International Journal of Pharmacy and Pharmaceutical Research (IJPPR)
Volume 31, Issue 1, January 2025 **ijppr.humanjournals.com** ISSN: 2349-7203

Wheatgrass as a Superfood: A Comprehensive Review

Tushar Martand Undegaonkar, Tejas Mahesh Karlekar, Rohit Ganeshrao Rathod

B. Pharmacy program at Dr. D. Y. Patil College of Pharmacy, Akurdi, Pune. India.

Received: 2025-1-05 Revised: 2025-1-16 Accepted: 2025-1-23

ABSTRACT

This is a mini-review with scientific research findings in different studies on wheatgrass. The intent of the article instigates the nutritional and medicinal value and also summarizes its pharmacokinetics and metabolism in the human body. Wheatgrass is usually consumed in the form of fresh juices. It is known for its high content of vitamins, minerals, proteins, active enzymes, and bioactive compounds such as alkaloids, glycosides, saponins, steroids, tannins, and flavonoids. The therapeutic benefits of wheatgrass are attributed to its antioxidant, antibacterial, and anti-inflammatory properties. It is believed to boost digestion, promote healthy skin and hair, improve immunity, and even aid weight loss by stimulating metabolism and providing essential nutrients to the body that suppress food cravings. Despite its nutritional benefits, more research is needed to determine its efficacy in preventing or curing diseases. Therefore, it's always recommended to consult with a healthcare provider before incorporating wheatgrass into your diet.

Keywords: Wheatgrass, Superfood

❖ INTRODUCTION, HISTORY, AND BOTANICAL EXPLICATION:

▪ INTRODUCTION

Wheatgrass is the freshly sprouted first leaves of the common wheat plant (Triticum aestivum), used as a food, drink, or dietary supplement. It is served freeze-dried or fresh, and so it differs from wheat malt, which is convectively dried Compared to wheat malt, wheatgrass is permitted to grow taller and longer. [1,2]

▪ Botanical Description

Wheatgrass belongs to the genus Agropyron, a group of wheat-like grasses in the family Poaceae, found throughout the North Temperate Zone. Usually, perennials and wheatgrass plants grow to a height of 30 to 100 cm (12 to 40 inches). Numerous spreads vegetatively and have creeping rhizomes or underground stems. The tiny flowers are carried in spike-like inflorescences, and the leaves are flat or slightly rolled. Several species are drought-tolerant and can survive in saline soils.[1,2]

▪ **History of Wheatgrass**

The consumption of wheatgrass in the Western world began in the 1930s as a result of experiments conducted by Charles Schnabel in his attempts to popularize the plant. By 1940, cans of Schnabel's powdered grass were on sale in major drug stores throughout the United States and Canada. Ann Wigmore was also a strong advocate for the consumption of wheatgrass as a part of a raw food diet.[1,2]

❖ AGRICULTURAL PRACTICES AND THEIR PHARMACOGNOSY:

• **Soil Requirement**: Wheatgrass is grown in a wide range of soils. Soils with a loamy texture or clay loam, and moderate water-holding capacity are best for wheatgrass cultivation.

• **Seed Rate and Treatment**: The seed rate in wheatgrass farming varies depending on the variety and the planting method.

• **Irrigation**: Wheatgrass is a drought-tolerant crop, but it benefits from regular watering, especially during dry periods.

• **Harvesting**: The wheatgrass crop is harvested after the straw becomes dry, and brittle, and the wheat grains harden.[3,4]

Now, let's move on to the pharmacognosy of wheatgrass:

Wheatgrass is considered a complete food because it contains every amino acid, vitamin, and mineral necessary for human nutrition. It is one of the most widely used health foods, but its functional groups and mechanisms remain unidentified Wheat sprouts produce vitamins, minerals, and phenolic chemicals, such as flavonoids, during germination.

. The phytochemical analysis of wheatgrass confirms the presence of various phytochemicals like alkaloids, flavonoids, tannins, terpenoids, steroids, and glycosides in their methanolic leaf extract field. [3,4]

- ***Chlorophyll*:** Wheatgrass is rich in chlorophyll, a green pigment in plants. Chlorophyll is known for its blood-building properties. Its molecular makeup is nearly the same as that of haemoglobin, the oxygen-carrying molecule in blood.

- ***Amino Acids*:** The building blocks of proteins, wheatgrass has 19 different amino acids. Proteins. This includes 9 essential amino acids that are not produced by the body and must be obtained from dietary sources.

- ***Vitamins and Minerals*:** Wheatgrass is a rich source of vitamins A, C, E, and K, and of the B-complex vitamins. It also contains minerals like calcium, potassium, iron, magnesium, sodium, and sulphur.

- ***Enzymes***: Wheatgrass contains several vital enzymes, including cytochrome oxidase, superoxide dismutase (SOD), and lipase. Enzymes aid in digestion and other metabolic processes. [3,4,5]

▪ **Phytochemistry**:

The phytochemistry of wheatgrass is quite complex due to the presence of various bioactive compounds. These compounds contribute to its health-enhancing properties[4]. The presence of phenols, flavonoids, tannins, polysaccharides, and various enzymes is detected during the phytochemical screening of wheatgrass extract[5]. These phytochemicals are responsible for the pharmacological activities of wheatgrass.[5,6]

❖ THERAPEUTIC PROPERTIES AND NUTRITIONAL VALUE OF WHEATGRASS

1. High in Nutrients and Antioxidants: Wheatgrass is an excellent source of many different vitamins and minerals. It is especially high in vitamins A, C, and E, as well as iron, magnesium, calcium, and amino acids.

• May Reduce Cholesterol: Several animal studies have found that wheatgrass may help lower cholesterol levels.
• Antioxidant Properties: Wheatgrass contains several important antioxidants, including glutathione and vitamins C and E. Antioxidants are compounds that fight free radicals to prevent cell damage and reduce oxidative stress.
• Anti-Inflammatory Properties: The anti-inflammatory properties found in wheatgrass may help with chronic inflammation.

- Boosts Immune System: Thanks to its phytochemicals, wheatgrass may help boost your immune system.
- Detoxification: Your body can eliminate pollutants and stored toxins with the help of the nutrients found in wheatgrass. [8,9]

Now, let's move on to the nutritional value of wheatgrass:

Wheatgrass is also a good source of protein, with up to 8 grams per ounce if consumed in powder form Potassium, dietary fibre, vitamins A, C, E (alpha-tocopherol), K, thiamine, riboflavin, niacin, vitamin B6, iron, zinc, copper, manganese, and selenium are all found in it. Please note that while wheatgrass is touted as a nutritional "superfood," other leafy green vegetables, such as spinach, contain more of many of these nutrients.[8,9]

❖ **METABOLISM AND PHARMACOKINETICS OF WHEATGRASS:**

***Metabolism of Wheatgrass: ***

- Wheatgrass stimulates the thyroid gland, which helps in boosting the metabolism. This provides the body with more energy than usual.

- Wheatgrass could also help support your overall efforts to eat healthfully and exercise since it contains proteins and antioxidants thought to boost metabolism. In other words, it might help you burn a few extra calories. [10,11]

***Pharmacokinetics of Wheatgrass: ***

- Wheatgrass contains proteins, fats, and carbohydrates that are absorbed, digested, and metabolized by regular physiological processes.
- Wheatgrass is either sold fresh or freeze-dried in a powder, meaning there are a variety of different ways you can add it to your diet.
- Wheatgrass juice is easily absorbed in the bloodstream and gives energy. On an empty stomach, it is easily assimilated in blood in approximately 20 minutes.

- Once your body is cleansed, you may see an increase in energy levels and better health overall. [10,11,12]

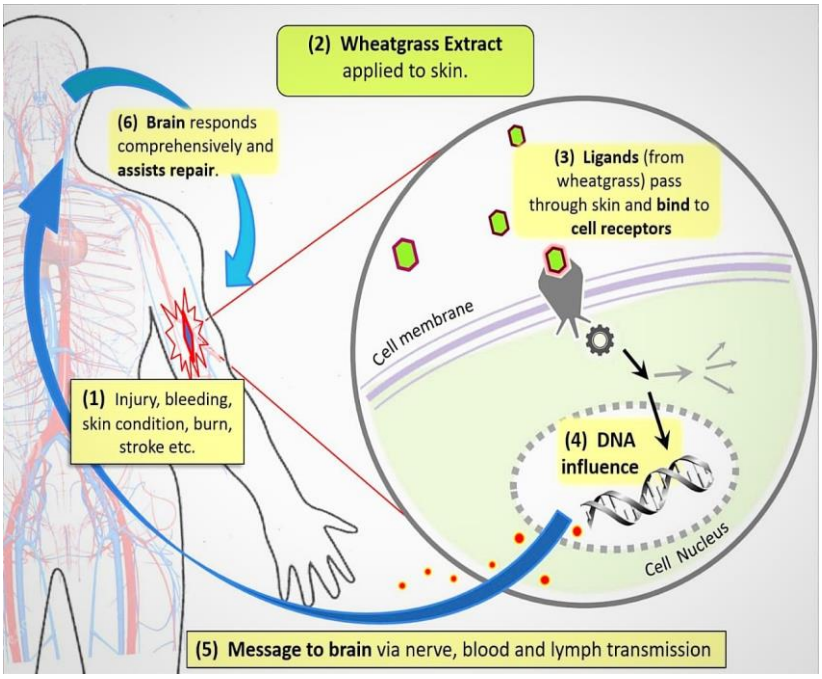
❖ PHARMACOLOGY AND ADVERSE EFFECTS

▪ Pharmacological Properties:

• Wheatgrass is a rich source of various nutrients like proteins, minerals, vitamins, active enzymes, and bioactive compounds such as alkaloids, glycosides, saponins, steroids, tannins, and flavonoids. It's also abundant in chlorophyll, often referred to as the "green blood" due to its high chlorophyll content, which accounts for 70% of its chemical constituents. The leaves of wheatgrass are known to increase the activities of liver enzymes and lipid peroxidation. Wheatgrass has been found effective in severe cases of acute stomach ache, gas, paralysis, infection of the digestive system, heart attack, diabetes, asthma, leukaemia, and other cancers.[13,14]

▪ The mechanism of action of wheatgrass:

• Wheatgrass plays a crucial role in regulating the enzymatic balance in the body. It's got enzymes like lysine, isoleucine, threonine, methionine, amino acid, glycine, proline and tyrosine. Lysine, present in wheatgrass, is known to improve anti-aging effects and the immune system. Threonine is believed to stimulate overall body metabolism and digestion.[13,14]
• The various enzymes responsible for its pharmacological actions are protease, amylase, lipase, cytochrome oxidase, transhydrogenase, and superoxide dismutase (SOD). These enzymes play a crucial role in the body's metabolic processes. For instance, protease aids in protein digestion, amylase helps in the breakdown of carbohydrates, and lipase is essential for fat digestion.
• Chemicals found in wheatgrass may have anti-inflammatory (anti-swelling) and antioxidant properties. For this reason, some believe it could be beneficial in treating ailments like inflammatory bowel disease. It also has an ingredient that may help prevent bacterial infections. [13,14]



▪ More about the Pharmacology of Wheatgrass.

Ben-Arye et al. reported in a randomized, double-blind, placebo-controlled research on WGJ that using wheat grass (Triticum aestivum) juice as a single or adjuvant treatment of active distal Ulcerative colitis (UC) is very safe and effective. In stressed rats, the green juice and fractions from young barley leaf juice that included organic chemicals and water-soluble proteins had anti-gastric ulcer efficacy. Within nine months, approximately 400 cases were treated with water-soluble derivatives of chlorophyll in another clinical trial. The study revealed numerous significant outcomes, most notably a reduction of the smell connected to infected wounds; an effect that stimulates the creation of tissue (granulation tissue) when used as a dressing, especially for burns; and an effect that dries up abscesses, sinus tracts, surface lesions, and osteomyelitis were all noted. The study's findings demonstrated that chlorophyll was found to be useful in treating burns (4 patients), gunshot wound sinus tracts (17 cases), decubitus ulcer (4 cases),

sarcoma/carcinoma (4 cases), ulcerative colitis (1 case), and several other conditions. Furthermore, it has been noted that chlorophyll improved healing and decreased 119 cases of compound fractures to the limbs, some of which had remarkable outcomes. For example, legs were spared from what seemed to be certain amputation. According to this clinical research, chlorophyll might be the most effective substance for treating indolent ulcers, suppurative illnesses, or any other condition where stimulating tissue healing is needed. [19,20,21] Research is underway to assess WGJ's potential as a treatment for ulcerative colitis due to its abundance in bioflavonoids, which are thought to have anti-inflammatory and antioxidant qualities. It has been demonstrated that apigenin, one of these bioflavonoids, inhibits transactivation mediated by tumour necrosis factor (TNF). In a different investigation, chlorophyll was applied to human patients' surgical wounds, ulcers, burns, and dermatome donor sites in addition to an experiment involving guinea pigs' skin wounds. According to the experimental study's findings, dermatome graft healing did not speed up wound healing in guinea pigs and only 30% of cases showed acceleration. Chlorophyll ointment was an adequate dressing in clinical burn situations; however, it didn't seem to help with wound healing. Studies on the application of chlorophyll to promote tissue growth have demonstrated the therapeutic value of chlorophyll ointment and aqueous solution for the treatment of skin ulcers [22,23]. It has also been demonstrated that additional chlorophyll derivatives have anti-inflammatory, wound-healing, and Odor-reducing properties. In addition to its bacteriostatic qualities, which aid in wound healing, chlorophyllin also promotes erythrocyte and haemoglobin formation in anaemic animals. It has been used as a wound healing agent, promoting granulation tissue and epithelization, to treat a variety of skin lesions, burns, and ulcers. [24,25]

Wheatgrass is a traditional medicine used worldwide to treat various ailments, including cancer. It has been reported to exhibit anticancer activity on several cell lines.

A study conducted on oral cancer (KB) cells and mouse embryonic cells (NIH3T3) evaluated the anticancer and cytotoxic activity of wheatgrass. The study used both ethanol extract of freshly grown wheatgrass prepared in their laboratory and commercially available wheatgrass powder. The anticancer activity on KB cells and cytotoxic activity on NIH3T3 cells were evaluated by MTT assay with the two forms of wheatgrass.

The results showed that wheatgrass exhibited inhibition of KB cells in a dose-dependent manner with an IC50 value of 156µg/ml and was non-toxic on NIH3T3 cells. Therefore, wheatgrass showed anticancer activity on KB cells and can be considered for further studies on animals and eventually on human beings.

In addition, a few test-tube studies have confirmed that wheatgrass can help kill cancer cells. According to one study conducted in test tubes, wheatgrass extract reduced oral cancer cell spread by 41%. Another test observed about 65% cell death and diminished leukemia cells within the first three days of treatment using wheatgrass.

Moreover, both water and alcohol extracts of wheatgrass were found to increase the rate of cell death in a human leukemia cell line, showing promise as an anti-cancer agent.

It's important to note that while these studies show promise, more research is needed to fully understand the anticancer potential of wheatgrass and its possible use in cancer treatment. [24,25]

▪ POTENTIAL HEALTH BENEFITS OF WHEATGRASS

➢ Wheatgrass is known for its high antioxidant content and has been studied for its potential health benefits. Here are some key points about the antioxidant activity of wheatgrass:

➢ ***Antioxidant Compounds*:** Wheatgrass is packed with antioxidant compounds, including flavonoids, chlorophyll, and vitamin C. These antioxidants fight the damaging effects of free radicals and reduce inflammation.

➢ ***Antioxidant Activity Evaluation*:** A study evaluated the antioxidant activity of wheatgrass grown under different conditions throughout 6, 7, 8, 10, and 15 days. The techniques used are assays for DPPH (1,1′-diphenyl-2-picrylhydrazyl), ABTS (2,2′-azobis-3-ethylbenzthiazoline-6-sulfonic acid), and FRAP (ferric reducing antioxidant power). [25,26]

➢ ***Growth Conditions and Antioxidant Activity***: The study found that the total phenolic and flavonoid contents of the extracts increased with growth under all conditions. It was discovered that the ethanol extracts contained more flavonoids and phenols than the water extracts.

➢ ***FRAP Values*:** The highest FRAP values occurred on day 15 of growth under condition 4 (soil with nutrients), the values being 0.463 and for the aqueous and ethanol extracts, there were 0.573 mmol of ascorbic acid and Trolox equivalents/100 g of fresh wheatgrass, respectively.

➢ ***Prevention of Disease***: The body uses antioxidants to help get rid of pollutants. Elevated oxidative stress levels have been linked to a number of health issues, including cancer. Chronic inflammation is a result of the immune system's reaction to an undesirable material, and antioxidants can help prevent it.

➢ ***Oxygen Radical Absorbance Capacity (ORAC)*:** The ORAC values of aqueous and ethanol extracts of day 10 with condition 4 were found to be 39.9 and 48.2 correspondingly, being greater than those documented for numerous natural extracts or veggies. [26,27,28]

➢ ***Anti-inflammatory Compounds***: Wheatgrass is rich in chlorophyll, which has been shown to have anti-inflammatory effects.

➢ ***Wheatgrass Fortified with Cow Urine Distillate*:** A research paper highlighted the anti-inflammatory activity of wheatgrass fortified with cow urine distillate. The study used carrageenan-induced paw edema in Wistar rats at different doses of wheatgrass powder fortified with cow urine distillate. The results showed a significant reduction in rat paw edema, suggesting enhanced anti-inflammatory activities.

➢ ***Inflammation and Oxidative Stress*:** The anti-inflammatory properties of wheatgrass exert a positive effect on reducing pain and swelling. Oxidative stress and inflammation are major risk factors in the pathogenesis of various chronic diseases. The stress is mainly due to the imbalance between the free radicals and antioxidants in the body.

➢ ***Antidiabetic Compounds*:** Wheatgrass is rich in compounds that have been shown to have antidiabetic effects. [30,31]

➢ ***Animal Studies*:** A study conducted on streptozotocin-induced diabetic rats evaluated the antidiabetic and antioxidant properties of wheatgrass. The ethanolic extracts of wheatgrass were administered orally for 30 days. The study found a significant decrease in fasting blood glucose, glycosylated haemoglobin levels, and serum marker enzyme levels. The total cholesterol and serum triglycerides levels were also significantly reduced and the high-density lipoprotein level was significantly increased upon treatment with the wheatgrass ethanol extract.

➢ ***Microgravity Conditions*:** Another study found that wheatgrass germinated under microgravity conditions showed a significant reduction in the levels of serum glucose, HbA1C, urea, creatinine, aspartate aminotransferase, and alanine aminotransferase, and insulin resistance compared to wheatgrass germinated under normal gravity conditions.

➢ ***Antihyperglycemic Activity*:** Wheatgrass extracts have been found to exhibit antihyperglycemic activity, hypolipidemic effects, and antioxidant properties capable of managing diabetes. [30,31,32]

▪ ADVERSE EFFECTS OF WHEATGRASS:

While wheatgrass is generally considered safe for consumption, it can cause some side effects in certain individuals or if consumed in excess. Here are some potential adverse effects:

1**. *Allergic Reactions***: Some people might be allergic to wheatgrass. Symptoms of a wheatgrass allergy could range from mild to severe. Mild symptoms might include small itchy red bumps on the skin, an itchy mouth, nausea, stomach pain, and vomiting. Severe symptoms could include difficulty swallowing and breathing.

2. ***Digestive Issues*:** Consuming high amounts of wheatgrass powder or juice may cause digestive issues such as nausea, headaches, diarrhoea, discomfort, gas, and bloating.

3. ***Overdose*:** It is possible to overdose on wheatgrass juice. If you consume too much wheatgrass juice, you might experience certain side effects. The suggested dosage for wheatgrass juice is around 40 ml to 120 ml per day. If you're taking wheatgrass powder, the suggested dosage is to mix 1 tsp of wheatgrass powder in a cup of water and drink. [33,34]

4. ***Lower Blood Sugar Levels*:** Wheatgrass might lower blood sugar levels. While this could be beneficial for some people, it might cause problems for others, especially those with diabetes or other blood sugar issues.

5. ***Pregnancy and Breastfeeding*:** There isn't enough reliable information to know if wheatgrass is safe to use when pregnant or breastfeeding. Stay on the safe side and avoid use.

6. ***Gluten Intolerance or Celiac Disease*:** Wheatgrass is usually gluten-free, but cross-contamination can occur if it's grown in fields or processed in facilities that also handle wheat and other gluten-containing grains. If you have celiac disease or a gluten intolerance, it's best to only use wheatgrass products that are certified gluten-free. [34,35]

❖ COMMERCIAL VALUES AND SALE STATS

***Commercial Values: ***

- Wheatgrass is used in various forms such as juice, powder, and pills.

- It is available fresh as produce, in tablets, frozen juice, and powder.

- Wheatgrass is also sold commercially as a spray, cream, gel, massage lotion, and liquid herbal supplement.

- Wheatgrass products are packed with a variety of nutrients including, minerals, vitamins, and amino acids.

- Due to its anti-oxidation and detoxification properties, pharmaceutical industries are adopting wheatgrass as an active ingredient in many of their formulations. [36,37]

***Sales Statistics: ***

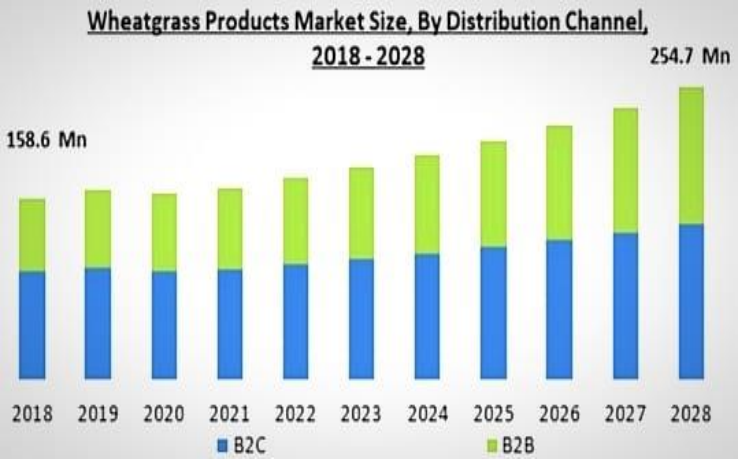
- The global wheatgrass product market size reached 3,975.0 Tons in 2023.

- The market is projected to reach 5,907.3 Tons by 2032, exhibiting a growth rate (CAGR) of 4.4% during 2024-2032.

- The wheatgrass products market was worth USD 54,412.0 million in 2018.

- It accumulated a market value of USD 60,000 million in 2022 while growing at a CAGR of 2.5% during the historical period.

The increasing use of wheatgrass in different industries is expected to further increase its usage, benefiting the market[5]. However, it's important to note that market trends can change rapidly, and the figures mentioned are as on the latest available data. [37,38,39]



❖ **MARKETED PRODUCTS OF WHEATGRASS**

CONCLUSION:

This mini-review with scientific facts was desired to acknowledge various communities about the cumulative particulars of Wheatgrass. The review article mainly sums up the aggregates. Wheatgrass, derived from young wheat plants, is a nutrient-rich superfood. It provides essential amino acids, detoxifies the body, and offers potential health benefits. Notably, it contains around 20% of total calories from protein. Research suggests that wheatgrass may enhance fertility, promote vitality, and serve as a functional herb. Its chlorophyll content contributes to antioxidant effects. Overall, wheatgrass continues to intrigue both researchers and health enthusiasts as an alternative medicine option.

❖ **REFERENCES:**

1. Wheatgrass - Wikipedia. https://en.wikipedia.org/wiki/Wheatgrass.
2. Wheatgrass | Nutrition, Health Benefits & Uses | Britannica. https://www.britannica.com/plant/wheatgrass.
3. Natural Resources Conservation Service Plant Guide – USDA Plants atabase.https://plants.usda.gov/DocumentLibrary/plantguide/pdf/pg_eltr7.pdf.
4. Is Wheatgrass Worth the Hype? 7 Benefits - Cleveland Clinic Health .... https://health.clevelandclinic.org/is-wheatgrass-good-for-you.
5. Wheatgrass – All You Need to Know | Guide to Fresh Produce - Instacart. https://www.instacart.com/company/ideas/wheatgrass-all-you-need-to-know/.

6. Wheatgrass- Overview, History, Uses, Benefits, Precaution, Dosage. https://www.bhumijalifesciences.com/blogs/news/wheatgrass-overview-history-uses-benefits-precaution-dosage.
7. A Guide to Wheatgrass — How to Use the Superfood - The Vegan Atlas. https://theveganatlas.com/a-guide-to-wheatgrass-all-about-the-superfood-and-how-to-use-it/.
8. What is Wheatgrass? - The definitive guide to wheatgrass as a superfood https://wheatgrass.com/pages/what-is-wheatgrass.
9. Nutritional Facts of Wheatgrass Powder | Girmes Wheatgrass. https://girmeswheatgrass.com/nutritional-facts/.
10. Wheatgrass - Wikipedia. https://en.wikipedia.org/wiki/Wheatgrass.
11. Green Blood Therapy of Wheat Grass - Nature's Finest Medicine'- A .... https://www.iosrjournals.org/iosr-jpbs/papers/Vol11-issue2/Version-4/I1102045764.pdf.
12. Nutritional value and impact of wheatgrass juice (Green ... - SpringerOpen. https://bnrc.springeropen.com/articles/10.1186/s42269-020-0272-x.
13. Phytochemical Characterization of Triticum Aestivum (Wheat Grass). https://www.phytojournal.com/archives/2016.v5.i1.748/phytochemical-characterization-of-triticum-aestivum-wheat-grass.
14. Wheatgrass benefits: Nutrition, side effects, and warnings. https://www.medicalnewstoday.com/articles/320210.
15. The Medical Use of Wheatgrass: Review of the Gap Between Basic and .... https://research.avemar.com/system/files/publications/2015__bar-sela__mini_rev_med_chem__15_1002-10.pdf.
16. 7 Evidence-Based Benefits of Wheatgrass - Healthline. https://www.healthline.com/nutrition/wheatgrass-benefits.
17. Is Wheatgrass Worth the Hype? 7 Benefits - Cleveland Clinic Health .... https://health.clevelandclinic.org/is-wheatgrass-good-for-you.
18. Wheatgrass: Benefits, Side Effects, and More - Healthline. https://www.healthline.com/health/food-nutrition/wheatgrass-benefits.
19. Wheatgrass benefits: Nutrition, side effects, and warnings. https://www.medicalnewstoday.com/articles/320210.
20. Wheatgrass - Wikipedia. https://en.wikipedia.org/wiki/Wheatgrass.
21. Wheatgrass Nutrition Facts and Health Benefits - Verywell Fit. https://www.verywellfit.com/the-benefits-of-wheatgrass-88680.
22. Wheatgrass: Health Benefits, Nutrition Information, How to Use ... - WebMD. https://www.webmd.com/diet/health-benefits-wheatgrass
23. Triticum aestivum (wheatgrass) Exhibited Anticancer Activity on Oral .... https://www.researchgate.net/profile/Chetana-Bogar/publication/346624712_Triticum_aestivum_wheat_grass_Exhibited_Anticancer_Activity_on_Oral_Cancer_KB_Cell_Line/links/5fc9f22392851c00f84ce297/Triticum-aestivum-wheat-grass-Exhibited-Anticancer-Activity-on-Oral-Cancer-KB-Cell-Line.pdf.
24. Triticum aestivum (wheatgrass) Exhibited Anticancer Activity on Oral .... https://www.academia.edu/44519795/Triticum_aestivum_wheat_grass_Exhibited_Anticancer_Activity_on_Oral_Cancer_KB_Cell_Line.
25. Wheatgrass for cancer treatment - 24 Mantra. https://www.24mantra.com/blogs/health-and-nutrition/can-wheatgrass-beat-cancer-heres-what-science-says/.
26. Anti-cancer and anti-oxidant effects of wheatgrass on human leukemia.... https://www.wheatgrasshealing.info/research/anti-cancer-and-anti-oxidant-effects-of-wheatgrass-on-human-leukemia-cells/.
27. 11 Benefits of Wheatgrass, Nutrition Info, and Side Effects - Greatest. https://greatist.com/health/wheatgrass-benefits.
28. Evaluation of the Antioxidant Activity of Wheatgrass (Triticum .... https://www.researchgate.net/profile/Sunil-Kulkarni-4/publication/7257231_Evaluation_of_the_antioxidant_activity_of_wheatgrass_Triticum_aestivum_L_as_a_function_of_growth_under_different_conditions/links/5a0af93ca6fdccc69ed9c640/Evaluation-of-the-antioxidant-activity-of-wheatgrass-Triticum-aestivum-L-as-a-function-of-growth-under-different-conditions.pdf.
29. Wheatgrass benefits: Nutrition, side effects, and warnings. https://www.medicalnewstoday.com/articles/320210.
30. 7 Evidence-Based Benefits of Wheatgrass - Healthline. https://www.healthline.com/nutrition/wheatgrass-benefits.
31. Nutritional prospects of wheatgrass (Triticum aestivum) and its .... https://www.explorationpub.com/Journals/em/Article/1001104.
32. Getty Images. https://www.gettyimages.com/detail/photo/fresh-homegrown-wheatgrass-royalty-free-image/937865762.
33. Wheatgrass - Wikipedia. https://en.wikipedia.org/wiki/Wheatgrass.
34. CHEMICAL ANALYSIS AND NUTRITIONAL VALUES OF WHEATGRASS COMPARED TO .... https://ijaer.in/uploads/ijaer_02__47.pdf.
35. Wheatgrass Product Market Size & Share Analysis - Growth Trends .... https://www.mordorintelligence.com/industry-reports/wheatgrass-product-market.
36. Wheatgrass Market Size, Share, Trends, Report, 2024-2032 - IMARC Group. https://www.imarcgroup.com/wheatgrass-market.
37. Wheatgrass Products Market Size, Share & Trends 2033 | FMI. https://www.futuremarketinsights.com/reports/wheatgrass-products-market.
38. Wheatgrass Nutrition Facts and Health Benefits - Verywell Fit. https://www.verywellfit.com/the-benefits-of-wheatgrass-88680.
39. Nutritional value and impact of wheatgrass juice (Green Blood Therapy .... https://bnrc.springeropen.com/articles/10.1186/s42269-020-0272-x.

International Journal of Pharmacy and Pharmaceutical Research (IJPPR)
Volume 31, Issue 1, January 2025 **ijppr.humanjournals.com** ISSN: 2349-7203

How to cite this article:
Tushar Martand Undegaonkar et al. Ijppr.Human, 2025; Vol. 31 (1): 28-37.

Conflict of Interest Statement: All authors have nothing else to disclose.