

Determination of Minerals and Antioxidant Activities at Different Levels of Jointing Stage in Juice of Wheat Grass -The Green Wonder

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ABSTRACT

Wheatgrass becoming a very popular green plant now a day's due to its several beneficial roles in a human diseases such as (Cancer, Thalassaemia, Cardiovascular diseases). Wheatgrass Juice is an impressive source of vital nutrients; Antioxidants are capable of neutralizing the deleterious effects of free radicals. The present study was aimed to develop a juice from fresh wheatgrass which is cultivated in the pots using the grain seed (soaked in distilled water for 8 hours) and transfer them in pots. The germination of seeds starts after 4-6 days and gain our height (7-12 inches) in 10-14 days. The grass was cut from the pots in different required heights (7-8", 9-10", 11-12") and prepared juice for the analysis of minerals and antioxidants. The results found that the level of height 9-10 inches has richest nutrients, and antioxidants and showing the significance difference ($p \leq 0.05$) in the mean value of parameters. It is concluded from the study that the 9-10 inches height of wheat grass is the best to obtain the juice having richest level of nutrients and antioxidants. Wheatgrass juice can be recommended to various sections of the community in order to improve their nutrient intakes.

Keywords: Development, Wheatgrass juice, Cancer and antioxidants.

INTRODUCTION

Wheat grass, young grass of common wheat plant, is freshly juiced or dried into powder for animal and human consumption- both the forms provide chlorophyll, amino acid, minerals, vitamins and enzymes. The consumption of wheatgrass in the Western world began in the 1930s as a result of experiments conducted by Charles F. Schnabel, a food scientist who experimented with various mixtures of grain and feed and found that chickens fed on mixtures that contained a high proportion of wheat grass had grown better, were more healthy and had 150% better egg production than other hens. Further experimentation on other animals yielded the same results. Animals fed on wheatgrass were undoubtedly healthier than those fed on other grains³. Wheat Grass Juice (WGJ) is an extract squeezed from the mature sprouts of wheat seeds (*T. aestivum*). The use of WGJ for therapeutic purposes was developed and popularized by Dr. Ann Wigmore, as part of herb therapeutic nutritional Approach⁹. Towards this attempt, few studies have been conducted to evaluate the efficacy of wheat grass (in form of powder or juice) in the treatment of chronic diseases like cancer⁶, rheumatoid arthritis⁷, ulcer⁸, etc. In our Institute, International Institute of Herbal Medicine (IIHM), Lucknow, India, we have developed organic wheat grass in powder form, which is being clinically investigated in various disease conditions and its beneficial effects have been observed. In the present review, attempts have been made to provide state of art of scientific and clinical studies made on the use of *Triticum aestivum* Linn. in the prevention and treatment of various ailments for better understanding of therapeutic potential of this medicinal grass.

The pH factor of human blood is 7.4 and the pH factor of wheatgrass juice is also 7.4, which is why it is quickly absorbed into blood. Wheatgrass is an effective alternative to blood transfusion. Wheatgrass has the potential to increase the haemoglobin (Hb) levels, increase the interval between blood transfusions, and decrease the amount of total blood transfused in thalassemia Major and intermediate Patients⁹.

Wheatgrass sprout extract has been tested for its ability to induce fetal haemoglobin (HbF) production using advanced DNA technology. A rapid 3-5-fold increase has been observed which is "significantly greater than any of the pharmaceutical inducers available". The use of wheatgrass extract may eventually result in an improved quality of life for thalasseemics. Wheatgrass extract (Dr Wheatgrass Skin Recovery Cream), a topical anti-inflammatory Immunomodulator, substance P inhibitor, topical haemostatic agent, and stimulant of fibroblastic activity, with a wide range of healing properties, has been attracting lot of attention; it is also inexpensive. It was observed that wheatgrass cream reduces skin toxicity from radiotherapy.

MATERIAL AND METHODS

The present investigation "Bioactive Components, Minerals And Anti-Oxidant Activity in Juice of Wheatgrass at Different Heights" was conducted in the Research laboratory of Foods and Nutrition in the Department of Centre of Food Technology, University of Allahabad, Allahabad.

The details of materials, experiments, procedures and techniques followed that were adopted during the course of this investigation are corroborated in this chapter.

1. Procurement of wheat grains.
2. Experimental site.
3. Chemical analysis of selected heights of wheatgrass.
4. Method of preparation of the wheatgrass juice.
5. Chemical analysis of the wheatgrass juice.
6. Statistical analysis of the wheatgrass juice.

PROCUREMENT OF WHEAT GRAINS:

Wheat grains were purchased from the authorized shop of Allahabad. The grass was cultivated in different pots at the same time. After reaching the different required heights (7-8", 9-10", 11-12") the grass was cut from the pots.

EXPERIMENTAL SITE:

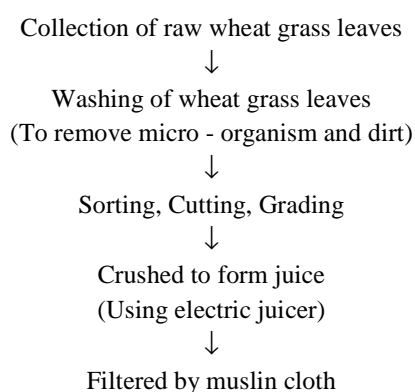
The investigation was carried out in the Research Laboratory of the Department of Foods and Nutrition, Centre of Food Technology, University of Allahabad.

ANALYSIS OF DIFFERENT HEIGHTS OF WHEATGRASS:

The identified Nutrients Content in Three types of heights.

METHOD OF PREPARATION OF WHEAT GRASSES JUICE:

For the preparation of juice from fresh wheatgrass leaves were used. Fresh (9-10 inches) height of wheatgrass generally gives the best juice.



Flow chart of the preparation of Wheatgrass juice using electric mixture

Source: Epub., 2011 Dec 16 Department of Food Technology and Biochemical Engineering, Jabalpur University,.

RESULTS AND DISCUSSION

The experimental study was conducted for analyzing the mineral content and antioxidant activity of the juice extracted from wheatgrass at three different heights i.e. 7-8 inches, 9-10 inches and 11-12 inches.

MINERALS CONTENT IN WHEAT GRASS JUICE AT DIFFERENT HEIGHTS**Table 4.2.5. Average Iron content of wheatgrass juice samples at different heights (mg/100ml)**

	N	Mean	Std. Deviation	ANOVA	Sum of Squares	df	Mean Square	Ftab(0.05 level)	Fcal
7-8"	3	17.00	1.562	Between Groups	8.193	2	4.097	5.14	8.066
9-10"	3	19.29	.793	Within Groups	8.018	6	1.336		
11-12"	3	18.52	.969	Total	16.211	8			
Total	9	18.27	1.424						

* Significant ($p \leq 0.05$)

Since $F_{cal} (8.066) > F_{tab} (5.14)$, there is significant difference in the mean scores of the Ascorbic acid content in the juice of wheat grass at different heights.

It is evident from the ANOVA table that the mean score of Beta carotene content in juice of wheat grass at 9-10" is the highest (19.29) and is significantly ($p \leq 0.05$) higher than the juice obtained from the wheat grass at the 7-8" (17) and 11-12" (18.52).

The experimental analysis clearly indicates that the amount of Iron varies with the height of the grass and maximum amount 19.29 mg/ gm found in 9-10 inches. Meyerowitz (1999) reported that 0.66 mg/gm Iron in the juice of wheat grass at different heights.

Table 4.2.6. Average Calcium content of wheatgrass juice samples at different heights (mg/100ml)

	N	Mean	Std. Deviation	ANOVA	Sum of Squares	df	Mean Square	Ftab(0.05 level)	Fcal
7-8"	3	130.00	1.000	Between Groups	1357.011	2	678.506	5.14	64.427
9-10"	3	160.08	1.009	Within Groups	6.036	6	1.006		
11-12"	3	145.00	1.000	Total	1363.047	8			
Total	9	145.03	13.053						

* Significant ($p \leq 0.05$)

Since $F_{cal} (64.427) > F_{tab} (5.14)$, there is significant difference in the mean scores of the Ascorbic acid content in the juice of wheat grass at different height.

It is evident from the ANOVA table that the mean score of Beta carotene content in juice of wheat grass at 9-10" is the highest (160.08) and is significantly ($p \leq 0.05$) higher than the juice obtained from the wheat grass at the 7-8" (130) and 11-12" (145).

The experimental analysis clearly indicates that the amount of Calcium varies with the height of the grass and present study shows maximum amount 160.08 mg/gm found in 9-10 inches. observed the 7.2 mg /gm calcium in the juice of wheat grass.

Table 4.2.7. Average magnesium content of wheatgrass juice samples at different heights (mg/100ml)

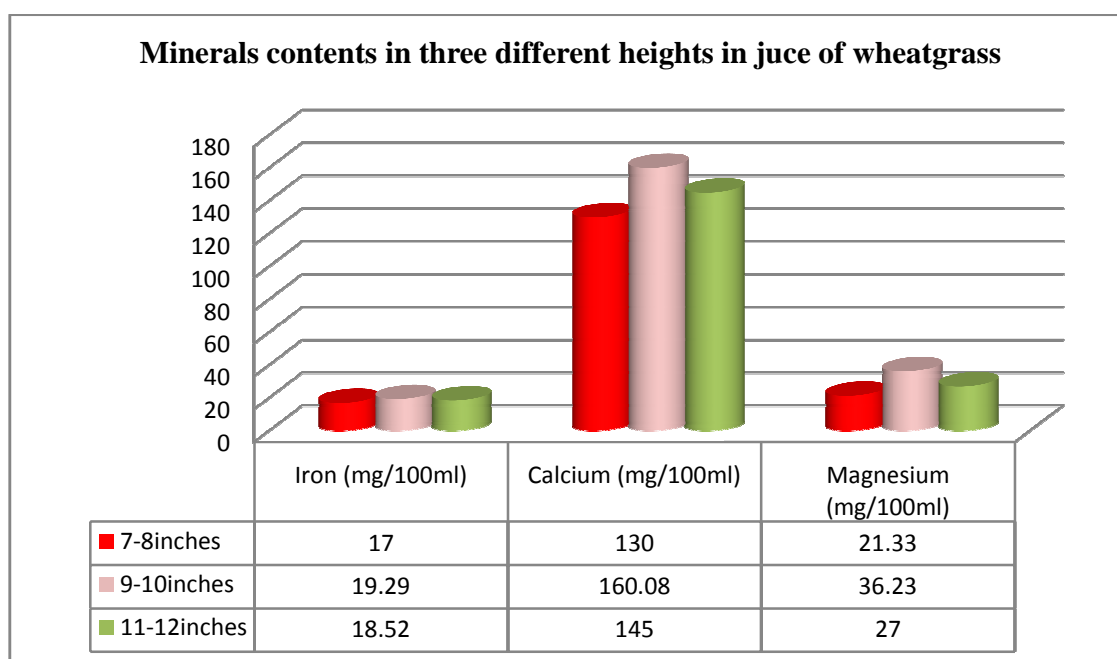
	N	Mean	Std. Deviation	ANOVA	Sum of Squares	df	Mean Square	Ftab(0.05 level)	Fcal
7-8"	3	21.33	1.528	Between Groups	339.054	2	169.527	5.14	67.924
9-10"	3	36.23	2.038	Within Groups	14.975	6	2.496		
11-12"	3	27.00	1.000	Total	354.029	8			
Total	9	28.19	6.652						

* Significant ($p \leq 0.05$)

Since $F_{cal} (67.924) > F_{tab} (5.14)$, there is significant difference in the mean scores of the Ascorbic acid content in the juice of wheat grass at different heights.

It is evident from the ANOVA table that the mean score of Beta carotene content in juice of wheat grass at 9-10" is the highest (36.23) and is significantly ($p \leq 0.05$) higher than the juice obtained from the wheat grass at the 7-8" (21.33) and 11-12" (27).

The experimental analysis clearly indicates that the amount of Magnesium varies with the height of the grass and present study shows maximum amount 36.23 mg/gm found in 9-10 inches. reported that 8 mg /gm magnesium found in wheatgrass juice.

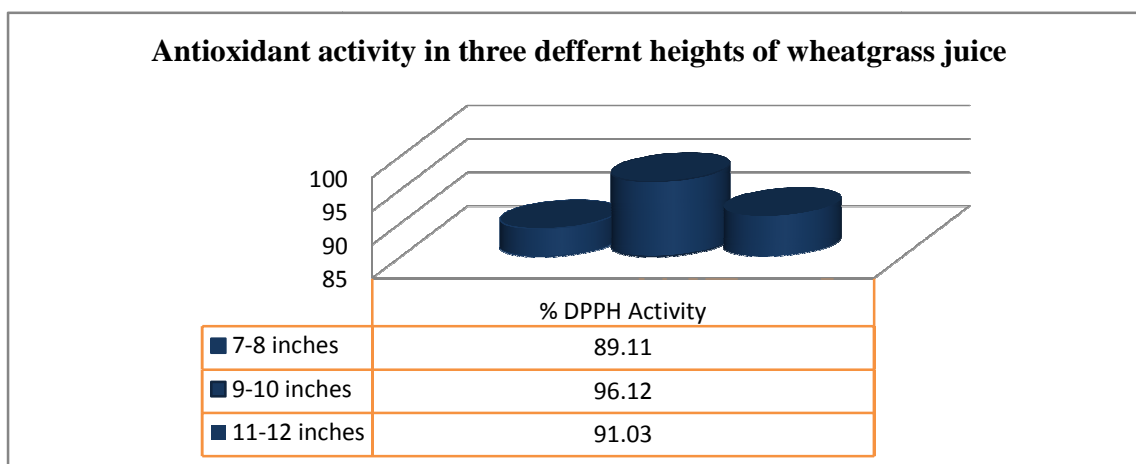


4.3 ANTIOXIDANT ACTIVITY IN WHEATGRASS JUICE AT DIFFERENT HEIGHTS:

Table 4.3.8. Average content 1, 1-Diphenyl-2-picrylhydrazyl of wheatgrass juice samples at different heights (percentage)

	N	Mean	Std. Deviation	ANOVA	Sum of Squares	df	Mean Square	Ftab(0.05 level)	Fcal
7-8"	3	89.11	1.017	Between Groups	78.851	2	39.426	5.14	38.394
9-10"	3	96.12	1.022	Within Groups	6.161	6	1.027		
11-12"	3	91.03	1.001	Total	85.013	8			
Total	9	92.09	3.260						

* Significant ($p \leq 0.05$)



Since $F_{cal} (38.394) > F_{tab} (5.14)$, there is significant difference in the mean scores of the Ascorbic acid content in the juice of wheat grass at different heights.

It is evident from the ANOVA table that the mean score of Beta carotene content in juice of wheat grass at 9-10" is the highest (96.12) and is significantly ($p \leq 0.05$) higher than the juice obtained from the wheat grass at the 7-8" (89.11) and 11-12" (91.03).

The experimental analysis clearly indicates that the amount of DPPH varies with the height of the grass and maximum amount 96.12 % found in 9-10 inches. DPPH, minerals, and most of the vitamins found in cereal grasses reach their peak concentrations in the period just prior to the jointing stage which is between 7-10 inches of the green plant.

Similar study was also been reported by Kulkarni *et al.*⁶ who analyzed the nutritive value of 1.476% of wheatgrass juice.

CONCLUSION

The present study entitled "**Bioactive Components Minerals and antioxidant activity in wheatgrass juice at different heights**" was undertaken with following objective: (1) to analyze the bioactive components in juice extracted from the wheatgrass of different heights. (2) to assess the minerals contents of juice extracted from the wheatgrass of different heights. (3) to assess the antioxidant activity of juice extracted from wheatgrass of different heights.

The experiment was conducted in the research Laboratory of Centre of Food Technology, University of Allahabad. The Wheatgrass juice at different heights was prepared from electric mixture and then strained by muslin cloth. The entire experiment was conducted to determine the minerals and antioxidant activity in the juice of wheat grass at different heights that is 7-8 inches, 9-10 inches and 11-12 inches. **Rangana (2000)** methods were used to estimate the Calcium and Iron and Magnesium was estimated by **AAS**. Antioxidant Activity was estimated by **DPPH method**. SPSS version 12 was used to analyse the data.. F test was applied for analysis of variance between mean values.

Laboratory analysis of minerals shows that the maximum iron content was in the juice of wheat grass at 9-10 inches (19.29 mg/100ml) followed by 11-12 inches (18.52 mg/100ml) inches and 7-8 inches (17mg/100ml). Maximum calcium content was in the juice of grass at 9-10 inches (160.08mg/100ml) followed by 11-12 inches (145mg/100ml) 7-8 inches (130mg/100ml) Magnesium content was maximum in the juice of grass at 9-10 inches (36.23 mg/100ml) followed by 11-12 inches (27/100ml) inches and 7-8 inches (21.33/100ml). Therefore,

Laboratory analysis of the juice shows that maximum antioxidant activity (DPPH%) was in the juice of grass at 9-10 inches (96.12 %) followed by 11-12 inches (91.03%) inches and 7-8 inches (89.11%) .

It can be concluded from the study that the 9-10 inches height of wheat grass is the best to obtain the juice having richest level of bioactive components (chlorophyll, ascorbic acid, beta carotene, TPC), minerals (iron, mg, calcium) and antioxidant.

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