

A Review on Wheat Grass Bioactive Compounds used to surge the Therapeutic potential.

DR. Priyanka Gupta

Assistant Professor, Department of Agriculture

Akal Degree College, Affiliated to Punjabi University, Mastuana Sahib, Sangrur, Punjab, 148001

Abstract

The Present study of Wheat grass bioactive compounds that is called a nutrient rich type of young grass, which contains many nutrients, vitamins, minerals, iron, zinc, sodium, aluminium, calcium, magnesium, amino acids and has high quantity of chlorophyll content. These bioactive compounds help to increasing the production of haemoglobin, improved blood sugar, removing toxins from the body. There are various bioactive phytochemicals are help in many therapeutic potential it includes acts as antithalassemia ,anticancer activity, antiulcer activity, antioxidant activity, antiarthritic activity, antiinflammatory activity. Wheat grass also help in treatment of some common ailments such as tooth disorders, in skin diseases, digestive disorders and circulatory disorders. The objective of this review to surge the value of wheat grass used as nutraceutical and functional food that helps to decrease the risk of acute diseases in humans.

Keywords: *Bioactive compounds, Haemoglobin, Phytochemicals, Nutraceutical*

1.) Introduction

Wheat grass is saucily grown with common wheat grass. It belongs the family of Poaceae (Gramineae). It is used in many Indian festivals and rituals especially in Navratri in month of April and October. Wheat grass is generally offered the saplings to the goddess Durga on the last day of Navratri(Murphy, Sean.,2006).Wheat grass has proteins, beta carotene, vitamin E, Vitamin C, Vitamin B12, Phosphorous, Magnesium, calcium, Iron, Potassium, Selenium, Thiamin, Riboflavin, Niacin, copper and pantothenic acid(Mujoriya et al.,2011).It also has many antioxidants to prevent cell damage and helps in reduction of oxidative stress, helps in asthma, helps in atherosclerosis, Joint pains, tuberculosis, constipation, helps in hypertension, diabetes and Parkinson's disease. It also helps in mouth cancer cells and in Breast cancer(Kulkarni et al.,2006.,Nenonen et al.,1998.,Gahan et al.,1943.,Singh et al.,2012.,Peryty et al.,1992.,Durairaj et al.,2014).

2.) Bioactive Phytochemicals

Phytochemicals are called secondary metabolites because it has many biological properties that helps to make our immune system strong for many severe diseases such as antimicrobial activity, In decrease of platelet aggregation and modulation of hormone metabolism and anticancer activities (Altiok., 2010).These Phytochemicals are Cellulose, mucilages, pectins, lignins, hemicellulose help to binding the toxins and bile acids. Terpenoids, alkaloids, phenolics helps to reduce the risk of fungal infections in body. Polyphenolic compunds, tocopherols, ascorbic acid, Carotenoids, curcumine, flavonoids, Carotenoids, polyphenols curcumine and flavonoids help to inhibit the tumour and lung cancer and also acts as antimetastatic activity. Some detoxifying agents are also help to inhibit the procarcinogen activation and tumourogenesis. These detoxifying agents are tocophenols, phenols, indoles, coumarins, isothiocyanates, flavones, cyanates and phytosterols(Saxena et al.,2013).

3.) Act as Antithalassemia

It is genetically inherited disorder that gives rise to the production of abnormal red blood cells that is called RBC in the body because there is the lackness of beta globin chain. It cause the desolation of red blood cells in spleen and in blood .It increase the level of fetal haemoglobin that is called Hb F and lack of HbA (Sussan PP,Gordon DG, Douglas VF etal.,1993).Wheat grass help in production of Hb F(Reynolds CA.,2005). Wheat grass helps to improved the appetite and reduced the musculo-skletal aches and pains (Marwaha RK, Bansal D etal.,2004).

4.) Acts as Anticancer

Caffeic acid phenethyl ester(CAPE) and Cucurbitacin I shows anticancer activities by suppressing the growth of some cancer stem cells or tumor cells and their apoptosis(Xiang D,Wang D etal.,2006;Wang D etal.,2005;Omene CO, Wu J.,2012;Chen YJ, Shiao MS 2001)

. Cucurbitacin I shows anticancer activity due to the inhibition of transcription-3 signal pathway and has the ability to vanquish the activity of cancer stem cells and increase the response of transcription-3 signal pathway and nuclear factor- kappa –beta in breast cancer cells pathways. CuI and CAPE are the two bioactive compounds to decrease the cell proliferation in these two lines. Caffeic acid phenethyl ester and Cu I help to inhibit the cell growth to decrease the colony number. The combination of these two compounds showing anticancer properties and lessen the toxicity(Watabe M etal.,2004;Van Laere SJ etal.,2007;Lau ST etal.,2010;Grivennikov SI etal.,2010;Mc Farland BC etal., 2013 .,Hortobagyi GN.,2001;Hong C-E etal 2014).

5.) Antiinflammatory Activity

Wheat grass contains chlorophyllicin content that has bacteriostatic properties that helps in wound healing and production of haemoglobin and erythrocytes. Chlorophyllicin helps in bracing the epithelization (Gahan E etal.,1943).

6.) Anti-oxidant Activity

Wheat grass has antioxidant activities that is maximum used as a dietary supplement due to it has superoxide dismutase enzyme that helps to change the free radical reactive oxygen species that is called ROS to Hydrogen peroxides and an oxygen molecule to increase the activity of antioxidant level in wheat grass (Kulkarni etal.,2006).

7.) Traditional and Medicinal uses

Wheat grass is used in cure of high blood pressure, in obesity, in diabetes, in gastritis, in ulcers, in asthma, in anaemia and eczema (Shah et al.,2011).Wheat grass is used in brewing industries and ethanol production in many industries as well as used in cosmetics industries. Wheat grass is also used in treatment of some digestive disorder. Wheat grass is used in confectionary products such as bread, noodles, wheat gluten and wheat straw composites (Kumar etal.,2011).

Wheat grass is used in maintanance of bone and joint diseases such as osteoarthritis and fractures, Gout due to its string antiinflammatory effect. It is used in lower pain, swelling and inflammation helps to stop the cutaneous and subcutaneous bleeding rapidly. It also helps to increase the natural healing process.

Wheat grass is used in skin diseases Ear diseases as well as kidney diseases such as acnes, cuts, boils, wounds, bites, Gangrenes, skin itching. It also helps in active blood purifying agent (Joan IA., 2012).

8.) Conclusion

The present study concludes the wheat grass is rich in phytochemicals they are bioactive compounds such as terpenoids, alkaloides, glycosides, coumarins, chlorophyll content and various phenolic compounds help to cure the

various serious diseases in human in present time. Some bioactive compounds are used in various useful products in medicines. These medicines is related to the kidney and urinary bladder diseases and ear diseases.

9.) References

- 1.) Murphy, Sean, "Wheatgrass, healthy for the body and the bank account." ABC Landline. Retrieved. 2006; 10-06.
- 2.) Mujoriya R. A study on wheat grass and its nutritional value. Food science and Quality Management .2011, 2.
- 3.) Kulkarni S.D., Tilak J.C., Acharya R, Rajurkar NS, Devasagayam TP, Reddy AV. Evaluation of the antioxidant activity of wheat grass (*Triticum aestivum* L.) as a function of growth under different conditions. Phytother Res. 2006, 3, 218-227.
- 4.) Nenonen MT, Helve TA, Rauma AL, Hanninen OO. Uncooked, Lactobacilli-rich Vegan Food and Rheumatoid Arthritis. British Journal of Rheumatology. 1998; 37: 274-281.
- 5.) Gahan E, Kline P, Finkle T. Chlorophyll in the treatment of ulcers. Derm and Syph. 1943; 47:849-851.
- 6.) Singh N; Verma,P; Pandey, B.R. Therapeutic potential of organic *Triticum aestivum* Linn.(Wheat grass) in prevention and treatment of chronic disease; An overview. Int. J. Pharm. Sci. Drug Res.2012, 4, 10-14.
- 7.) Peryty B, Szynczy KT, Lesca P. Mechanism of anti mutagenicity of wheat sprout extracts. Mutat Res.1992; 269:201-205.
- 8.) Durairaj V, Hoda M, Shakya G, Babu SPP and Rajagopalan R. Phytochemical screening and analysis of antioxidant properties of aqueous extract of wheat grass, Asian Pacific Journal Tropical Medical, 2014, 7, 1 389-404.
- 9.) Altoik, E. Recovery of phytochemicals from local plants. Sciences of Izmir Institute of Technology, Izmir.2010
- 10.) Saxena M.,Saxena, J.,Nema, R and Singh, D.Phytochemistry of medicinal plants Journal of Pharmacognosy and Phytochem, 2013,1,6,168-182.
- 11.) Susan PP, Gordon DG, Douglas VF, George HD,Iku-ta T, Witkowska HE etal. A Short term trial of butyrate to stimulate fetal globin expression in the i- Globin Disorders. The New England Journal of Medicine. 1993; 328:81-86.
- 12.) Reynolds CA. DNA technology-based cellular assay used to measure specific biological activity in a wheat grass extract. Journal of Australasian Integrative Medicine Association. 2005,1,3.
- 13.) Marwah RK, Bansal D ,Kaur S and Trehan A. Wheatgrass juice reduces transfusion requirements in patients with Thalassemia major: a pilot study, Indian Pediatr.2004,41,7,716-720,
- 14.) Xiang D, Wang D, He Y, etal. Caffeic acid phenethyl ester induces growth arrest and apoptosis of colon cancer cells via the beta-catenin/T-cell factor signaling. Anticancer Drugs.2006; 17, 7: 753-762.
- 15.) Wang D,Xiang D-B,He Y-J etal. Effect of caffeic acid phenethyl ester on proliferation and apoptosis of colorectal cancer cells in vitro. World J Gastroenterol.2005;11,26:4008-4012.
- 16.) Omene CO, Wu J,Frenkel K. Caffeic acid phenethyl ester (CAPE) derived from propolis, a honeybee product, inhibits growth of breast cancer stem cells. Invest New Drugs. 2012; 30, 4:1279-1288.
- 17.) Watabe M, Hishikawa K, Takayanagi A, Shimizu N, Nakaki T. Caffeic acid phenethyl ester induces apoptosis by inhibition of NF kappa B and activation of Fas in human breast cancer MCF-7 cells. J. Biol. Chem.2004;279,7:6017-6026.
- 18.) Van Laere SJ, Van der Auwere I, Van den Eynden GG etal. NF-kappa B activation in inflammatory breast cancer is associated with oestrogen receptor down regulation, secondary to EGFR and /or ErbB2 over expression and MAPK hyper activation. Br. J Cancer.2007;97 ,5:659-669.
- 19.) Lau ST, Lin ZX,Leung PS. Role of oxygen species in brucein D-mediated p38-mitogen- activated protein kinase and nuclear factor- kappa B signalling pathways in human pancreatic adenocarcinoma cells. Br J Cancer.2010;102, 3:583-593.

20.) Grivennikov SI, Karin M. Danferous liaisons: STAT3 and NF-kappa B collaboration and crosstal in cancer. Cytokine Growth Factor Rev.2010; 21, 1:11-19.

21.)McFarland BC, Gray GK, Nozell SE, Hong SW,Benveniste EN. Activation of the NF-kappa B pathway by the STAT 3 inhibitor JSI-124 in human glioblastoma cells. Mol Cancer Res. 2013;11(5):494-505.

22.) Hortobagyi GN.Progress in systemic chemotherapy of primary breast cancer: an ovrview. J.Natl Cancer Inst Monogr.2001, 30:72-79.

23.) Hong C-E,Park A-K,Lyu S-Y. Synergistic anticancer effects of lectin and doxorubicin in breast cancer cells. Mol. Cell Biochem.2014;394(1-2):225-235.

24.) Shah etal. Antiulcer activity of Triticum aestivum on Ethanol induced mucosal damage in Wistar Rats. Pharmacology online, 2011.2:929-935.

25.) Kumar P, Yadava RK, Gollen B, Kumar S, Verma RK, Yadava S. Nutritional content and medicinal properties of wheat a review. Life Science and Medicine Research.2011.

26.) Joan IA, Campbell- Tofte, Per Molgaard, Kaj Winther. Harnessing the potential clinical Use of medicinal plants as anti diabetic agents. Botanics:Targets and Therapy,2,2012,7-19.

