

## A study on wheat grass and its Nutritional value

Rajesh Mujoriya (Corrospoding Authors)

Sardar patel college of technology, {b-pharmacy}

Balaghat, dis. Balaghat, {m.p.} – 481001,INDIA

Tel. No. +918817517515, E-mail: [raj\\_mujoriya@live.com](mailto:raj_mujoriya@live.com)

Dr. Ramesh Babu Bodla

K.I.E.T. School of pharmacy, Gaziabad, India

E-mail:- [ramesh\\_bodla@rediffmail.com](mailto:ramesh_bodla@rediffmail.com)

### Abstract

Wheat Grass refers to the young grass of the common wheat plant, *Triticum aestivum* that is freshly juiced or dried into powder for animal and human consumption. Both provide chlorophyll, amino acids, minerals, vitamins, and enzymes. Wheat grass 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

**Key-Word:** - Wheat Grass, human consumption, *Triticum aestivum*, enzymes, vitamins, nutrients.

### 1) Introduction

Wheatgrass juice will provide you with more energy by fulfilling nutritional deficiencies and by removing wastes that clog your cells, blood, tissues and organs.

Wheat Grass refers to the young grass of the common wheat plant, *Triticum aestivum* that is freshly juiced or dried into powder for animal and human consumption. Both provide chlorophyll, amino acids, minerals, vitamins, and enzymes. Wheat grass 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

Although the wonder benefits of wheat grass are being discovered only now in India, they have been known in the West for years. Wheat grass juice has chlorophyll that neutralizes infections, heals wounds, overcomes inflammations and gets rid of parasitic infections the three most important effects of wheat grass on the human body are: blood purification, liver detoxification and colon cleansing. 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.

### 1.1) Green Blood Therapy

Green Blood Therapy is the use of wheat grass juice which has also been called the green blood.

The wheat grass juice contains all the nutrients the body requires and is considered a complete food

### 1.2 Green Blood Therapy: Cure for Many Diseases

Wheat grass therapy is recommended for patients suffering from chronic diseases like Asthma, Atherosclerosis, Parkinson's disease, Joint pains, TB, Constipation, Hypertension, Diabetes, Bronchitis, Insomnia, Eczema, Sterility, Hemorrhage, Obesity and Flatulence. It is also useful in the treatment of cancer

## 2) *Method Of Preparation*

The method of extracting the grass juice

Place the fresh wheat grass, soon after cutting it, on a platform or in a pounding basic and crush it well. Then wrap them in a clean and thin piece of cloth and strain the juice out of it. A plastic strainer could also be used for this purpose. If the magnetically treated water is added to it while crushing it, the extraction of juice will be in a greater quantity with its effectiveness is also strengthened. This wheat grass can be also crushed in the electric juicer or mixer also.

## 3) *Wheat Grass and Its Nutritional Values*

- 3.1) Wheatgrass juice is crude chlorophyll and can be taken orally and as a colon implant without toxic side effects.

Chlorophyll is the basis of all plant life.

- 3.2) 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.
- 3.3) Chlorophyll is anti-bacterial and can be used inside and outside the body as a healer.
- 3.4) 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 anaemia or low in red cell count.
- 3.5) Dr. Ann Wigmore had been helping people get well from chronic disorders for 30 years using wheatgrass.
- 3.6) Liquid chlorophyll gets into the tissues, refines them and makes them over.
- 3.7) Wheatgrass juice is a superior detoxification agent compared to carrot juice and other fruits and vegetables. Dr. Earp-Thomas, associate of Ann Wilmore, says that 15 pounds of wheatgrass is the equivalent of 350 pounds of carrot, lettuce, celery and so forth.
- 3.8) Liquid chlorophyll washes drug deposits from the body.
- 3.9) Chlorophyll neutralizes toxins in the body. .
- 3.10) Chlorophyll improves blood sugar problems.
- 3.11) In the American Journal of Surgery, 1940, Benjamin Ruskin, M.D. recommends chlorophyll for its antiseptic benefits. The article suggests the following clinical uses for chlorophyll to clear up foul smelling odors, neutralize strep infections, heal wounds, hasten skin grafting, cure chronic sinusitis, overcome chronic inner-ear inflammation and infection, reduce varicose veins and heal leg ulcers, eliminate impetigo and other scabby eruptions, heal rectal sores, successfully treat inflammation of the uterine cervix, get rid of parasitic vaginal infections, reduce typhoid fever, and cure advanced pyorrhea in many cases.
- 3.12) A small amount of wheatgrass juice in the human diet prevents tooth decay...
- 3.13) Drink wheatgrass juice for skin problems such as eczema or psoriasis.
- 3.14) Wheatgrass juice keeps the hair from graying.
- 3.15) Pyorrhea of the mouth: Lay pulp of wheatgrass soaked in juice on diseased area in mouth or chew wheatgrass, spitting out the pulp.
- 3.16) Wheatgrass juice improves digestion...
- 3.17) Wheatgrass juice is great for constipation and keeping the bowels open. It is high in magnesium.
- 3.18) Dr. Bircher, 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.
- 3.19) According to Dr. Bircher, nature uses chlorophyll (wheatgrass) as a body cleanser, re-builder and neutralizer of toxins.
- 3.20) 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 hemoglobin production.

- 3.21) Wheatgrass juice is great for blood disorders of all kinds.  
3.22) The pH (hydrogen molecules) value of human blood and Wheatgrass both is about 7 (alkaline) & is therefore quickly absorbed in the blood and is highly beneficial.

#### **THE MAIN SUBSTANCES AND THEIR USES:**

Life saving substances:

- A. *Vitamin A*: It enhances the skin luster and provides glow to the outer skin and makes it disease free. It helps to cure the black spots and blemishes below the eyes and improves the eyesight. It is also helpful in checking the eyes, nose, and throat disorders. It nourishes hair and is helpful in fighting the problems of pollution. . Vitamin A is essential for normal growth and development, good eyesight, and reproduction.
- B. *Vitamin B*: It aids digestion. It is helpful in the treatment of digestive disorders, mental, depression, insomnia, premature aging and anorexia.
- C. *Vitamin C*: Vitamin C is usually associated with citrus fruits, such as lemons, limes and oranges. However, ounce for ounce, wheatgrass contains more vitamin C than an orange. A powerful antioxidant, vitamin C is helpful for recovering from sickness (including the common cold) and preventing disease (such as scurvy) it is a vital substance for healthy gums and teeth and maintenance of bones. It is essential for health and vitality and healing of sores and wounds. It is also a natural source for antibiotic elements
- D. *Vitamin E*: It dilates the capillaries and enables free flow of the blood. It is helpful for the women during pregnancy, it prevents abortion and it is a helpful substance in the treatment of sexual impotency, diabetes, cancer, heart disorders and dysmenorrhea etc. Without enough of this fat-soluble vitamin, we would face muscle degeneration, sterility, and slower healing of wounds and infections. Vitamin E, an antioxidant and fertility vitamin is also a protector of the heart.
- E. *Vitamin K and B-complex vitamins*- Wheatgrass contains a number of other important vitamins. It's rich in vitamin E, vitamin K and B-complex vitamins. Wheatgrass is also a source of vitamin B-17, also known as amygdaline, which some studies suggest can help ward off cancer. In addition to these vitamins, wheatgrass contains 17 amino acids and 92 different minerals the human body uses and needs. The nutrients in wheatgrass are also said to assist in fighting cancer and repairing cellular damage of the lungs.
- F. *MSM* -  
MSM is a sulfur bearing molecule found in all living organisms destroyed in processed food. It helps our body use vitamins, helps to reduce allergies, helps detoxify the body and increase oxygen, and takes out inflammation. That also contains in wheat grass juice.
- G. *Proteins and Amino acids*: Proteins are essential for muscular strength and physical elegance. Plasmas, hormones and antibodies are obtained through proteins. Amino acids aid digestion, blood formation and provide potency to the heart.
- H. *Enzymes*: Enzymes are the digestive elements. The substances in the Wheat grass juice are helpful for dyspepsia. These are helpful for digestion, building a healthy body and counteract the premature aging.
- I. *Minerals*:  
*Iron*: Iron is an essential element for life. Iron deficiency creates shortage of hemoglobin in blood. It is helpful in pregnancy, for excessive sweating, pale complexion, laziness and lethargy, and insomnia. Inorganic iron is often constipating, but the iron salts in wheatgrass have no side effects.

*Calcium:* Calcium is the prime instigator of vital activity. It strengthens the bones, it provides alkaline for the children and vitality for old. It is helpful in treatment of the diseases like hemorrhage, distension of body, slow movements, coldness and varicose veins etc. Wheatgrass is a good source of calcium, which helps build strong bones and teeth and regulates heartbeat, in addition to acting as a buffer to restore balance to blood pH.

*Potassium:* Helpful for the radiance and luster of youth, hypertension, dementia, palpitation, tiredness, suicidal instincts and depression etc. Potassium, called the youth mineral by some nutritionists, helps maintain a smooth mineral balance, and balanced body weight. It also tones the muscles, firms the skin, and promotes overall beauty.

*Zinc:* Helpful in the prostate gland disorders and nourishes hair.

*Sodium:* Sodium regulates the extra cellular fluid volume. It also regulates the acid-base equilibrium and maintains proper water balance in the body.

*Magnesium:* You will find about as much magnesium in wheatgrass as in broccoli, Brussels' sprouts, beets, carrots, or celery. Magnesium is important for good muscle function and for bowel health, as it aids eliminative functions. I believe that this mineral is also responsible for drawing fat out of the liver, in cases of fatty infiltration there.

*J. Nutrients and other substances:* These provide nutrition to the tendons. These are the elements which are resistant to the disorders related to jaundice, menstruation, hydrocele, dysentery, mental debility, tooth problems, evacuation of bowels and the cold related problems.

*K. Chlorophyll:* The curative and prophylactic elements- The wheat grass juice is a source of the alkaline elements, prophylactic and curative elements. It also supplements proteins, carbohydrates and fat. The lacteal substances found in it are considered to be an effective element and the only remedy for curing cancer. Chlorophyll the most important element of the wheat grass is contained in the cells called chloroplasts. Chloroplasts produce nutritious elements with the help of sunshine. Dr. Brusher calls it as "Concentrated Solar Energy." The chemical formation of the wheat grass juice has a striking similarity with the chemical formation of the human blood. The pH factor of the human "blood is 7.4. The pH factor of the wheat grass juice is also 7.4 that is the reason why it is quickly absorbed in the blood.

We all know that human blood contains a substance called hemoglobin it also obstructs their regeneration or reproduction. The physicians who have successfully tried this therapy on a number of diseases such as skin diseases, T.B., heart diseases, brain hemorrhage, ulcer, varicose veins, inflammation of the intestine, arteriosclerosis, osteomyelitis, etc have found it quite effective.

#### *Internal Rejuvenation*

Wheat protein, which comprises up to eight per cent of the grain, has a special benefit as it has eight of the essential amino acids in delicately balanced proportions. A complete internal rejuvenation takes place when Wheat protein is metabolized into health-building amino acids.

#### *4) Diseases And Their Treatment*

Wheat grass therapy is recommended for patients suffering from chronic diseases like Asthma, Atherosclerosis, Parkinson's disease, Joint pains, TB, Constipation, Hypertension, Diabetes, Bronchitis, Insomnia, Eczema, Sterility, Hemorrhage, Obesity and Flatulence. It is also useful in the treatment of

cancer. Wheat grass can be directly taken by chewing or in the form of juice. For better results it can be taken in the form of juice. This is the last alternative when all other therapies fail to cure.

#### *4.1) Diseases related to Blood and the Blood Circulation System*

Included among this category are anaemia, high blood pressure, atherosclerosis, internal haemorrhage, clotting and the like. Regular intake of the wheat grass juice works wonders especially in the cases of anaemia for which no other therapy has such quick cure. Having 200 ml juice twice a day is recommended.

- 4.1.1) *Deficiency of Hemoglobin* - Wheat grass juice is termed as a substitute for natural red blood cells. The wheat Grass possesses all the compositions that Hemoglobin possesses. It is also known as “Green Blood” because of its close structural similarity to Hemoglobin. Wheat Grass contains many nutritious and prophylactic ingredients.
- 4.1.2) *Increase Of Uric Acid In Blood* --- The increase of uric acid in the blood caused complications such as swelling of the body, digestion trouble, insomnia, etc. He approached Grime’s Nature Cure Center for treatment and could not believe that Wheatgrass therapy could help him. He decided to give it a try and was amazed at the excellent results. Within one month all his problems were gone and he became perfectly normal.

#### *4.2) Diseases related to the Respiratory System*

Common cold, asthma, bronchitis and all the related disease get cured with the regular regimen of this wheat grass juice therapy. Common cold generally disappears in a couple of days only. Asthma is a dreadfully stubborn disease responding to almost no given therapy. But wheat grass juice taken twice a day creates wonders in this case also.

#### *4.3) Digestive diseases*

Wheat grass therapy is most effective in the case of digestive disorders i.e. it shows its quick effect. Constipation, indigestion, flatulent, nausea, vomiting, acidity, ulcers in the stomach and intestines, smelling on the intestines and worms are some of the prominent diseases. It is an excellent laxative  
In the severity of rectal bleeding.  
No serious side effects were found Grass juice appeared effective and safe as a single or as added support to treat active ulcerative colitis.  
This enema is very helpful in disorders of the colon, mucous and ulcerative colitis, chronic constipation and bleeding piles.

#### *4.4) Teeth and Gum related diseases*

- 4.4.1) *Tooth Disorders*: - Wheat is valuable in the prevention and cure of pyorrhea. It takes time to eat wheat and as it is generally taken with other foods, it compels the chewing of other foods also.. Wheat grass juice acts as an excellent mouth wash for sore throats and pyorrhea. It also prevents tooth decay and tooth aches.
- 4.4.2) *CURE FOR Toothache*--- The juice of wheat grass acts as an excellent mouthwash for tooth decay and cures toothaches. Wheat grass can be chewed with beneficial results.

#### *4.5) Diseases of Joints*

Included in this category are swelling on the joints, pain in the joints, osteoarthritis, bone rotting

The efficacy of wheatgrass in the management of bone and joint disorders is due to its powerful anti-inflammatory effect. It can significantly help reduce pain, swelling and inflammation, and check subcutaneous and cutaneous bleeding quickly, thereby enhancing the natural healing process.

4.5.1) *In osteoarthritis*-- patients frequently report warmth in and around the joint a short while after application. Usually this is followed by increased mobility of the joint i.e. within 10 to 20 minutes. This can be quite dramatic. As with any "natural" product, it pays to persist with chronic conditions for at least three months before ceasing treatment.

4.5.2) *Fractures*

If closed fracture, apply immediately to suspected fracture site before splinting. Apply around the wound if skin broken. If plaster already applied, smear WG over skin at both ends of plaster 3 times a day. Can produce marked reduction in swelling, bruising & pain & hasten healing.

4.5.3) Gout, acute & acute on chronic  
Apply every 3 or 4 hours. Maintain hyperuricemic therapy. Can facilitate anti-inflammatory effect of hyperuricemics & shorten attack. Continue daily application to assist prevention of further attacks.

4.6) *Skin diseases*

As the wheat grass juice is an active blood purifying agent, it is very effective in the treatment of skin diseases. It has been found to be curing eczema, ache (pimples), boils, cuts and wounds, bites and burns.

4.6.1) *GANGRENE*-- The Wheatgrass powder / juice was poured over the wounds thrice everyday. Initially he was kept on a diet of Naturopathy juices of various fruits and vegetables miraculously, his situation improved and to everybody's surprise he was cured of the gangrene in about 10 months time. The kidney function and Hemoglobin level in the blood also improved up to normal.

4.6.2) *SKIN ITCHING*--- Severe itching on the skin all over the body used to cause wounds. The treatment he was undergoing started showing side effects such as improper bowel movement, gases in stomach and loss of appetite. At this stage, he started the Wheatgrass therapy. Within a month the itching reduced and with it the digestion system also improved. In three months the patient was cured of his problem without any side effects.

4.6.3) *Reduce Eczema Symptoms*---- Wheatgrass juice is an excellent choice for a drink as it helps in blood purification. Drinking wheatgrass on a regular basis will also ensure you of a normal blood pressure. Hence, wheatgrass is said to be able to "cure" blood disorders of all kinds. Wheatgrass is also known to provide the essential enzymes that the body needs for optimum health. Enzymes, in turn, are very helpful in strengthening the body's immune system and in your fight against eczema.

4.7) *Kidney related ailments*

Included in the section are the problem of stone, inflammation of the urinary bladder, and inflammation of the kidneys. Along with the wheat grass juice if water treated with magnets is also taken the results are better and the cure is faster.

4.8) *Disease connected with the reproductive organs*

Sexual debility and dismenorrhhea are the two disease/disorders which this therapy can cure with comparative ease. Taking the wheat juice orally and applying the parts of the soft portion of the wheat grass on the private parts help greatly cure the disease.

4.9) *Ear diseases*

In relieving ear pain and curing the problem of septic discharge from the ear wheat grass juice has shown very good results. In addition to taking the wheat grass orally, some juice should be dropped in the ears to cure ear diseases.

#### 4.10) Anticancer

4.10.1) *Myelodysplastic Syndrome (Preleukemia)*- The effect of wheat grass juice in reducing Ferrite (Iron) level in myelodysplastic syndrome (Preleukemia) and also do the biochemical analysis of the wheat grass juice.

Wheatgrass juice is a MUST for Cancer patients of any type whether you are operated, done Chemo / Radiation or with no Allopathy treatment. SOD, Selenium, laetrile (B17) in Wheatgrass kills Cancer cells and Chlorophyll (a green blood) increases your white & red blood cells counts for faster cure.

4.10.2) *On Breast Cancer* -- Bone marrow (where new blood cells are made) damage caused by chemotherapy can become life threatening. White blood cell count and red blood cell count can become abnormally low. There are medications to help build the blood cell count, but they come with negative side effects and increased costs. It was found that drinking the green healing juice helped produce healthier blood levels while receiving the chemotherapy thus *decreasing* the need for blood building medications. Wheatgrass juice was found to *not* diminish effectiveness of chemotherapy. These preliminary results need confirmation in a phase III study.

4.10.3) *Reduces Skin Toxicity in X-Ray*--

Deep X-ray therapy for the treatment of breast cancer can be fraught with complications and adverse reactions called "skin toxicity". Essentially, this means that after treatment, the skin becomes inflamed, tends to blister and break down leading to pain, difficulty in management and wound infection. Because of skin toxicity, the patient has to wait much longer between treatments for the skin to recover sufficiently to allow the next treatment. This in turn tends to reduce the patient's chances of recovery.

#### 4.11) Treatment of migraine

Migraines are severe, recurrent headaches that can cause debilitating pain for hours on end. While there is no cure for a migraine, home remedies and life-style changes can go a long way to reduce symptoms. A highly digestible, concentrated source of nutrients, wheatgrass is a commonly used supplement for natural healing for all kinds of illness, including migraines. Wheatgrass contains chemicals shown to have antioxidant and anti-inflammatory properties (helpful for overall health and migraines). Wheatgrass treatment usually involves daily consumption of a small amount of freshly juiced wheatgrass.

#### 4.12)Thalassemia

Whether 'green blood' method is not a cure for thalassaemia. What we have found among patients taking this therapy is that the interval between blood transfusions has increased to 25-30 days. Earlier, thalassaemia patients had to have a transfusion once in two weeks. However, we are still studying the efficacy of this treatment," Dr Ram K Maratha of the pediatrics' department of PGI told *The Times of India*. .

grass juice is the juice extracted from the pulp of wheatgrass and has been used as a general purpose health tonic for several years. Several patients in the thalassemia (a hereditary form of anemia, occurring chiefly in people of Mediterranean origin, marked by the abnormal synthesis of hemoglobin and a consequent shortened life span of red blood cells) unit began consuming wheatgrass juice after anecdotal accounts of beneficial effects on transfusion requirements.

These encouraging experiences prompted evaluations on the effect of wheatgrass juice on transfusion requirements in patients with transfusion dependent beta thalassemia.



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## Reference

- Boehme, Cahey Clinical Bulletin, (1946) "The Treatment of Chronic Leg Ulcers with Special Reference to Ointment Containing Water Soluble Chlorophyll." (4), p. 242
- Bowers. (1947) "Chlorophyll in Wound Healing and Superlative Disease." *The American Journal of Surgery*, P.245
- Coli and Babb. , (1948) "Study of a New Stimulatory Growth Factor," *Journal of Biological Chemistry* (174) p.405
- Friedman and Friedman. (1939), "Gonad tropic Extracts from Green Leaves." *American Journal of Physiology* (125), p.486
- Gomez, Hartman and Dryden, (1941) "Influence of Wheat Grass Juice Extract on Rats (as research ).*The Journal of Dairy Science.*, (24), p.507
- Gomez. (1942) "Further Evidence of the Existence and Specificity of an Orally Activity in Plant Juice Preparations." *The Journal of Dairy Science.* (25), p.705
- Hughes and Letner. (1936) "Chlorophyll and Hemoglobin Regeneration," *American Journal of Medical Science*, p. 188- 206
- Illingworth. (1939), "Hemorrhage in Jaundice (Use of Dehydrated Cereal Grass)." *Lancet.* (236), p.1031
- Juul-Moller and Middelsen. (1948)"Treatment of Intestinal Disease with Solutions of Water Soluble Chlorophyll." *The Review of Gastroenterology.*, (15), p.549
- Kohler, Elvahjem and Hart. (1936) "Growth Stimulating Properties of Grass Juice," *Science*, p.445
- Kohler, Elvahjem and Hart. (1938),"The Relation of the Grass Juice Factor to Guinea Pig Nutrition." *Journal of Nutrition*,(15), p.445
- Kohler, Randle and Wagner. (1939) "The Grass Juice Factor." *Journal of Biological Chemistry*.(128), p.254
- Kohler. (1944)"The Effect of Stage of Growth on the Chemistry of the Grasses." *The Journal of Biological Chemistry*. P. 215-223
- Miller. (1941) "Chlorophyll for Healing." *Science News Letter. March* (15), p.171
- Offenkrantz. (1950), "Water-Soluble Chlorophyll in Ulcers of Long Duration." *Review of Gastroenterology*, (17), p.359-367
- Patek. (1936) "Chlorophyll and Regeneration of Blood," *Archives of Internal Medicine*. P.57-76
- Randle, Sober and Kohler. (1940)"The Distribution of the Grass Juice Factor in Plant and Animal Materials." *The Journal of Nutrition.* (20), p.459
- Rhoads. (1939)"The Relation of Vitamin K to the Hemorrhagic Tendency in Obstructive Jaundice (Dehydrated Cereal Grass as the Source of Vitamin K)." *Journal of Medicine*,(112), P.2259
- Waddell. (1939)"Effect of Vitamin K on the Clotting Time of the Prothrombin and the Blood (Dehydrated Cereal Grass as the Source of Vitamin K)." *Journal of Medicine.* (112), P. 2259
- Hagiwara, Yoshihide.( 1981), Green Barley Essence: A Surprising Source of Health as wheat grass on migraine Tokyo, Japan: *Association of Green and Health Distributors*, p.512



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