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EVALUATION OF ANTI-OXIDANT PROPERTIES OF WHEAT GRASS POWDER AS AFFECTED BY DIFFERENT DRYING PROCESSES

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ABSTRACT: Wheatgrass is one grass that has been demonstrated to be of particular use to humans as a nutritional source of vitamins, enzymes, minerals, trace minerals and chlorophyll in addition to its various health benefits. Wheat grass in powder form is a method for preserving wheat grass nutrients with long shelf life and use of wheat grass powder is more convenient than wheat grass juice. **Objective:** To estimate the antioxidant properties of wheat grass powder obtained by different drying methods. **Research Design:** Different drying methods used for preparation of wheat grass powder were 1) Hot air oven drying [50°C, 6 hr and 60°C, 5hr] 2) Microwave drying [600W, 15 min and 800 W, 10 min] 3) Vacuum oven drying [50°C, 25kPa, 6 hr]. For estimation of the antioxidant properties of wheat grass powder samples, chlorophyll content, Total Phenol Content and % Anti-Radical Activity were measured. **Result:** In the quantitative analysis of antioxidant component, microwave dried wheat grass powder samples [600W, 15 min] had highest mean value of total phenol content (25.20), chlorophyll (23.33) and 2, 2-diphenyl-1-picrylhydrazyl scavenging ability (58.29) in comparison with the other samples of the wheat grass powder obtained by hot air oven drying and vacuum oven drying. Thus it was observed that microwave drying method was the best in comparison to other methods to prepare the wheat grass powder and utilize it daily life.

INTRODUCTION: The mature sprouts of Wheat seeds (*Triticumaestivum*) known as Wheat Grass and it is one grass that has been demonstrated to be of particular use to humans as a good nutritional source. Wheatgrass is a good source of calcium, iron, sodium, potassium, and magnesium, as well as trace minerals, all B Vitamins, pro-Vitamin A, Vitamin E, and Vitamin K. In addition, wheatgrass has seventeen amino acids, eight live enzymes, and chlorophyll¹.

Wheat grass in powder form is a method for preserving wheat grass nutrients which consistently achieving protein assays exceeding forty percent and which also has optimally high levels of live enzymes and readily absorbable minerals as well as trace minerals for use in maintaining good human health and enhanced resistance to disease².

Wheatgrass contains an abundance of chlorophyll and structure of chlorophyll is similar to that of hemoglobin, which makes it possible for our body to convert chlorophyll into hemoglobin. So chlorophyll increases the hemoglobin index in human body, which makes it the best choice for treating anemia. In addition, chlorophyll and % anti-radical activity of wheat grass is more powerful than any other remedies in helping the human body resists carcinogens. It strengthens the

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functions of liver, neutralizes toxic compounds as well as eliminates toxins in blood³.

MATERIALS AND METHODS:

Procurement of raw material:

The wheat grass leaves grown indoors in the mud pots and it was cut when the wheatgrass growth was at the first node stage having length of 10-12 inches, known as pre-jointing stage.

Experimental Site:

Research Laboratory of the Centre of Food Technology, University of Allahabad, Allahabad.

Method of preparation of wheat grass powder:

The fresh wheat grass leaves was collected for washing, sorting, cutting and grading to remove micro-organism and dirt. After that leaves were dried by different drying methods i.e. hot air oven

drying (50°C, 6 Hour and 60°C, 5hr), microwave drying (600 W, 15 min and 800 W, 10 min) and vacuum oven drying (50°C, 15lb, and 7hr). Dried leaves grinded in powdered form and stored for the analysis.

Chemical analysis:

The anti-oxidant activity of wheat grass powder were analyzed by % anti-radical activity estimation by 2, 2-diphenyl-1-picrylhydrazyl method, Total phenol content estimation by mg gallic acid equivalent/g dry weight method and chlorophyll content estimation by Arnon (1949)⁴ method. Statistical analysis of the data- F- test was applied for analysis of variance to find the significant difference in the means of the sample.

RESULTS AND DISCUSSIONS:

TABLE 1: AVERAGE CHLOROPHYLL CONTENT (mg/100g) OF WHEAT GRASS POWDER OBTAINED BY DIFFERENT DRYING PROCESSES

DRYING VARIATIONS	N	Mean	Sd.	ANOVA	Sum of Squares	df	Mean Square	Fcal (0.05)	Ftab
HAO (50 C /6 H)	3	279.000	4.5825	Between Groups	3242.26	4	810.56	12.56	
HAO (60 C /5 H)	3	306.000	8.0000	Within Groups	645.333	10	64.533		3.48*
MW (600 W/ 15 m)	3	322.333	7.0237	Total	3887.60	14			
MW (800 W/ 10 m)	3	310.666	11.015						
VAC (1)	3	295.000	8.1853						
Total	15	302.600	16.663						

*Significant $p \leq (0.05)$

The data illustrated in the above table shows that $F_{cal} (12.56) > F_{tab} (3.48)$, then there is significant difference in the mean scores of the chlorophyll content in the samples of wheat grass powder obtained by different drying process. It is evident from the ANOVA table that the mean score of chlorophyll content of wheat grass powder prepared by microwave drying [600W, 15 min] is the highest (322.3) and is significantly ($p \leq 0.05$) higher than the wheat grass powder obtained by microwave drying [800 W, 10 min.] (310.6), hot air oven drying [60°C, 5hr] (306), vacuum oven drying [50°C, 15lb, 6 hr] (295) and hot air oven drying [50°C, 6hr] (279). In a similar study, it has been observed that the average chlorophyll content of the wheat grass was 540 mg/100g⁵.

The data illustrated in the above table shows that $F_{cal} (12.56) > F_{tab} (3.48)$, then there is significant difference in the mean scores of the % anti-radical activity in the samples of wheat grass powder obtained by different drying process. It is evident from the ANOVA table that the mean score of % anti-radical activity of wheat grass powder obtained by microwave drying [600W, 15 min] is the highest (58.2) and is significantly ($p \leq 0.05$) higher than the wheat grass powder prepared by microwave drying [800 W, 10 min.] (55.5), hot air oven drying [50°C, 6hr] (53.9), vacuum oven drying [50°C, 15lb, 6 hr] (49.9) and hot air oven drying [60°C, 5hr] (33.0).

TABLE 2: AVERAGE % ANTI-RADICAL ACTIVITY (PERCENTAGE) OF WHEAT GRASS POWDER OBTAINED BY DIFFERENT DRYING PROCESSES

Drying Variations	N	Mean	Sd.	ANOVA	Sum of Squares	df	Mean Square	Fcal (0.05)	Ftab
HAO (50 C /6 H)	3	53.910	.38743	Between Groups	1207.94	4	301.98	267.72	3.48*
HAO (60 C /5 H)	3	33.023	1.3687						
MW (600 W/ 15 m)	3	58.293	.85237	Total	1219.22	14			
MW (800 W/ 10 m)	3	55.520	.66091						
VAC (1)	3	49.953	1.5662						
Total	15	50.140	9.3320						

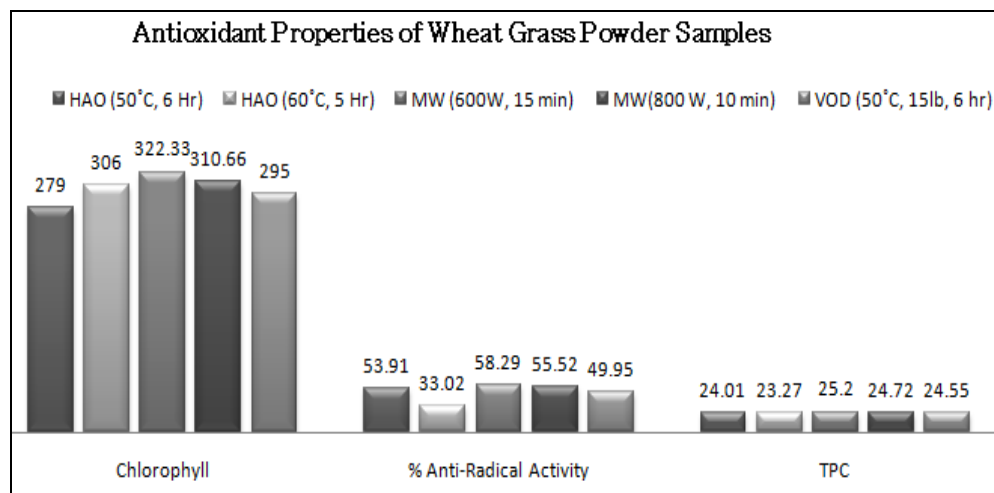
*Significant $p \leq (0.05)$ **TABLE 3: AVERAGE TOTAL PHENOL CONTENT (mg G.A/gm) OF WHEAT GRASS POWDER OBTAINED BY DIFFERENT DRYING PROCESSES**

Drying Variations	N	Mean	Sd.	ANOVA	Sum of Squares	df	Mean Square	Fcal (0.05)	Ftab
HAO (50 C /6 H)	3	24.0067	.48521	Between Groups	6.580	4	1.645	11.25	3.48*
HAO (60 C /5 H)	3	23.2700	.03606						
MW (600 W/ 15 m)	3	25.2033	.53003	Total	8.041	14			
MW (800 W/ 10 m)	3	24.7233	.44501						
VAC (1)	3	24.5533	.12220						
Total	15	24.3513	.75785						

*Significant $p \leq (0.05)$

The data illustrated in the above table shows that Fcal (12.56) > Ftab (3.48), then there is significant difference in the mean scores of the total phenol content of different samples of wheat grass powder obtained by different drying process. It is evident from the ANOVA table that the mean score of total phenol content of wheat grass powder obtained by

microwave drying [600W, 15 min] is the highest (25.2) and is significantly ($p \leq 0.05$) higher than the wheat grass powder prepared by microwave drying [800 W, 10 min.] (24.7), hot air oven drying [50°C, 6hr] (24), vacuum oven drying [50°C, 15lb, 6 hr] (24.5) and hot air oven drying [60°C, 5hr] (23.3).

**FIG.1: ANTIOXIDANT PROPERTIES OF WHEAT GRASS POWDER SAMPLES**

CONCLUSION: From the results summarized above, it can be concluded that in the quantitative analysis of antioxidant components, microwave dried wheat grass powder samples had the highest value of chlorophyll, total phenol content and DPPH scavenging activity while hot air dried sample had lowest value among all the samples of wheat grass powder obtained by different drying methods. So microwave drying is best method for preparation of wheat grass powder which is beneficial for the treatment of various degenerative diseases of humans.

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REFERENCES:

- Meyerowitz and Steve: "Nutrition in Grass"-Wheatgrass Nature's Finest Medicine: The Complete Guide to Using Grass Foods & Juices to Revitalize Your Healthpp 1999; 186-187. *Healthy Living Publications*.
- Kulkarni SD, Acharya R, Nair AGC, Rajurkar N and Reddy AVR. :Determination of elemental concentration profiles in tender wheatgrass (*Triticum aestivum* L.) using instrumental neutron activation analysis. *Food Chemistry* 2006; 95(4):699-707.
- Ferruzzi MG and Blakeslee J. Digestion, absorption, and cancer preventative activity of dietary chlorophyll derivatives. *Nutrition Research* 2007;27:1– 12.
- Arnon DI: Copper enzymes in isolated chloroplasts, polyphenoxidase in beta vulgaris. *Plant Physiology* 1949; 24: 1-15.
- Kulkarni SD, Acharya R, Rajurkar NS and Reddy AVR. Evaluation of bio-accessibility of some essential elements from wheatgrass (*Triticum aestivum* L.) by *in vitro* digestion method. *Food Chemistry* 2007; 103(2):681-688.
- Alitheen NB, Oon CL, Keong YS, ChuanTK, Li HK and Yong HW: Cytotoxic effects of commercial wheatgrass and fiber towards human acute promyelocytic leukemia cells (HL60). *Pakistan Journal of Pharmaceutical Sciences* 2011; 24(3):243-50.
- Bar-Sela G, Tsalic M, Fried G and Goldberg H: Wheat Grass Juice May Improve Hematological Toxicity Related to Chemotherapy in Breast Cancer Patients: A Pilot Study. *Nutrition and Cancer* 2007; 58(1):43–48
- Ben-Arye E, Goldin E, Wengrower D, Stamper A, Kohn R and Berry E: Wheat Grass Juice in the Treatment of Active Distal Ulcerative Colitis: A Randomized Double-blind Placebo-controlled Trial. *Scandinavian Journal of Gastroenterology* 2002; 37(4):444-449.
- Das A, Raychaudhuri U and Chakraborty R: Effect of freeze drying and oven drying on antioxidant properties of fresh wheatgrass. *International Journal of Food Sciences and Nutrition* 2011; 31(1):644-769.
- James S and Phyllis A (2007) Compositional, Nutritional and Functional evaluation of Wheat Grass (*Triticumaestivum*). *Journal of Food Processing and Preservation* 15(1):63-77.
- Kulkarni SD, Acharya R, Rajurkar NS and Reddy AVR: Evaluation of bio-accessibility of some essential elements from wheatgrass (*Triticum aestivum* L.) by *in vitro* digestion method. *Food Chemistry* 2007; 103(2):681-688.
- Kulkarni SD, Tilak JC, Acharya R, Rajurkar NS, Devasagayam TPA and Reddy AVR: Evaluation of the Antioxidant Activity of Wheatgrass (*Triticum aestivum*L.) as a Function of Growth under Different Conditions. *Phytotherapy Research* 2006; 20:218-227.
- Rowena TR, Zhang R, Teter S and Mc Garvey JA. The effect of enzyme addition on anaerobic digestion of *Jose Tall* Wheat Grass. *Bioresource Technology* 2009; 100(20):4564-4571
- Singh K, Pannu MS, Singh P and Singh J. Effect of Wheat Grass Tablets on the Frequency of Blood Transfusions in Thalassemia Major. *Indian Journal of Pediatrics* 2010; 77(1):90-91.
- Telekes A, Hegedus M, Chae CH and Vekey K. Avemar (wheat germ extract) in cancer prevention and treatment. *Nutrition and Cancer* 2009; 61(6):891-9.

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