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WHEATGRASS: A NEW ERA OF DIETARY SUPPLEMENTS

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ABSTRACT

Wheatgrass is one of nature's true super foods and can be considered as a complete food capable of sustaining human life in the absence of other nourishment for long periods. Single-track approach to nutrition is not recommended, but this amazing thing contains almost everything necessary to keep us going. It is a very good provider of the proteins required for cell regeneration and is renowned for its healing properties. Apart from being a blood builder, wheatgrass is also a blood purifier greatly assisting in the removal of waste products of the body because of its 'detergent' properties. It helps drainage of the lymphatic system and breaks down mucous, which can render the body's natural processes less efficient. It is said to be helpful in the removal of carcinogens, harmful chemicals and heavy metals present in the body. It is also an excellent blood tonic as it increases the hemoglobin content of the blood and improves oxygen transport. It has natural antibiotic properties, which help to maintain a healthy digestive tract. It can also be used externally to help with wounds, skin conditions, and dandruff. The vitamin content of this is outstanding and it is a powerful antioxidant. Thus it can be said that wheat grass is a fabulous supplement as it consists nutrients having therapeutic value as vitamins, mineral, enzymes, protein and chlorophyll.

Keywords:-Wheatgrass, Dietary Supplement, Green blood.

INTRODUCTION

Wheat grass is one of the so-called green foods that are valued by health-conscious individuals as a great natural source of nutrients. It is considered to be a complete food in itself. The fact is that one pound of fresh wheatgrass is equivalent in nutritional value to 23 pounds of choice garden vegetables. 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 unfavorable environment for bacterial growth in the body and therefore effective in increasing the body's resistance to illness. It is known as an alternative cancer therapy. Drinking of wheat grass juice helps our body to build red blood cells which carry oxygen to every cell. By increasing the oxygenation the body can help offset smog and carbon monoxide and increase our endurance during physical exercise [1]. Wheat grass has been found to dissolve scars formed in the lungs and in addition helps to wash drug deposits from the body, purifies the blood and organs and counteracts acids and toxins in the body. It helps to increase the enzyme level in our cells, aiding in the rejuvenation of the body and the metabolism of nutrients these enzymes assist in dissolving tumors [1]. Wheatgrass juice benefits the blood cells, bones,

glands, hair, kidneys, liver, muscles, spleen, teeth and other body parts. It can be applied to the skin or scalp and it has been used as a rectal implant via an enema to cleanse the large intestine. It can be used to cleanse eyes, gums, sinuses and teeth. Wheatgrass juice protects the lungs and blood from water and air pollution, toxins, cigarette smoke and heavy metals. It is also a safe and extremely potent aid to weight loss since it suppresses the appetite and stimulates circulation and metabolism. Wheatgrass can also be taken in tablet and powder form - very useful when travelling. People sensitive or even allergic to wheat and wheat products - usually to the gluten found in wheat and also rye, barley etc - have no problems with wheatgrass juice, since it contains no gluten in this form and hence can be considered as a "True Complete Super Food"[1]. It has been found to be responsive, alongside specific individualized lifestyle changes in the following conditions like Acne, ageing (premature), anemia, arthritis, asthma, bladder disorder, blood pressure (high or low), bone disorders, bronchitis, cancer, circulatory weakness, colitis, constipation, diabetes, eye disorders, fatigue, hay fever, hair loss, heart disease, hypoglycemia, impotence, infection, kidney disorders, liver disorders,

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lung disorders, nervous disorders, skin disorders, ulcer, weight loss. Wheatgrass being too much advantageous for public health, an attempt has been made to accumulate its all properties and prepare a review that would be beneficial for future researchers.

History

The consumption of wheatgrass in the Western World began in the 1930s as a result of experiments by Charles F. Schnabel and his attempts to popularize the plant [2,3]. Schnabel, an agricultural chemist, conducted his first experiments⁴ with young grasses in 1930, when he used fresh cut grass in an attempt to nurse dying hens back to health. The hens not only recovered, but they produced eggs at a higher rate than healthy hens. Encouraged by his results, he began drying and powdering grass for his family and neighbors to supplement their diets. The following year, Schnabel reproduced his experiment and achieved the same results. Hens consuming rations supplemented with grass doubled their egg production. Schnabel started promoting his discovery to feed mills, chemists and the food industry. By 1940, cans of Schnabel's powdered grass were on sale in major drug stores throughout the United States and Canada [2-5]. Grasses are the foundational food for most land based life. Wheatgrass was identified as the finest grass food of all after a series of intensive agricultural research studies spearheaded by Dr. Charles Schnabel and assisted by Dr. George Kohler, Dr. Richard Graham, Conrad A. Elvehjem and E. B. Hart in the 1930s, 40s and 50s. Of particular note, they performed direct comparisons of wheatgrass against other well regarded vegetables including spinach, broccoli and alfalfa. While animals fed these foods exclusively began to waste away, those fed only wheatgrass thrived on it. This spawned further research which showed that wheatgrass contains a broad spectrum of vitamins, minerals, antioxidants, amino acids, essential fatty acids and enzymes. In addition, their research also identified benefits that could not be associated with any of the known nutrients [6].

Juicing Origins

Juicing wheatgrass was started in the 1950's by Ann Wigmore independent of the agricultural research. The essence is that she was a Boston resident of Lithuanian descent who suffered from a variety of ailments in her early life. Drawing on her peasant background and the experiences of her grandmother, she healed herself with wild weeds, herbs and greens. She consumed many different types of greens and also fed the same to her animals. Her observations led her to conclude that wheatgrass was the best source of greens. One day, at a local yard sale, she picked up an old cast iron meat grinder. With a few modifications, the first wheatgrass juicer was born [6].

Cultivation and Harvesting

Wheat can be cultivated over a wide range of soils and can be successfully grown over large portions of the world, ranging in altitude from sea level to over 10,000 feet. Annual rainfall of 10 inches (254 millimeters) is generally considered the minimum, and the soil should be sufficiently fertile. Soil benefits from a good humus content (partially decayed organic matter), and chemical fertilizers are also helpful. Wheatgrass requires 200 days of slow growth, through the winter and early spring, when it is harvested at the jointing or reproductive stage. It is at this stage that the plant reaches its peak nutritional potential; after jointing, concentrations of chlorophyll, protein, and vitamin decline sharply [2].

Figure 1. Wheatgrass juice is extracted with a manual juicing machine.



Taxonomic position

Kingdom: Plantae
Division: Angiospermae
Class: Monocotyledons
Series: Coronarieae
Order: Liliales
Family: Liliaceae
Genus: Tritium
Species: Aestivum
Common name: Wheatgrass

Description of wheatgrass

Wheatgrass refers to the young grass of the common wheat plant, *Triticum aestivum* that is freshly juiced or ried into powder for animal and human consumption. Both provide chlorophyll, amino acids, minerals, vitamins, and enzymes. It is claimed that wheatgrass's health benefits ranges from providing supplemental nutrition to having unique curative properties. Some consumers grow and juice wheatgrass in their homes. It is often available in juice bars, alone or in mixed fruit and/or vegetable drinks. It is also available in many health food stores as fresh product, tablets, frozen juice and powder contents [2].

Figure 2. Wheat grass in field



Figure 3. Wheat



Nutritional claims

Wheatgrass is a humble weed that is a powerhouse of nutrients and vitamins for the human body. In the form of fresh juice, it has high concentrations of chlorophyll, active enzymes, vitamins and other nutrients. This nutrient-rich grass contains 17 amino acids which are the building blocks of proteins. The body uses these amino acids for things like building muscle tissue, repairing cells and clotting the blood. Wheatgrass retains 92 of the 102 minerals found in the soil. These minerals include calcium, phosphorus, iron, magnesium and potassium. It is a rich natural source of vitamins A and C. It has more vitamin C than oranges and twice the vitamin A of carrots. It is exceptionally rich in vitamins E, K, and B-complex. It is also a natural source of laetrile (B-17). It produces an immunization effect against many dietary carcinogens. 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. One ounce of wheatgrass juice is equivalent in food value to two and a half pounds of green leafy vegetables and it has chlorophyll that neutralizes infections, heals wounds, overcomes inflammations and gets rid of parasitic infections. It contains an enzyme (P₄D₁) capable of repairing faulty DNA. It is also a great skin cleanser and can be poured into the bath water for a refreshing soak. The best part is that it has 'live enzymes'. Each enzyme performs a specific function within the body in conjunction with other enzymes and they control all the

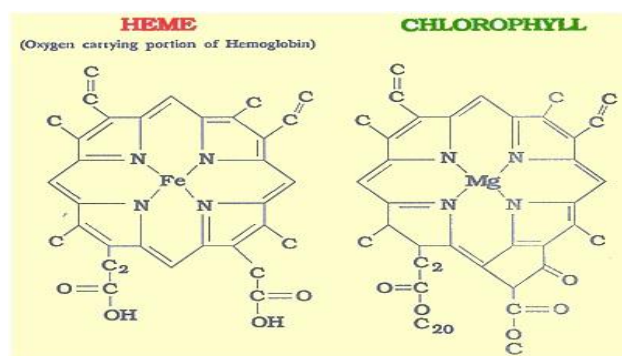
bodily functions. Enzymes also have a deterrent ability against cancerous cells. Unfortunately, the over-salted, processed modern diet provides little by way of enzymes.

The three most important effects of wheatgrass on the human body are: blood purification, liver detoxification, colon cleansing and colon cancer [7]. This is because wheat grass juice is the richest source of vitamins A, B, C, E and K, calcium, potassium, iron, magnesium, sodium, sulphur and 17 forms of amino acids [8]. Wheatgrass juice is literally condensed sunlight energy. It is one of the most potent healing agents on the planet. It is potent raw, living food. The grass itself comes from the common wheat plant (species *Triticum aestivum*) when it is young, vibrant and full of rich green chlorophyll. When the grass is squeezed, a dark green liquid is expressed and this is called wheatgrass juice. Wheatgrass is harvested for juicing when the grass reaches its nutritional peak. This is just before the jointing stage, when the plant is between 7 and 11 inches tall. At this point, it has accumulated energy which will soon power a massive growth spurt. It is this energy that is captured in the juice. When wheatgrass is juiced, it is volatile and will oxidize quickly. It is important to either rapidly consume it or immediately protect the juice from oxidation[6].

Hemoglobin and Chlorophyll - Similar Chemical Structure

The intense green color of wheatgrass juice is due to the chlorophyll content. The molecular structure of Chlorophyll contained in Wheatgrass bears a close resemblance to Hemoglobin contained in human blood. Dieticians therefore call Wheatgrass as "Green blood". The major difference between chlorophyll and hemoglobin is the central metal atom. In hemoglobin the central atom is Iron (Fe), and in chlorophyll it is Magnesium (Mg).

Figure 4. Structure of Hemoglobin and Chlorophyll



Comparison to other nutritional sources

Proponents of wheatgrass make many claims for its health properties, ranging from promotion of general well-being to cancer prevention and heavy-metal detoxification. None of these claims has been substantiated in the scientific literature³, though there is some evidence in support of the beneficial effects of

chlorophyll in the human diet [2,7,9,10]. Dr. Ann Wigmore, a pioneer of wheatgrass therapy, has used it and said that wheatgrass is a humble weed that is a powerhouse of nutrients and vitamins for the human body. Wheatgrass has been found to contain eleven times more calcium than found in cow's milk, five times more iron than in spinach, seven times more vitamin C in oranges, four times more vitamin B1 than in whole wheat, and is one of the most abundant sources of vitamin B12.

Nutritional facts [12]

Following are some facts which establish the nutritional value of wheatgrass.

- Wheatgrass juice is one of the best sources of living chlorophyll available [13].
- Chlorophyll is the first product of light and, therefore, contains more light energy than any other element.
- Wheatgrass juice is crude chlorophyll and can be taken orally and as a colon implant without toxic side effects.
- Wheatgrass is high in oxygen like all green plants that contain chlorophyll. The brain and all body tissues function at an optimal level in a highly-oxygenated environment.
- Chlorophyll is anti-bacterial and can be used inside and outside the body as a healer.
- Science has proven that chlorophyll arrests growth and development of unfriendly bacteria
- Chlorophyll (wheatgrass) rebuilds the bloodstream. Studies of various animals have shown chlorophyll to be free of any toxic reaction. The red cell count was returned to normal within 4 to 5 days of the administration of chlorophyll, even in those animals which were known to be extremely anaemic or low in red cell count.
- Farmers who have sterile cows and bulls put them on wheatgrass to restore fertility. (The high magnesium content in chlorophyll builds enzymes that restore the sex hormones).
- Chlorophyll can be extracted from many plants, but wheatgrass is superior because it has been found to have over 100 elements needed by man. If grown in organic soil, it absorbs 92 of the known 102 minerals from the soil.
- Wheatgrass has what is called the grass-juice factor, which has been shown to keep herbivorous animals alive far longer than would be expected.
- Liquid chlorophyll gets into the tissues, refines them.
- Wheatgrass juice is a superior detoxification agent compared to carrot juice and other fruits and vegetables. Dr. Earp-Thomas, says that 15 pounds of wheatgrass is the equivalent of 350 pounds of carrot, lettuce, celery and so forth.
- Liquid chlorophyll washes drug deposits from the body.
- Chlorophyll neutralizes toxins in the body.
- Chlorophyll helps purify the liver.
- Chlorophyll improves blood sugar problems.

- Wheatgrass juice heals acne and even removes scars after it has been ingested for seven to eight months. The diet must be improved at the same time.
- Wheatgrass juice acts as a detergent in the body and is used as a body deodorant.
- Wheatgrass juice held in the mouth for 5 minutes will eliminate toothaches and tooth decay. It pulls poisons from the gums and thus Pyorrhoea of the mouth.
- Gargle wheatgrass juice for a sore throat.
- Drink wheatgrass juice for skin problems such as eczema or psoriasis.
- Wheatgrass juice keeps the hair from greying.
- Wheatgrass juice is high in enzymes.
- Wheatgrass juice is an excellent skin cleanser and can be absorbed through the skin for nutrition.
- Wheatgrass implants (enemas) are great for healing and detoxifying the colon walls. The implants also heal and cleanse the internal organs.
- Wheatgrass juice is great for constipation and keeping the bowels open. It improves digestion.
- Dr. Birscher, a research scientist, called chlorophyll 'concentrated sun power'. He believes that chlorophyll increases the function of the heart, affects the vascular system, the intestines, the uterus and the lungs.
- Wheatgrass juice can dissolve the scars that are formed in the lungs from breathing acid gasses. The effect of carbon monoxide is minimized since chlorophyll increases haemoglobin production.
- Wheatgrass juice reduces high blood pressure and enhances the capillaries.
- Wheatgrass juice is great for blood disorders of all kinds.
- Detoxification-Another common claim for wheatgrass is that it promotes detoxification. The limited data in support of that claim applies to most green vegetables [14].

Wheatgrass Powder V/s Wheatgrass Juice

- Powder is easy to transport, convenient to carry and has good shelf life.
- Powder retains all the important nutrients of fresh wheatgrass.
- Powder has higher quantity of dietary fiber than fresh juice.
- Fiber is strained out while extracting juice.
- Powder is more palatable than fresh juice by all age groups.
- Powder equals therapeutic efficacy as fresh Wheatgrass.
- One Tsp. Powder (approx 3g) equals to 40 g fresh Wheatgrass.

Wheatgrass Powder Supports Blood Production & Circulation

It purifies the blood, oxygenates the blood, build healthy blood, extremely helpful in blood disorders, especially anemia. Wheatgrass Powder builds up white blood cells and strengthens immune system and arrests the growth of

unfriendly bacteria. In doing so, it helps slow down overactive systems and strengthen areas that have deficiencies.

Wheatgrass Powder Helps Combating Diseases

- Helps in combating diseases such as Cancer, BP, Menstrual
- Problems, Paralysis, Leukemia, Arthritis, Insomnia, Diabetes, Asthma, etc.
- Helps prevent tooth decay
- Helps the body heal from diabetes and heart disease
- Helps with skin problems such as eczema or psoriasis.
- Chlorophyll in wheatgrass helps improve blood sugar disorders
- Reduce high blood pressure
- Wheatgrass Powder has anti-aging effect as it helps in cell rejuvenation.
- Keep hair from graying, improves complexion and the high magnesium content in chlorophyll builds enzymes that restore the sex hormones.

Balancing of body pH by Wheatgrass juice

Since most of us develop acidic body chemistry

over time, we need alkalizing foods to restore pH balance. Wheatgrass juice is a powerful alkalizer. It is also a preferred food because it seems to possess the ability to single-handedly change people's body chemistry when used in sufficient amounts. As a result, it is exactly the kind of food needed to help jump start the processes of the body. It is also the perfect food to consume when life's challenges (like travelling for work) get in the way of the lifestyle choices you prefer. For many, consuming wheatgrass juice is like have a license to exist in the world around us. It is important to note that we don't want our bodies to be either alkaline or acidic; rather, we are trying to achieve balance.

Effect of change in diet on the body

In case of weight loss and weight gain, the intake of Wheatgrass Powder is the same but the accompanying diet is different as follows: Weight loss-Diet should contain more of vegetables, soups, sprouts, green salads, fruits, juices, dry fruits, etc. Items such as milk, sweets, ghee, butter, rice, non-veg, alcohol, etc, should be avoided. Weight gain Diet should contain more of vegetables, fruits, juices, honey, milk, dry fruits, ghee, porridge, salads, brown rice, soups, and Jaggery-weetened milk at night, etc.

Table 1. Nutrient comparison of 1 oz (28.35 g) of wheatgrass juice, broccoli and spinach

Nutrient	Wheatgrass Juice	Broccoli	Spinach
Protein	860mg	800mg	810mg
Beta carotene	120 IU	177 IU	2658 IU
Vitamine E	880 mcg	220 mcg	580 mcg
Vitamin C	1mg	25.3mg	8mg
Vitamine B12	0.30mcg	0mcg	0mcg
Phosphorus	21mg	19mg	14mg
Magnesium	8mg	6mg	22mg
Calcium	7.2mg	13mg	28mg
Iron	0.66mg	0.21mg	0.77mg
Potassium	42mg	90mg	158mg

Data on broccoli and spinach from USDA database [11]. Data on Wheatgrass juice from indoor grown wheatgrass [5].

CONCLUSION

Wheatgrass juice is one of nature's true super foods; in fact it is a complete food capable of sustaining human life in the absence of other nourishment for long periods. We certainly wouldn't recommend such a single-track approach to nutrition, but this amazing juice contains almost everything necessary to keep us going. A common misunderstanding is that to supply our bodies with protein we must eat protein. This is not so, amino acids are the building blocks of the proteins our bodies use. If we eat protein in the form of grains, pulses, fish or meat, our bodies must break down these proteins into amino acids in order to digest them, and then reconstitute these into the required proteins. Thus it is easier to provide our bodies with the right range of amino acids to produce the protein we need and cut out the taxing process of breaking down protein we consume, especially

if that protein has been damaged by cooking. Wheatgrass juice is a very good provider of the proteins required for cell regeneration and is renowned for its healing properties. It is also an excellent blood tonic, increasing the hemoglobin content of the blood and improving oxygen transport, it is thus helpful with people suffering anemia. Apart from being a blood builder, wheatgrass juice is also a blood purifier greatly assisting in the removal of waste products of the body because of its 'detergent' properties. It is said to be helpful in the removal of carcinogens, harmful chemicals and heavy metals present in the body.

By doing all the studies this can be concluded that wheatgrass is very useful in various diseased conditions as it comprises so many nutrients having therapeutic value such as vitamins, mineral, enzymes, protein and chlorophyll.

REFERENCES

1. Available from <http://www.foodalive.org/articles/wheatgrass.htm>.
2. Available from <http://en.wikipedia.org/wiki/Wheatgrass>.
3. Murphy, Sean. "Wheatgrass, healthy for the body and the bank account" Retrieved, 2006,10-06.
4. Available from <http://www.wheatgrasshealthy.com>.
5. Meyerowitz, Steve. "Nutrition in Grass". Wheatgrass Nature's Finest Medicine: The Complete Guide to Using Grass Foods & Juices to Revitalize Your Health (6th Edition Ed.). Book Publishing Company, 1999, 53.
6. Available from <http://www.dynamicgreens.com>.
7. de Vogel, Johan, Denise S. M. L. Jonker-Termont, Martijn B. Katan, and Roelof van der Meer. "Natural Chlorophyll but Not Chlorophyllin Prevents Heme-Induced Cytotoxic and Hyperproliferative Effects in Rat Colon" *J. Nutr.* (The American Society for Nutritional Sciences) 135, 1995–2000.
8. Available from <http://www.lifepositive.com>.
9. Ben-Arye, E; Goldin, E (2002 April), trial", *Scand J Gastroenterol* (Norway), 37(4), 2002, 444-9.
10. Ferruzia, Mario G; Blakesleeb, Joshua (January 2007), "Digestion, absorption, and cancer preventive activity of dietary chlorophyll derivatives", *Nutrition Research* Volume 27(Issue 1):1-12, doi:10.1016/j.nutres, 12, 2006, 3.
11. Available from "USDA Nutrient Database". Retrieved, 1, 2011, 6.
12. Available from <http://www.dynamicgreens.com>.
13. Available from <http://www.healthbanquet.com>.
14. Fahey, Jed W.; Katherine K. Stephenson, Albena T. Dinkova-Kostova, Patricia A. Egner, Thomas W. Kensler and Paul Talalay. "Chlorophyll, chlorophyllin and related tetrapyrroles are significant inducers of mammalian phase 2 cytoprotective genes" *Carcinogenesis* (Oxford University Press), 26 (7), 2005, 1247-1255.