

## Green Blood Therapy of Wheat Grass - Nature's Finest Medicine'- A Literature Review

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**Abstract:** The purpose of this review is to summarize the literature available on the extract known as wheatgrass juice derived from Wheat grass which is the mature shoot of the plant *Triticum aestivum* Linn. belonging to the family Gramineae. In general, Wheat Grass Juice (WGJ) is an extract squeezed from the mature sprouts of wheat seeds. Green Blood Therapy is the use of wheat grass juice (WGJ) to cure multiple diseases. The name "green blood" of wheat grass is attributable to its high chlorophyll content which accounts for about 70% its total chemical constituents and also to its close structural similarity to Haemoglobin. Wheat grass juice contains almost all the nutrients the body requires and is considered to be a complete food. Two ounces of wheat grass juice has the nutritional equivalence of five pound of the best raw organic vegetables. It is overflowing with vitamins, aminoacids, liver enzymes and chlorophyll. It contains 98 of 102 earth elements found in soil, including phosphorous, calcium, iron, magnesium and potassium as well as essential enzymes and 19 aminoacids. It has twice vitamin A as in carrots and is higher in vitamin C than oranges. 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, Haemorrhage, Obesity and Flatulence. Nowadays it is widely used in the treatment of cancer. Hence, the themes reviewed highlight the far reaching branches of study and application of this miracle plant in the treatment for minor ailments and serious life threatening issues as well as a preventative dietary supplement. This review aims to focus on the scientific trials with regard to the medicinal value of WGJ.

**Keywords:** Wheat grass juice, Green blood therapy, *Triticum aestivum*, Medicinal Value of WGJ, Nature's finest medicine, Complete food, Pharmacological effects and Therapeutic benefits of WGJ.

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### I. Introduction

Herbal or 'alternative' medicine is gaining popularity and scientific attributes regarding wheatgrass as a "functional food" is becoming more available and popular as a research topic. Wheat grass is the mature shoot of *Triticum aestivum* Linn. belonging to the family Gramineae. *Triticum* is a genus of annual and biennial grasses, yielding various types of wheat, native to south west asia (<http://informahealthcare.com>). 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 India. Wheat grass is cost efficient and a source to provide all kinds of nutrients like vitamins, proteins, minerals, antioxidants and medicinal benefits for a healthy and rejuvenating body. Wheat grass has high concentration of chlorophyll, minerals (calcium, potassium, iron, magnesium, sodium and sulphur), 17 forms of amino acids, vitamins (A, B, C, E and K) and active enzymes (Lee *et al*; 2003). It stimulates metabolism and also restores alkalinity to the blood. It is the chlorophyll content in wheat grass that detoxifies the body and strengthens immunity. The three most important effects of wheat grass on human body are blood purification, liver detoxification and colon cleansing. The consumption of wheatgrass in the Western world began in the 1930's as a result of the experiments conducted by Charles Schnabel, a food scientist who experimented with various mixtures of grain and feed and found that chickens fed on mixtures that contained a high proportion of wheat grass had grown better and were healthier. Further research and development continued which had contributed a substantial product to the food supplements industry (Singh *et al*; 2012).

### II. History

Wheat Grass Juice (WGJ) is an extract squeezed from the mature sprouts of wheat seeds (*T. aestivum*). Wheat grass can be traced back in history over 5000 years in ancient Egypt and perhaps even early in Mesopotamian civilization. It is reported that ancient Egyptians found sacred the young leafy blades of wheat and freeze them for positive effect on their health and vitality. The consumption of wheat grass in western world began in the 1930's as a result of the experiments conducted by Charles Schnabel an agricultural chemist on his hens using wheatgrass to nurse them back to health. He found that when supplemented his ill hen's diets with wheatgrass they doubled their egg production. Schnabel also produced dried and powdered wheatgrass for him and his family to supplement their diets.

The use of WGJ for therapeutic purposes was developed and popularized by Dr. Ann Wigmore, as part of her herbal therapeutic nutritional approach. Wigmore, believed that wheat grass, as a part of a raw food diet, would cleanse the body of toxins while providing a proper balance of nutrients as a whole food. The use of wheatgrass, particularly its fresh juice became popular again in the 1970s, through Ann Wigmore's 'The Wheatgrass Book' which later on became somewhat of a gospel amongst health supplement fanatics. Ann Wigmore also established the famous Hippocrates Centre treating thousands of clients with herbal grasses and wheatgrass juice (<http://en.Wikipedia.org/wiki/wheatgrass>). Fig.1 & 2.

In Asia and Europe wheat grass based products are consumed in the form of juices, powders and extracts for the healthy growth of human body. Wheat grass juice is nature's finest medicine. Two ounces of wheat grass juice has the nutritional equivalence of five pounds of the best raw organic vegetables. It is overflowing with vitamins, aminoacids, liver enzymes and chlorophyll. It contains 98 of 102 earth elements found in soil, including phosphorous, calcium, iron, magnesium and potassium as well as essential enzymes and 19 aminoacids. It has twice vitamin A as in carrots and is higher in vitamin C than oranges (Meyrowitz,1992). It contains the full spectrum of complete proteins which is in the form of simple polypeptides, a short chain of aminoacids that the body absorbs more efficiently in the blood stream.

In order to develop a holistic approach for the treatment of chronic diseases, scientists and clinicians world over are now a day's conducting extensive studies to evaluate the efficacy of wheat grass (in the form of powder or juice) and also for the better understanding of therapeutic potential of this medicinal grass (Rajesh *et al* ; 2011).



Fig : 1 Wheat Grass



Fig : 2 Wheat Grass Juice

### 1.1 Green Blood Therapy

Green Blood Therapy is the use of Wheat Grass Juice (WGJ) to cure multiple diseases. Wheat grass is called as the green blood. The name "green blood" of wheat grass is attributable to its high chlorophyll content which accounts for about 70% of its total chemical constituents' (The medicinal properties and values of wheatgrass , 2012),(Sweti *et al* ., 2005).

### 1.2 Nutritional Value

Wheatgrass juice is a rich source of Vitamins A, C, E and B complex, including B12. It contains a multitude of minerals such as calcium, phosphorus, magnesium, alkaline earth metals, potassium, zinc, boron and molybdenum. The various enzymes responsible for its pharmacological actions are protease, amylase, lipase, cytochrome oxidase, transhydrogenase and super oxide dismutase (SOD). The other notable feature of wheatgrass is its high proportion of amino acids such as aspartic acid, glutamic acid, arginine, alanine and serine. It also has a high content of bioflavonoids like apigenin, quercetin and luteolin. All of these enzymes contribute to its antioxidant activity. Other compounds present, which make this grass therapeutically effective, are the indole compounds, choline and laetrile (amygdalin)(Sweti *et al* .,2005).

### 1.3 Wheat Grass Cultivation And Its Parameters

Wheat grass can be cultivated in outdoors, but is commonly grown in indoors on trays filled with potting mix for 15 days. As the leaves grow, they eventually split. At this so called "jointing stage" point the blades can be snipped off, allowing for a second round of leaves to grow. Wheat grass was successfully grown in growth chambers and in field conditions at temperature of 18 to 26 °C and a relative humidity of 40 to 50% was found to be suitable for the growth of wheat grass (Ravi , Pharma Tutor p no: 45) .

### 1.4 Treatment For Multiple Diseases

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

### III. Chemical Constituents Of WGJ

#### 2.1 Vitamins

**Vitamin A:** It enhances the skin luster and provides glow to the outer skin and makes it disease free.

**Vitamin B:** It aids in digestion. It is helpful in the treatment of digestive disorders, mental depression, insomnia, premature aging and anorexia.

**Vitamin C:** It 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 (Hemilia , 1992)

**Vitamin E:** It dilates the capillaries and enables free flow of blood. It prevents abortion, diabetes, cancer, heart disorders and dysmenorrhoeal etc. This antioxidant and fertility vitamin is also a protector of the heart (Andrew *et al.*, 2000).

**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.

#### 2.2 Msm

MSM is a sulphur bearing molecule found in all living organisms which get destroyed in processed food. It helps our Body to use vitamins, helps to reduce allergies, helps detoxify the body and increase oxygen and takes out inflammation.

#### 2.3 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.

#### 2.4 Enzymes

Enzymes are the digestive element helpful for dyspepsia, digestion, building a healthy body and counteract premature aging.

#### 2.5 Minerals

**Iron:** It is helpful in pregnancy, for excessive sweating, pale complexion, laziness, 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 restores an alkaline environment in the body for the children and vitality for old. It is helpful in the treatment of diseases like haemorrhage, distension of body, slow movements, coldness and varicose veins etc.

**Potassium:** Helpful for the radiance and luster of youth, hypertension, dementia, palpitation, tiredness, Suicidal instincts and depression. Potassium, called the youth mineral by some nutritionists, helps to maintain a smooth mineral balance and balanced body weight.

**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:** Magnesium is important for good muscle function and for bowel health, as it aids eliminative functions.

#### 2.6 Chlorophyll

Chlorophyll the most important element of wheat grass is contained in the cells called chloroplasts. The chemical formation of wheat grass juice has a striking similarity with the chemical formation of human blood (Chenomorsky , 1988). The only difference is that the central element in chlorophyll is magnesium and in haemoglobin it is iron. Wheat grass is high in oxygen like all green plants that contain chlorophyll. The molecular structure of chlorophyll in wheat grass and haemoglobin in the human body is similar and because of this wheat grass is called 'GREEN BLOOD'. The pH factor of human blood is 7.4. The pH factor of the wheat grass juice is also 7.4 which may be the reason why WGJ is quickly absorbed in the blood. Chlorophyll present in wheat grass can protect us from carcinogens; it strengthens the cells. It is anti – bacterial and can be used inside and outside the bodies as a healer (Wigmore , 1985). Chlorophyll neutralize toxins in the body and improve blood sugar problems.

### 3. Therapeutic Benefits Of Wheat Grass Juice.

Wheatgrass juice is nothing but crude chlorophyll which 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.

Chlorophyll is anti-bacterial and can be used inside and outside the body as a healer. Chlorophyll (wheatgrass) rebuilds the bloodstream. Wheatgrass juice is a superior detoxification agent compared to carrot juice and other fruits and vegetables. Studies report that 15 pounds of wheatgrass is equivalent to about 350 pounds of carrot, lettuce, celery and so forth (Sean , 2006). Chlorophyll neutralizes toxins in the body. Chlorophyll improves blood sugar problem. A small amount of wheatgrass juice in the human diet prevents tooth decay. Drinking wheatgrass juice is good for skin problems such as eczema and psoriasis. It keeps the hair from greying and improves digestion. It prevents constipation. Chlorophyll is called as 'concentrated sun power'. Chlorophyll increases the function of the heart, the vascular system, the intestines, the uterus and the lungs. Chlorophyll (wheatgrass) is a natural body cleanser, re-builder and neutralizer of toxins. Wheatgrass juice is good for blood disorders of all kinds.

#### **IV. Polypharmacological Effects Of WGJ.**

##### **4.1 Diseases Related To Blood And 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 case of anaemia for which no other therapy has such quick cure. For this an intake of 200 ml juice twice a day is recommended.

###### **4.1.1 Deficiency Of Haemoglobin**

Wheat grass juice is termed as a substitute for natural red blood cells. Wheat Grass possesses all the compositions that Haemoglobin possesses. It is also known as Green Blood because of its close structural similarity to Haemoglobin. 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 causes complications such as swelling of the body, digestion trouble, insomnia, etc. This can also be cured using WGJ.

##### **4.2 Diseases Related To The Respiratory System**

Common cold, asthma, bronchitis and all the related diseases get cured with the regular regimen of this wheat grass juice therapy. Common cold generally disappears within a couple of days. Asthma is a dreadfully stubborn disease responding to almost all 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. Constipation, indigestion, flatulence, nausea, vomiting, acidity, ulcers in the stomach and intestines 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, ulcerative colitis and chronic constipation.

##### **4.4 Teeth And Gum Related Diseases**

###### **4.4.1 Tooth Disorders**

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

###### **4.5.1 Osteo-Arthritis**

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 the skin is broken. Can produce marked reduction in swelling, bruising and pain.

#### **4.5.3 Gout, Acute And Chronic**

Apply every 3 or 4 hours. Maintains hyper-uricemics therapy. Can facilitate anti-inflammatory effect of hyper-uricemics and 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 almost all skin diseases. It has been found to be curing eczema, achne, boils, cuts and wounds, bites and burns etc.

##### **4.6.1 Gangrene**

Pour the WGJ or powder over the wounds thrice every day. Thus, situation will be improved and cured in about 10 months' time. The Kidney function and Haemoglobin level in the blood also improve up to normal.

##### **4.6.2 Skin Itching**

Severe itching on the skin all over the body will cause wounds. Through Wheatgrass therapy, within a month the itching will be reduced.

##### **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. If wheat grass juice is taken regularly the results are better and the cure is faster.

#### **4.8 Disease Connected With The Reproductive Organs**

Sexual debility and dysmenorrhea 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 Myelodysplastic Syndrome (Preleukemia)**

Wheat grass juice is effective in reducing Ferrite (Iron) level in myelodysplastic syndrome (Preleukemia). Wheatgrass juice is a MUST for Cancer patients of any type whether you are operated, done Chemo / Radiation or with no Allopathic treatment. SOD, Selenium, laetrile (B17) in Wheatgrass kills Cancer cells and Chlorophyll (a green blood) increases the WBC and RBC counts for faster cure.

##### **4.10.1 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 provides healthier blood levels while receiving the chemotherapy thus decreasing the need for blood building medications. Wheatgrass juice was found to diminish the effectiveness of chemotherapy.

Wheat grass helps to neutralize toxins and environmental pollutants in the body (Falcioni *et al.* , 2002) . This is because wheat grass contains enzymes that help to protect us from carcinogens, including superoxides dismutase (SOD) that lesser the effect of radiations thereby digest toxins in the body (Bar – Sela *et al.* , 2007) . Cancer thrives in low oxygen environments, thereby preventing cancer due to antioxidant content chlorophyll, laetrile and antioxidant enzyme super oxide dismutase (SOD) which converts dangerous free radical reactive oxygen species (ROS) into oxygen molecule. In another study, Dey *et al.* , 2006 found that wheat grass juice helped to improve the health status and life span in terminally ill cancer patients. The extract of wheat grass when applied to known chemical mutagens decreased their cancer causing ability by 99 percent which suggests that wheat grass may have cancer preventing property. The clinical studies conducted on human breast cancer have shown that chlorophyllin, a compound that is similar to chlorophyll produced synthetically, has capability to reduce the risk of breast cancer.

#### **4.10.2 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 migraine, home remedies and life-style changes can go a long way to reduce the 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 (Hagiwara *et al.* ,1981).

#### **4.12Thalassemia**

Whether green blood method is a cure for thalassemia, the common findings are that, among patients taking this therapy the interval between blood transfusions has been increased upto 25-30 days. Earlier, thalassemia patients had to have a transfusion once in every two weeks. The grass juice extracted from the pulp of wheatgrass has been used as a general purpose health tonic for several years. Several patients in the thalassemia (a hereditary form of anaemia, occurring chiefly in people of Mediterranean origin, marked by the abnormal synthesis of haemoglobin and a consequent shortened life span of red blood cells) unit began consuming wheatgrass juice after anecdotal accounts of beneficial effects on transfusion requirements.

Wheat grass has the potential to increase the haemoglobin levels, increase the interval between blood transfusion and decrease the amount of total blood transfused in the thalassemia. Marwaha *et al.*,conducted a pilot study to scientifically evaluate the effect of wheat grass juice therapy in patients with transfusion dependent Beta- Thalassemia and it was observed that consumption of wheat grass juice was found to give beneficial effect on the transfusion requirement in 50% of patients in this pilot study. The study suggested that WGJ has the potential to lower transfusion requirements in thalasseemics. It has been proved that wheat grass helps blood flow, digestion, detoxification of the body etc (Padalia *et al.* , 2010) , (Ben – Arye *et al.* , 2002) .The indole compounds present in wheat grass might be responsible for the deactivation of carcinogens by increasing the activity of xenobiotic metabolic enzyme in the liver and intestinal mucosa (Christne *et al.* , 2001).

#### **4.13 Anti- Ulcer Activity**

In a randomized, double blind placebo controlled study on WGJ Ben-Arye *et al.*, 2002 observed that the use of wheat grass juice is very effective and safe as a single or adjuvant treatment of active distal Ulcerative colitis ( UC) . Green juice and fractions from green juice of young barley leaves containing water soluble proteins organic compounds showed anti - stomach ulcer activity in stressed rats. The clinical studies suggest that chlorophyll may be the best agent known for or wherever stimulation of tissue repair is desired ( Bower,1945) . Studies are in progress to evaluate WGJ as possible therapy for ulcerative colitis as it is rich in bioflavonoid which are believed to possess both anti – inflammatory and antioxidant properties .One of these bioflavonoid, api- genin, has been shown to inhibit tumour necrosis factor (TNF) induced transactivation (Shah , 2007) .

The studies related to the use of chlorophyll in stimulating tissue growth have shown that chlorophyll ointment and aqueous solution is very effective in the treatment of skin ulcer (Lam *et al.* , 1950). Further more, chlorophyll derivatives have also been shown to exhibit anti – inflammatory ,wound healing and odour reducing capabilities . Chlorophyllin has bacteriostatic properties aiding in wound healing, and stimulates the production of haemoglobin and erythrocytes in anaemic animals. It has been used to treat various kinds of skin

lesions, burns and ulcers where it acts as a wound healing agent, stimulating granulation tissue and epithelisation (Gahan ,1943).

#### **4.14 Anti- Oxidant Activity**

The aqueous and ethanol extracts of wheat grass has an ability to inhibit the growth of leukaemia cells and also an increase in CAT, SOD and ADA activities were calculated in the cell lines treated with wheat grass extracts (Aydos *et al.* , 2011). The concentration of vitamin C and E ,beta carotene, ferulic acid and vanilic acid present in wheat grass increases with the germination period of wheat grass (Hanninen *et al.* , 1999). A study done on MCF-7 breast cancer lines with different extracts show highest free radical scavenging activity and the highest cell killing property (Tandon *et al.*, 2011) , (Kulkarni *et al.* , 2006). The antioxidant activity of wheat grass has been measured under different condition (1) tap water, (2)tap water with nutrients, (3)soil and tap water,(4) soil with nutrients, it has been found that the ethanol extract of wheat grass has highest FRAP values day 15 of growth under condition 4 (Siener *et al.* , 2006). Wheat grass contains antioxidant enzyme super oxide dismutase which converts dangerous free radical reactive oxygen species into hydrogen peroxides, which is not destructive as superoxides molecule and an oxygen molecule (Mates *et al.* , 2000).

#### **4.15 Anti- Arthritic Activity**

In rheumatoid patients randomized into diet and control groups, it has been observed that an uncooked vegetrain 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 fibre and iron. Further the studies showed significant response in arthritic patients ( Nenonen *et al.* , 2010) .

#### **4.16 Anti- Inflammatory Activity**

It was observed that wheat grass cream reduces inflammation and skin toxicity from radiotherapy. But, another study showed that the topical application of wheat grass has been use treat burns and ulcers.

**Pharmacokinetics:** The proteins, lipids and carbohydrates in wheat grass are digested, absorbed and metabolized by normal physiological processes.

**Contraindications:** Wheat grass is contraindicated in those who are hypersensitive to any component of a wheat grass containing supplement.

**Precautions:** Pregnant women and nursing mothers should avoid wheat grass containing supplements. Wheatgrass supplements may contain high amounts of vitamin K. Those on warfarin should exercise caution in the use of wheat grass supplements (Swathi *et al.* , 2010).

**Adverse reactions:** Wheatgrass juice is safe and the incidence of side effects is very low. It may cause nausea and headache when taken in excessive quantities. Throat swelling may occur in hypersensitive individuals

## **V. Conclusion**

To conclude, wheatgrass seems to be a very promising herbal drug and extensive research work is needed in order to explore its therapeutic application in various diseases. Wheatgrass juice generally contains no harmful substances with the exception of a possible allergic reaction. Wheatgrass is known to help minimize fatigue, improve sleep, increase strength, naturally regulate blood pressure and blood sugar, support weight loss, improve digestion and elimination, support healthy skin, teeth, eyes, muscles and joints, improve the function of our heart-lungs and reproductive organs, heal ulcers and skin sores, slow cellular aging, improve mental function and is beneficial in arthritis and muscle cramping. It is proven to be beneficial under various conditions, such as anaemia, diabetes, cancer, eczema, constipation, kidney swelling, and common cold. Thus, it should be made part of daily dietary intake in order to explore its maximum benefits.

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