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Wheatgrass: A Green Wonder with Multifaceted Health Benefits

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ABSTRACT:

This article explores the diverse health benefits of wheatgrass *(Triticum aestivum*), a young grass derived from the common wheat plant. Wheatgrass is rich in essential nutrients, including vitamins, minerals, enzymes, amino acids, and phytochemical compounds. It is known for its potential anti-cancer, anti-ulcer, anti-inflammatory, anti-diabetic, anti-bacterial, anti-thalassemia, and anti-arthritic properties. Additionally, wheatgrass may offer cardioprotective and hepatoprotective effects. The article discusses its taxonomical classification, phytochemical composition, and various therapeutic applications.

1. INTRODUCTION:

Wheatgrass, scientifically known as *Triticum aestivum*, is a type of young grass that comes from the common wheat plant. It's a widely found herb in India, although we don't know exactly where it originally comes from.

The stems of wheatgrass are simple, hollow or filled with soft tissue, and smooth. The leaves are about 1.2 meters tall, flat, narrow, and measure 20-38 centimeters in length and 1.3 centimeters in width. The spikes, which are long and slender, are somewhat flat and compressed from the sides.

Wheatgrass is believed to have a lot of nutritional value and is known to have various health benefits. It has been shown to have properties like reducing inflammation, acting as an antioxidant, preventing cancer, modulating the immune system, promoting bowel movements, tightening tissues, increasing urine production, fighting bacteria, and slowing down the aging process. It can also be beneficial in treating conditions like acidity, colitis, kidney problems, atherosclerosis (a condition where arteries become narrow and hardened), and swelling.[(1)]

While the incredible benefits of wheatgrass are just starting to gain recognition in India, they have been known in the Western world for some time. Wheatgrass juice contains chlorophyll, which can combat infections, promote wound healing, reduce inflammation, and help eliminate parasites. The three key effects of wheatgrass on the human body are blood purification, detoxification of the liver, and cleansing of the colon. This is because wheatgrass juice is exceptionally rich in essential nutrients, including vitamins A, B, C, E, and K, as well as calcium, potassium, iron, magnesium, sodium, sulfur, and 17 different amino acids.[(2)]

Figure: 1 Wheatgrass https://en.wikipedia.org/wiki/Wheatgrass

Wheatgrass juice, being perishable, is best consumed fresh. This restricts access for many individuals. However, its popularity has grown globally in recent years due to its nutritional benefits, leading to a demand for preservation methods that maintain its nutritional qualities and extend its shelf life. High-temperature treatments can affect the quality and nutrient content of the juice. Hence, exploring non-thermal methods becomes a promising option for extending shelf life while preserving its beneficial properties.[3]

2. TAXONOMICAL CLASSIFICATION OF WHEATGRASS[4]:

Taxonomical rank	**Taxon**
Kingdom	Plantae
Division	Magnoliophyta
Class	Liliopsida
Order	Cyperales
Family	Gramineae/Poaceae
Subfamily	Pooideae
Tribe	Triticeae
Genus	*Triticum*
Species	*aestivum*
Common name	Wheatgrass

Table:1 Taxonomical Classification

3. PHYTOCHEMICAL COMPOUNDS IN WHEATGRASS:[4]

Wheatgrass is often referred to as "green blood" due to its high chlorophyll content, constituting about 70% of its chemical composition. The juice extracted from wheatgrass is abundant in essential vitamins, including Vitamin A, Vitamin C, Vitamin E, and the Vitamin B complex. It also contains a variety of minerals such as phosphorus, calcium, magnesium, selenium, alkaline earth metals, boron, zinc, potassium, and molybdenum.

Wheatgrass juice contains several enzymes, including amylase, protease, cytochrome oxidase, transhydrogenase, and superoxide dismutase, which may have various biological functions. Additionally, wheatgrass is a valuable source of amino acids, including glutamic acid, arginine, alanine, aspartic acid, and serine. These components contribute to the nutritional profile and potential health benefits of wheatgrass.

wheatgrass is utilized in clinical settings primarily for its antioxidant properties, attributed to its high content of bioflavonoids such as luteolin, quercetin, apigenin, and indole compounds like laetrile (amygdalin) and choline. Additionally, wheatgrass contains a range of other constituents, including abscisic acid, alkaloids, carbohydrates, saponins, gums, mucilage, proline, glycine, and histidine.

It's worth noting that the concentration of certain antioxidants such as ferulic acid, vanillic acid, beta-carotene (pro-Vitamin A), Vitamin C, and Vitamin E tends to increase as wheatgrass grows. These components contribute to wheatgrass's potential health benefits, particularly its antioxidant and nutritional properties.

4. PHARMACOLOGICAL ACTION:

4.1. Anti-Cancer Activity: [5]

Selenium and laetrile, which are components found in wheatgrass, have demonstrated potential anticancer properties. Studies have shown that both aqueous and ethanol extracts of wheatgrass possess the ability to inhibit the growth of leukemia cells in a time-dependent manner.

Specifically, the aqueous extract of wheatgrass exhibits antiproliferative effects, meaning it can slow down the growth and reproduction of cancer cells. On the other hand, the ethanolic extract of wheatgrass appears to have the most potent anti-proliferative properties among the two extracts.

Additionally, in another laboratory study conducted in vitro, it was observed that wheat sprout extract can effectively hinder the metabolic activation of carcinogens, reducing their cancer-causing potential by up to 99%.

In summary, selenium and laetrile in wheatgrass, along with its aqueous and ethanol extracts, show promise in inhibiting leukemia cell growth, and wheat sprout extract has been found to significantly reduce the cancer-causing ability of carcinogens. These findings suggest that wheatgrass may have potential as a natural anticancer agent.

4.2.Anti-Ulcer Activity:[6]

Wheatgrass has demonstrated effectiveness in the treatment of active distal ulcerative colitis. This research was conducted using rats as experimental subjects. Water-soluble proteins and water-soluble organic compounds derived from wheatgrass showed promising results in their ability to alleviate symptoms associated with stomach ulcers. wheatgrass extracts, particularly water-soluble proteins and water-soluble organic compounds, exhibited

notable antistomach ulcer activity. This suggests that wheatgrass may have a protective effect on the stomach lining and can potentially be used to manage stomach ulcers.

4.3.Anti-inflammatory Activity: [7]

Chlorophyll is known for its anti-inflammatory properties. It can help reduce inflammation in various tissues and may be useful in managing inflammatory conditions. Chlorophyll has been found to contribute to the process of wound healing. It can aid in the repair and regeneration of damaged tissues, helping wounds to heal more effectively. Chlorophyll has the ability to stimulate the production of hemoglobin and red blood cells in animals suffering from anemia. This can be particularly beneficial in addressing anemia-related health issues. Chlorophyll has applications in the treatment of skin lesions and burns. It can assist in the healing process, potentially reducing scarring and promoting healthy skin regeneration. Chlorophyll is known to stimulate granulation tissue formation and epithelization. This means it can help in the growth of new tissue and the development of epithelial cells, which are essential for the healing of wounds and lesions.

4.4.Anti-Diabetic Activity: [8]

Wheatgrass is known to be a good source of dietary fiber, which can have a beneficial impact on blood sugar control. Fiber can slow down the absorption of glucose in the digestive system, helping to stabilize blood sugar levels. However, it's not the only factor at play, and other components of wheatgrass may also contribute to any potential hypoglycemic effect.

4.5.Anti bacterial activity: [9]

The presence of antibacterial activity in wheatgrass juice against E. coli and Staphylococcus aureus, as well as the detection of various secondary metabolites in wheatgrass, suggests that it contains bioactive compounds with potential health benefits. Secondary metabolites are compounds produced by plants that are not essential for their growth or development but often have important biological activities. These compounds can include phytochemicals such as flavonoids, alkaloids, and polyphenols.

4.6.Anti- thallesemia Activity: [10].

the chlorophyll molecule in wheatgrass is structurally similar to the hemoglobin molecule in humans, with the key difference being that hemoglobin contains iron while chlorophyll contains magnesium. Furthermore, it claims that the intake of chlorophyll derivatives, specifically from wheatgrass juice, resulted in a significant increase in red blood cell (RBC) count and hemoglobin concentration in thalassemia patients, with effective results observed in 50% of the patients.

4.7.Skin Disease: [11]

Scientific studies have indeed suggested that the chlorophyll component found in wheatgrass may have antibacterial properties, which can inhibit the growth and development of harmful bacteria. This antibacterial activity can be beneficial in various applications, including wound care and skin health.

4.8. Anti- Arthiritic Activity: [12,13]

certain studies have found potential benefits of dietary choices in managing rheumatoid arthritis (RA) symptoms and that wheatgrass may have shown positive effects against the disease.

4.9. Cardioprotective Activity: [14]

The chlorophyll content found in wheatgrass has been suggested to potentially offer several cardiovascular benefits, such as reducing blood pressure and increasing heart rate. Additionally, the presence of potassium in wheatgrass can contribute to the maintenance of normal blood pressure.

4.10. Hepatoprotective activity: [15]

Wheatgrass may have the ability to lower total cholesterol levels in the blood, potentially helping to manage hypercholesterolemia. Triglycerides are a type of fat in the bloodstream, and high levels are associated with an increased risk of cardiovascular problems. Wheatgrass may have shown the potential to reduce triglyceride levels. High-density lipoprotein (HDL) cholesterol is often referred to as "good" cholesterol because it helps remove excess cholesterol from the blood vessels. Wheatgrass may have demonstrated the ability to increase levels of HDL cholesterol.

5. CONCLUSION:

Wheatgrass, often referred to as "green blood" due to its high chlorophyll content, has gained recognition for its remarkable health benefits. It possesses a wide range of medicinal properties, from fighting cancer cells and healing ulcers to reducing inflammation and managing diabetes. Additionally, it

offers potential benefits for cardiovascular health and liver protection. Wheatgrass represents a promising natural remedy with a multifaceted approach to improving overall well-being. As research on its therapeutic potential continues to evolve, incorporating wheatgrass into a balanced diet may contribute to a healthier lifestyle.

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