

GREEN BLOOD THERAPY IN MODERN MEDICINE

Sabeeha Shafi*

Department of Pharmaceutical Sciences, University of Kashmir, Hazratbal,
Srinagar, Kashmir, Jammu & Kashmir, India.

ABSTRACT

Triticum aestivum (Family Poaceae) commonly called as wheatgrass, is a plant that has immense medicinal potential and its juice (WGJ), known as green blood is largely used in the western world for the treatment of various health ailments. The knowledge about its medicinal potential is very less known in India although it is widely used. Its use has been termed as Green blood therapy. The present review is an effort to provide detailed information on the folkloric uses, chemical composition and pharmacological activities of the plant. This can provide a useful data for further research studies. Since very little clinical studies have been made on this very promising herbal drug, efforts are needed to conduct extensive studies on the *Triticum aestivum* both in experimental models and human subjects to develop wheat grass therapy with no side effects in prevention, cure and management of chronic diseases for which our modern systems have lost their hopes.

INTRODUCTION

The plant is a complete food. It contains polysaccharides – Glucan, fatty oil (2%) Phospholipids (1%) Glycolipids (0.5%) particularly acyl digalactosyl glycerols, steroids (0.3%) sterol esters, proteins (20%) Lignin, alkyl resorcinols (0.1-0.2%). The principal carotenoids pigment is α -dihydroxy carotene. Small quantities of flavonoids are also present. Two derivatives of apigenin, flavonoid A and flavonoid B have also been identified. The major clinical utility of wheat grass in diseased conditions might be due to the presence of biologically active compounds and minerals in it and due to its antioxidant potential which is derived from its high content of bio-flavonoids such as apigenin, quercetin, luteoline. Furthermore, indole compounds namely choline and laetrile present in it might be also responsible for its therapeutic potential. The presence of 70% chlorophyll, which is almost chemically identical to hemoglobin, in *Triticum aestivum* makes it more useful in various clinical conditions involving hemoglobin deficiency and other chronic disorders. This plant has been widely studied by

different researchers for its pharmacological activities. It bears a close resemblance to human hemoglobin, the iron present in hemoglobin has been replaced by magnesium present in chlorophyll of the plant.

Source:-The major Indian source of wheat grass is *Triticum aestivum*. Other varieties of wheat grass in various plant genera found in temperate region of the world are mentioned below:

- *Agropyron spicatum* (bluebunch wheat grass)
- *Agropyron critatum* (Crested Wheatgrass)
- *Agropyron trachycaulum* (slender wheat grass)
- *Elytrigia*
- *Eremopyrum*
- *Pascopyrum*

Triticum. aestivum linn. Common or bread wheat, is widely cultivated almost all over the world. Generally 15-20 species are recognized, of which 8 have been reported to occur in India¹.



CLASSIFICATION

Kingdom:	Plantae-Plants
Subkingdom:	Tracheobionta-Vascular plants
Division:	Spermatophyta-Seed plants
Class:	Magnoliophyta-Flowering plants
Subclass:	Liliopsida- Monocotyledons
Order:	Cyperales
Family:	Poaceae-Grass family
Genus:	<i>Triticum</i> L
Species:	<i>aestivum</i>

Common names of *Triticum aestivum*

Hindi	Gehun
Kannada	Godhi
Manipuri	Gehun
Sanskrit	Arupa, godhuma
Tamil	godumai
Telugu	godumalu
Urdu	Gehun
English	wheat

Objective This review is written to focus the importance and effectiveness on easily available plants like *Triticum aestivum* and also the medical and economic view point related to the plant.

Botanical characters *Triticum aestivum* is an annual grass with simple culms, erect, hollow or pithy, upto 1.2m tall. Leaves are flat, narrow, 20-

28cm long, about 1.3cm broad. Flower-spikes are long, slender, dorsally compressed somewhat flattered. Rachis is tough, not separately from spikelet at maturity. Spikelet's are 2-5 flowered, relatively far apart on stem, slightly overlapping, nearly erect, pressed close to rachis. Glumes are keeled in upper half, firm, glabrous, shorter than the lemmas. Lemmas are awned or awn less, less than 1.3cm long, palea as long as the lemma, remaining entire at maturity. Caryopsis free-threshing, soft or hard, red or white²

Folk Medicine. The seeds are used in folk remedies for cancers, corns, tumours, warts and whitlow. Reported to be antivenous, billous, demulcent, diuretic, emollient, expectant, intoxicant, laxative, useful as a poultice, restorative, sedative, used as a shampoo, vulnerary, for burns, diarrhea, dysentery, fertility, fever, flux, hematuria, haemorrhage, leprosy, leucorrhoea, menorrhagia, perspiration³

Method of preparation Wheatgrass is grounded manually, then de-ionized water is added. The whole mixture is used within 20 mm. The intake of wheat grass juice (WGJ) should be gradually increased from 10 ml to 100 ml per day⁴

Chemical Constituents^{5,6,7}

Life saving substances Vitamins A, B, 2, 3, 5, 6, 8, and 12: C, E and K. ascorbic acid, dehydrated ascorbic acid, carotene. Some of them are:-

Vitamin A It enhances the skin lustre 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 B It aids digestion. It is helpful in the treatment of digestive disorders, mental, depression, insomnia, premature aging, and anorexia.

Vitamin C 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.

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, dysmenorrhea, etc.

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. Amino acids such as aspartic acid, threonine, asparagines, glutamine, proline, glycine, arginine, alanine, valine, methionine, isoleucine, leucine, tyrosine, phenylalanine, lysine, histidine, tryptophan and serine are present.

Enzymes Enzymes are the digestive elements. The substances in the WGJ are helpful for dyspepsia. These are helpful for digestion, building a healthy body and counteract the premature aging. Protease, amylase, lipase, cytochrome oxidase, transhydrogenase, superoxide dismutase (SOD) are also present.

Minerals

Sulfur, sodium, aluminum, copper, calcium, iodine, phosphorus, magnesium, alkaline earth metal, potassium, selenium, Iron, Zinc, boron and molybdenum. Some of them are mentioned below:-

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.

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, varicose veins, etc.

Potassium: Helpful for the radiance and lustre of youth, hypertension, dementia, palpitation, tiredness, suicidal instincts, depression, etc.

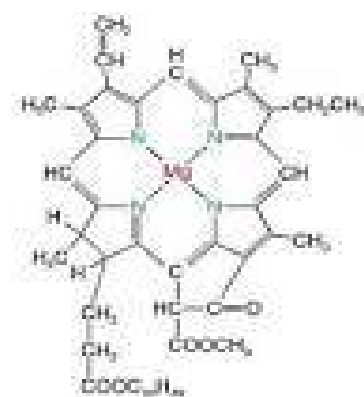
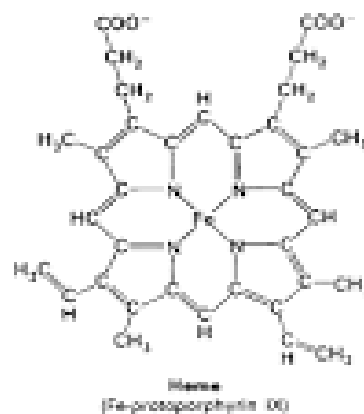
Zinc: Helpful in the prostate gland disorders and nourishes hair

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

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.

Chlorophyll as green blood: Chlorophyll resembles haemoglobin in the blood. The structures of both compounds possess tetra pyrrole ring structure but they differ only in their central metal atom that is magnesium (Mg) is present in chlorophyll and iron (Fe) is in hemoglobin. Due to the apparent resemblance, chlorophyll shows therapeutic effects in case of hemoglobin deficiency⁸



Nutritional value. A hundred gram wheatgrass powder obtained from 1 kg of fresh wheatgrass can supply nourishment equal to that obtained from 23 kg of selected vegetables⁹

Pharmacokinetics The proteins, lipids and carbohydrates present in wheat grass are digested, absorbed and metabolized by normal physiological processes¹⁰

Contraindications It is contraindicated in those who are hypersensitive to any component of a wheat grass containing supplement¹⁰

Adverse reactions Wheatgrass juice is safe and the incidence of side effects is very low except throat swelling that may occur in hypersensitive individuals. If excess quantities are taken it may cause nausea and headache¹⁰

Suggested Dosage For normal health maintenance the dose should be 1 to 4 oz daily and for therapeutic dosage 4 to 8 oz daily. Wheatgrass acts as a powerful "detoxifier" of both the liver and large intestine^{11,12}

Diseases and their Treatment with Wheatgrass Juice^{13,14,15,16}

Cancer The wheat grass juice (WGJ) is an integral part of the macrobiotic diet under the complementary and alternative medicine (CAM) approach of anticancer therapy, due to its high antioxidant content. The WGJ is a highly placed source of chlorophyll, laetrile, and antioxidant enzyme superoxide dismutase. Wheatgrass intake enhances hemoglobin synthesis as chlorophyll bears a structural analogy to hemoglobin. It is indicated that the oxygen supply to all body cells including cancer cells which are highly vulnerable to high oxygen concentration due to the deleterious effects caused by the generation of reactive oxygen species. Wheatgrass implicated as an anticancer agent is the plant hormone abscisic acid (ABA). This hormone is 40 times more potent 4 h after cutting the wheatgrass plant. ABA can neutralize the effect of the hormone chorionic gonadotropin and a compound similar to this hormone has been found to be produced by the cancer cells. The WGJ appears beneficial include antioxidant activity preventing oxidative damage to deoxyribonucleic acid (DNA) and lipid peroxidation, stimulation of gap junction communication, effects on cell transformation and differentiation, inhibition of cell proliferation and oncogene expression, effects on immune function and inhibition of endogenous formation of carcinogens^{17,18,19}

Diseases related to blood and the blood circulation system

Anemia, high blood pressure, atherosclerosis, internal hemorrhage are cured by this plant. Regular intake of the WGJ works wonders especially in the cases of anemia for which other therapy has such quick cure. Having 200 ml juice

twice a day is recommended. It is also useful for thalassemic patients. WGJ reduces transfusion requirement in patients with thalassemia. There was a decrease in amount of transfusion as well as the increase in interval between transfusions^{20,21}

Obesity and ulcerative colitis

The WGJ has a therapeutic role and offers a genuine therapeutic advantage in patients with active left colon ulcerative colitis. Wheatgrass juice is nutritious and acts as an energizer for the body. It is also responsible for weight control and cleanses the body²²

Digestive diseases

Wheatgrass therapy is most effective in the case of digestive disorders, i.e. it shows quick effect. Constipation, indigestion, flatulence, nausea, vomiting, acidity, ulcers in the stomach and intestines, smelling on the intestines, and worms are some of the prominent diseases and disorders which wheatgrass can cure. However, the patients suffering from constipation are advised to chew wheatgrass well at first and then swallow the residual lump also afterward. If cabbage juice is added to the WGJ it yields quicker and better results in the complaint of ulceration in the stomach and intestines. Wheatgrass juice improves digestion and is rich in enzymes^{23,24}

Anti-asthmatic and anti-allergic agent The rich vitamin and antioxidant content is used for the anti-allergic actions of WGJ. Patients with a high intake of vitamin C have a higher forced expiratory volume in (FEV1) and higher forced vital capacity (FVC) than those with a low vitamin C intake.

Teeth and gum-related diseases Wheatgrass is an effective remedy for all the complaints of teeth and gums. However, the cure would be better if wheatgrass is chewed and its juice is massaged on the gums. Wheatgrass juice in the human diet prevents tooth decay. Gargle of wheatgrass juice is used for sore throat.

Diseases of joints .Swelling on the joints, pain in the joints, osteoarthritis, bone rotting are cured by WGJ.

Skin diseases Wheatgrass extract (Dr. Wheatgrass Skin Recovery Cream), a topical anti-inflammatory immunomodulator, substance P inhibitor, topical haemostatic agent, and stimulant of fibroblastic activity has a wide range of healing properties. Chlorophyll present in wheat grass

juice is used in the treatment of skin diseases like eczema or psoriasis and also acts as an excellent skin cleanser for first and second degree burns^{25,26}

Kidney-related ailments The WGJ gives better results for stone, inflammation of the urinary bladder, and inflammation of the kidneys.

Disease connected with the reproductive organs Sexual debility and dysmenorrheal are the two disease disorders which this therapy can cure. Taking the wheat juice orally and applying the parts of the soft portion of the wheatgrass on the private parts help greatly cure the disease.

Ear diseases It is used in relieving ear pain and curing the problem of septic discharge from the ear. The WGJ has shown very good results. In addition to taking the wheatgrass orally, some juice should be dropped in the ears to cure ear diseases.

Detoxifying agent The vitality of liver is of high concern for the overall wellbeing of an individual as it is the major organ implicated in detoxification. In addition to the stimulating and regenerative properties of chlorophyll, other constituents of WGJ like choline and its high mineral content are responsible for the therapeutic benefits^{27,28}

It has been observed that choline prevents the deposition of fats in the liver of experimental animals when they were administered a diet rich in cholesterol. Choline promotes the removal of the esters of both cholesterol and glycerol, with the effect on the glyceride fraction preceding that on the cholesterol esters. The lipotropic action of choline is attributed to its in vivo conversion to an active compound which is retained within the hepatic cells and enhances oxidation of fatty acids and formation of tissue lecithins. The latter effect augments lipoprotein synthesis which acts as a transport form of fatty acids in plasma and thus helps in removal of lipids from a fatty liver. It has been demonstrated experimentally that the dietary indoles like indole-3-carbinole and ascorbigen increase the activity of phase I and phase II xenobiotic metabolic enzyme in the liver and intestinal mucosa.

Antioxidant activity .Wheat grass contains antioxidant enzyme superoxide dismutase (SOD) which converts dangerous free radical reactive oxygen species (ROS) into hydrogen peroxides

(having extra oxygen molecule to kill cancer cells) and an oxygen molecule^{29,30,31}

Anti-arthritic activity. The effect of uncooked vegetarian diet rich in lactobacilli, in rheumatoid patients has been studied. It has been observed that uncooked vegetarian diet, rich in lactobacilli, decreased subjective symptoms of rheumatoid arthritis. The studies indicated that the following group of dietary factors was partially (48%) responsible for the observed decrease in the disease activity index: fermented wheat drink, wheat grass drink, dietary fiber and iron. The studies showed significant response in arthritic patients^{32,33}

Precautions before Starting the Therapy

1. One should take only juice for 2 days before starting the therapy. As a result all toxic elements would be eliminated from the body
2. Take raw vegetables and sprouts for 1 or 2 days. Then start the therapy.
3. Pregnant women and nursing mothers should avoid wheatgrass-containing supplements
4. Wheatgrass supplements may contain high amounts of vitamin K. Those on warfarin should exercise caution in the use of wheatgrass supplements.

CONCLUSION

This review concluded that the wheat grass juice (WGJ) has higher degree of curative index and can be recommended to treat many diseases such as asthma, atherosclerosis, Parkinson's disease, joint pains, TB, constipation, hypertension, diabetes, bronchitis, insomnia, eczema, sterility, hemorrhage, obesity, flatulence and cancer.

REFERENCES

1. Wheatgrass: www.dr-kessler.com/download/71297101, Wheat, grass. Pdf
2. Edwin E, Sheeja E. Color Atlas of Medicinal Plants 1st edn. New Delhi CBS Publisher and Distributor; 2006;45: 247.
3. Padalia S, Drabu S, Raheja I, Gupta A, Dhamija M. Multitude potential of wheatgrass juice (Green Blood): An overview; Chron Young Sci. 2010; 1: 23-8
4. Information on Wheat Grass; (<http://www.foodalive.org/articles/wheatgrass.html>)
5. Wheatgrass; (http://www.wandacline.com/files/Growing_wheatgrass.Pdf).

6. Ravi K. Green blood Therapy. www.pharmatutor.org/articles/green_blood_therapy. Retrieved 25/11/2014:1674.
7. Meyerowitz S. "Nutrition in Grass". *Wheat grass Nature's Finest Medicine: the complete guide to using grass foods and juices to revitalize your health*. 6th Edn. Book Publishing Company, 1999: 53.
8. Gruskin B. Chlorophyll. Its therapeutic place in acute and suppurative disease. Preliminary report of clinical use and rationale. *Am. J Surg.* 1940; 49:49-55.
9. Wheatgrass juice usage protocol; ([http://dynamicgreens.com/information/Dynamic Greens Wheatgrass Juice Usage-Protocol. Pdf.](http://dynamicgreens.com/information/Dynamic%20Greens%20Wheatgrass%20Juice%20Usage-Protocol.Pdf)
10. Singhal VK, Singhal AK, Jagatheesh K, Padmavathi K, Elangoran N, Bang OP, Sit R. Multifunctional role of green blood therapy to cure for many diseases; *Chron Young Sci*, 2012; 3:12-6.
11. Valli; *Green Blood Therapy: Cure for Many Diseases*; October 6th, 2007; (<http://healthmad.com/alternative/green-blood-therapy.cure-for-many-diseases>)
12. Wheatgrass Benefits - Health Benefits of Wheatgrass juice; (<http://www.knowledge-database-script.com/demo/article-970.html>).
13. N Singh, P Verma, BR Pandey. Therapeutic Potential of Organic Triticum aestivum Linn, (Wheat Grass) in Prevention and Treatment of Chronic Diseases: An Overview; *International journal of Pharmaceutical Sciences and Drug Research* 2012; 4(1): 10-14
14. Swati P, Sushma O. Indira R, Alka G, Mamta O. Maharaja S. Multitude potential of wheatgrass juice (Green Blood): An overview. *Chron Young Sci*. 2010; 1:23-8.
15. Singh N, Verma P, Pandey BR. Therapeutic potential of organic Triticum aestivum Linn (Wheatgrass) in prevention and treatment of chronic diseases: An overview; *Int J Phar Sci & Drug Research* 2012; 4(1): 10-14.
16. Wheatgrass; ([http://www.cancer.org/Treatment/Treatments and Side Effects/Complementary and Alternative Medicine/Diet and Nutrition/wheatgrass](http://www.cancer.org/Treatment/Treatments%20and%20Side%20Effects/Complementary%20and%20Alternative%20Medicine/Diet%20and%20Nutrition/wheatgrass)) reviewed on 11/01/2000.
17. Mukhopadhyay S. Basak J, Kar M, Mandai S. Mukhopadhyay A. The role of iron chelation activity of wheatgrass juice in patients with myelodysplastic syndrome. *J. Clin. Oncology* 2009; 27(12): 7007.
18. Dey S, Sarkar R, Ghosh P, Khatun R, Ghorai K, Choudhari R, Ahmad R, Gupta P, Mukopadhyay S, Mucopadhyay A. Effect of Wheat grass Juice in supportive care of terminally ill cancer patients- A tertiary cancer centre Experience from India. *J of Clin Oncology*. 2006; 181: 8634.
19. Bhalla M, Singh N. A clinical study of anticancer properties of Organic Ashwagandha, Tulsi and Wheat Grass, in the proceeding of the National Seminar. Brain Storming Session on Integrated Therapeutic Approach in the Management of Cancer. Lucknow, 2011; 26-27: 35.
20. Marawaha RK, Bansal D, Kaur S, Trehan A. Wheat grass juice reduces transfusion requirement in patients with thalassemia major: a pilot study; 2004; 41(7): 716-20.
21. Bar SQ, Medy T, Getta F, Goldberg H. Wheatgrass juice may improve hematological toxicity related to chemotherapy in breast cancer patients: A Pilot Study. *J. Nutr. Cancer* 2007; 58: 43-8.
22. Ben-Ayre E, Goldin E, Wengrower O, Stamper A, Kohn R, Berry E. Wheatgrass juice in the treatment of active distal ulcerative colitis: A randomized double-blind placebo-controlled trial. *Scand Gastroenterol* 2002; 37:444-9.
23. Ketan Shah, Devang Sheth, Pravin Tirgar, Tusharbindu Desai. Anti-ulcer action of Triticum aestivum on ethanol induced mucosal damage (cytoprotective activity) in wistar rats; *Pharmacology online* 2011: 929-935.
24. Gahan E, Klina P, Finkle T. Chlorophyll in the treatment of ulcers. *Derm and Syph* 1943; 47: 849-851.
25. Zahra Al Timimi, MS. Jaafar, Mohd Zubir M Jafri; Photodynamic therapy and Green Laser blood Therapy; *Global Journal of Medical Research*, 2011; 11(5): 23-28.
26. Wheat J, Currie G, Coulter K. Wheatgrass extract as a topical skin agent for acute radiation skin toxicity in radiation therapy: A randomized controlled trial *J Aust Trad Med Soc* 2006; 121: 35-7.
27. Kothari S, Jain AK, Mehta SC, Tonpay SD. Hypolipidemic effect of fresh Triticum aestivum (wheat) grass juice in hypercholesterolemic rats. 2011; 68(2): 291-4.
28. Kothari S, Jain AK, Mehta SC, Tonpay SD. Effect of fresh Triticum aestivum grass juice

- on lipid profile of normal rats; Indian J Pharmacol, 2008; 40(5): 235-6.
29. Yi B, Kasai H, Lee HS, Kang Y, Park JI Yang M; Inhibition by wheat sprout (*Triticum aestivum*) juice of bisphenol. A-induced oxidative Stress in young women, 2011; 724(1-2): 64-8.
30. Kulkarni SD, Tilak JC, Achaya R, Rajurkar NS, TI Reddy. Evaluation of the antioxidant activity of wheatgrass (*Triticum aestivum*) as a function of growth under different conditions *Phytother Res* 2006;20:218-27
31. Grievink L, Smit A, Ocke MC, Pieter V, Kromhout O. Dietary intake of antioxidant pro-vitamins, respiratory Symptoms and pulmonary function: The MOR-GEN study. *Thorax Int J Respir. Med* 1998; 53:166-71.
32. Balint G, Apathy A, Blazsci G, Hidvegi M, Paksy A, Resetar A et al. Effect of Avemar - a fermented wheat germ extract-on rheumatoid arthritis. Preliminary data *Clin Exp Rheumatol* 2006;24:325-8.
33. Nenonen MT, Helve TA, Rauttia AL, Hanninen OO. Uncooked. Lactobacilli-rich, Vegan Food and Rheumatoid Arthritis *Brit J of Rheumatol* 1998; 37:274-281.