.33	8.2± 0.45	8.1 ± 0.94	7.4 ± 1.1	6.2 ± 1.7
Texture	8.8±0.32	8.3± 0.49	8.2 ± 0.74	7.2 ± 1.2	6.2 ± 1.7
Taste	8.9 0.23	8.4± 0.52	8.1 ± 0.66	7.1 ± 1.2	6.4 ± 1.3
Overall acceptability	8.9±0.23	8.6± 0.50	8.1 ± 0.99	7.3 ± 1.4	6.4 ± 1.8

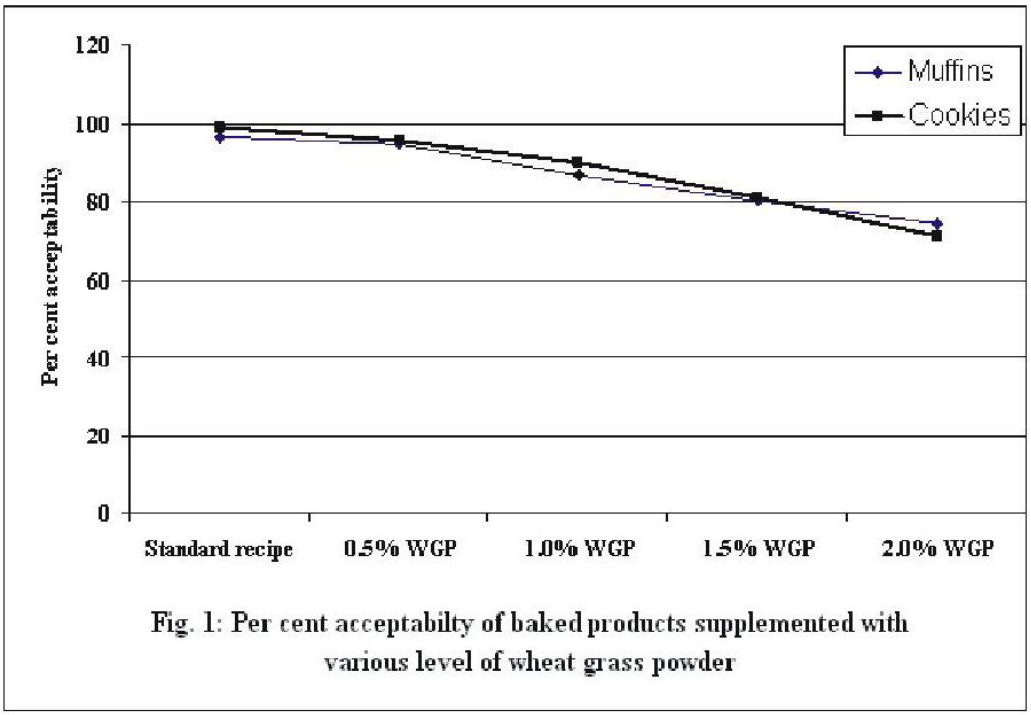

Fig. 1: Per cent acceptabilty of baked products supplemented with various level of wheat grass powder

anti-inflammatory properties.

Acceptability Evaluation of Product Developed

Two baked products namely muffins and cookies were developed . Muffins made by incorporating wheat grass powder scored 6.1 ± 1.8 to 8.5 ± 0.52 for all the attributes of appearance, color, texture and taste . Overall acceptability of the test products supplemented with 0.5% and 1% WGP (8.5 ± 0.52 and 7.8 ±

0.66) were acceptable as standard product except the test product supplemented with 1.5% and 2% WGP (7.2 ± 1.4 and 6.7 ± 0.98) which were slightly liked by the semi trained panel members. Thus the muffins supplemented with 0.5% and 1% WGP were almost equally acceptable as standard recipe of muffins (Fig 1).

Cookies prepared by incorporation with wheat grass powder scored between 6.2 ± 1.7 to 8.6 ± 0.42 for all the attributes of appearance, color, texture and taste. Overall acceptability of the test products supplemented with 0.5% and 1% WGP (8.6 ± 0.5 and 8.1 ± 0.99) were acceptable as standard product except the test product supplemented with 1.5% and 2% WGP (7.3 ± 1.4 and 6.4 ± 1.8) were slightly liked by the semi trained panel members (Table 4). Thus the cookies supplemented with 0.5% and 1% WGP was almost equally good as standard (Fig.1). Thus it can be concluded that baked products can be supplemented with 0.5 to 1.0% of wheat grass powder .

Conclusion

The study conclude that the use of wheat grass powder could be of immense help in leading a healthy life. Although the medicinal and therapeutic uses of wheat grass is well noted, yet the utilization is not widespread. Wheat grass is an ideal supplement for general health and well being which proves to be beneficial for the society in prevention from life threatening diseases. The amount of chlorophyll in grass is very high, this establishes that wheat grass is a healer, blood regenator and also helpful in reversing mutagenic activity. Awareness among people about the availability, nutritional and therapeutic values of wheat grass can be done by using wheat grass powder as an ingredient in product development. One teaspoon of wheat grass powder is recommended for daily basis.

References

1. Sharma S. Practical biochemistry. Jaipur: Classic Publishing House; 2007, 269-271.
2. Handa SS. Quality control and standardization of herbal material and traditional remedies. *East Pharma.* 1995; 38: 23-25.
3. Harborne, JB. *Phytochemical methods: A guide to modern techniques of plant analysis.* 2nd ed. London: Chapmann and Hall; 1983.
4. Meyerowitz and Steve. Wheat grass natures finest medicine. *Mass US: Sproutman.* 1999; 58: 98-106.
5. Wigmore A. The wheat grass book. United States of America, Avery a member of Penguin Putnam Inc. 1985.