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A comparative study of anti-oxidative potentials of wheat grass, sorghum grass and barley grass juices and its anti-diabetic effectiveness

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Abstract

The aim of the review is to evaluate the oxidative potentials of Wheat, Sorghum grass, and Barley grass juices and its Anti diabetic activity. Diabetes mellitus is a major disease over worldwide many deaths every year. Now we have chosen the essential grasses juices which plays an important role in hypoglycemic effect and other diseases: like Wheat grass, sorghum grass and Barley grass juices is of great interest because of economical and commercial value in conventional medicine. Wheat, Sorghum and Barley grass juices contains high amount of antioxidant activity than other fruits and vegetables, and there are increased levels of oxidative potentials are noticed in chronic diseases, so Wheat, Sorghum and Barley grass juices can be used as an herbal antioxidant supplement to treat various chronic diseases in future. Hence, we comparative study of Wheat, Sorghum and Barley grass juices has major oxidative potentials which having anti-diabetic properties, provided in this study in detail. In view of the above features, the present assessment offers info about the antidiabetic medicinal plants, accessible through literature sources.

Keywords: Anti-oxidative potentials, wheat grass, sorghum grass, barley grass juices

Introduction

Plants are important sources of natural remedies which have been utilized by human for a long time since they contain numerous organically dynamic mixes, for instance, polyphenols, nutrients, terpenes, natural acids, and so on that work against sicknesses, for example, cancer, atherosclerosis, diabetes, and some more. Also, plants at young stage produce phytochemicals substances to shield themselves from peril and these mixes apply different organic benefits to human health. Along these lines, grow, being a new, straightforward, with sustenance vegetable, can be recommended as a decent decision of healthy eating diet. Besides, the utilization of grow juice is noticeable, as it is a basic way to enhance the amazing nutritive and favorable mixes in little amounts.

India is the biggest maker of therapeutic herbs and is known as the greenhouse of the earth. Ayurveda, alongside other Indian productions, underlines the utilization of plant life in the treatment of different human sicknesses. India has around 45,000 types of plants and furthermore, among them, it is accounted for that a couple of thousand have therapeutic characteristics. The investigation led in recent years on plants referenced in the previous writing is generally utilized for diabetes shows properties against diabetes. The World Health Organization (WHO) trusts that more than 80% of the human populace relies upon standard medication systems for their essential wellbeing necessities and that these strategies depend basically on restorative plants.

Diabetes: Diabetes mellitus is a disorder, at first described by loss of glucose homeostasis coming about because of imperfections in insulin discharge, insulin activity both bringing about hindered digestion of glucose and other vitality yielding fills, for example, lipids and proteins. This glucose is the essential supply of fuel to get power for the whole body. After separate of nourishment the sugar achieves our blood stream precisely where it's for body cells to use for energy. Be that as it may, insulin is required for the glucose to enter the cells. Insulin can be a hormone discharged by the pancreas. It's the duty of the pancreas to emit the plentiful measure of insulin, to transport glucose from blood into various cells of the body. On the off chance that the showed pancreas does not take enough insulin or even the insulin delivered does not work legitimately, glucose can't enter the cells of the entire body.

So, the sugar remains in the blood. This causes the blood sugar level to begin to rise, which prompts diabetes. Diabetic issues are a relentless state of the metabolic procedure in which an individual has an abnormal state of sugar in the blood, on the grounds that the entire organism does not take enough insulin, or maybe in light of the fact that the cells don't respond to the insulin delivered. This abnormal state of glucose in the blood makes the great symptoms of polyuria, polydipsia (expanded thirst) and polyphagia (expanded hunger).

In general, additional biological data exist, the specific action in the treatment of diabetes techniques, but it has been found that most plants contain substances such as glucoside, alkaloid, terpenoid, flavonoid, etc., having antidiabetic effects (Arumugam G *et al.* 2013) [12]. Trade defense measures (research of the plant kingdom) diabetes mellitus continue growing in the world, since the disease presents several challenges, not only for specialists, but also for the researcher. This article focuses on the various investigations that focus on connecting the oxidative potential of wheatgrass, sorghum and barley grass juice and its antidiabetic impact.

Now, here we overview of comparative studies of Wheat, Sorghum and Barley grass juices have the major oxidative potentials, having anti-diabetic properties, provided in this study, which of these are best for diabetes. In view of the above features, the present assessment offers info about the antidiabetic medicinal plants, accessible through various literature sources. Here we generalized many allopathic treatments for diabetes not as much sufficient for curable as well as their many side effects. Now this study is beneficial for diabetic patients to choose these grass juices which have not any side effect but having major oxidative potential to cure diabetes as much as possible required for long life. Detail study are given below:

Profile of Wheat Grass Juices And Its Therapeutic Potentials Roles

Classification of the Wheat Grass

Kingdom:	Plantae
Division:	Magnoliophyta
Class:	Liliopsida
Order:	Cyperales
Family:	Poaceae
Genus:	<i>Triticum</i>
Species:	<i>aestivum</i>

Forms available in market

Wheat grass is generally accessible in three forms: wheat capsule, wheatgrass powder and wheatgrass juices.

Phytochemicals in Wheatgrass

Reducing sugars, anthraquinones, saponins, flavonoids, tannins, alkaloids, terpenoids phenolics, are the phytochemicals present in wheatgrass which are responsible for a variety of medicinal properties of wheatgrass (Tandon *et al.*, 2011) [10].

Therapeutic Roles of Wheatgrass against Chronic Diseases Anticancer activity

T. aestivum a major sustenance crop universally, is perceived as a co-adjuvant in cancer treatment (Bonfilia *et al.*, 2009) [11]. Wheatgrass has high amount of chlorophyll which go about as a cell reinforcement and can influence cancer avoidance. Selenium and lactrile present in wheatgrass have anticancer exercises and can decrease danger of cancer. It has

been seen that in stage 2 liver detoxification, compounds called glutathione transferase in light of the fact that glutathione to respond with the cancer-causing agents framed from cytochrome P-450 activity to create harmless extra products, yet this procedure isn't proficient (Finch *et al.*, 1997) [12].

Wheatgrass juice are useful supplements, nutrients, for diabetes as well as cancer prevention representatives, chemicals, and also phytonutrients, wheatgrass is the same a competent detoxifier, especially of the liver as well as blood. It kills poisons as well as ecological contaminations within the body. This's on account of Wheatgrass has helpful compounds which shield us from cancer causing agents, like Superoxide Dismutase (SOD), which reduces the impacts of light & introduction toxins within the body. It scrubs the body coming from top to toe of any vast metals, harmful toxins as well as various contaminants which may be stored in the body's organs and cells. It's best to have 2 ounces of wheatgrass juice daily.

Antioxidant activity

Chlorophyll present in wheatgrass restrains the metabolic actuation of cancer-causing agents (Lai *et al.*, 1978, Lai, 1979) [13, 14], wheatgrass was additionally found the oxidative DNA harm (Falcioni *et al.*, 2002) [15]. An examination done by on MCF-7 chest cancer cell lines with different concentrates of wheatgrass found that unrefined ethanolic expel show most dumbfounding total phenolic content DPPH radical-seeking action, Ferric reducing cell reinforcement power and Anti-radical movement (Tandon *et al.*, 2011) [10]. We evaluated the agent to prevent the Wheatgrass cancer movement, which were created under different conditions (1) water spike (2) water enhancement accessories, (3) ground and tenon water, and (4) land improvements, it was found that the highest FRAP values were found to be 15 in condition 4, the qualities were 0463 and 0573 mmoles of ascorbic destructor and Trolox partner / 100 g of fresh wheatgrass for liquids and extractable ethanol, independently and the ORAC was found to be more imperative day 10 with condition 4, estimates of aqueous evacuation and ethanol were considered as 39.9 and 48.2, exclusively (Kulkarni *et al.*, 2006; Siener *et al.*, 2006) [16, 17]. Superoxide dismutase containing reinforcement wheatgrass chemical cell (SOD) becomes open oxygen species (ROS) dangerous peroxides of hydrogen free radicals, which are not crushing, superoxide particles and an oxygen atom. (Mates *et al.*, 2000) [19].

Anti-Diabetic activity

Wheatgrass contains a good amount of fibers which are able to maintain blood sugar levels; chlorophyll present in wheatgrass is shown to perform as an anti-diabetic agent (Shirude, 2011) [20]. Shaik *et al.*, (2011) [21] has demonstrated that wheatgrass juice indicates hypoglycemic impact on instigated diabetic rodents. The antihyperglycemic action of the plants is for the most part a direct result of its ability to restore the limit of pancreatic tissues by causing a development in insulin performance the intestinal absorption of glucose or with the help of metabolites in subordinate insulin methods. Glycosides, alkaloids, terpenoids, flavonoids, carotenoids, and so forth, from the plants, are a great part of the time associated with having antidiabetic sway

Anti-Thalassemic activity

Wheatgrass juice has more than 70% chlorophyll, the chlorophyll molecule has a nearly similar structure of the

hemoglobin molecule in humans, the only difference is that the chlorophyll has magnesium and hemoglobin has iron as a central element. It has been found that the usual administration of chlorophyll derivatives leads to 70-83% increase in RBC's and hemoglobin concentration within 0-16 days (Kelentei *et al.*, 1958) [22].

Anti-Ulcer activity

It has been found that 100ml of wheatgrass juice given daily for one month to patients suffering from ulcerative colitis results in reduced levels of severe rectal bleeding and also decrease the dis-ease activity index (Ben *et al.*, 2002) [23]. It has been discovered that chlorophyll balm with fluid arrangement indicates valuable in treatment of skin ulcer and furthermore animates tissue development

Other beneficial effects

Wheatgrass has a raised amount of chlorophyll, magnesium present in chlorophyll helps in expelling overwhelming metals from the blood and prompts moderate down the way toward maturing (Wheat and Currie, 2008) [25]. Wheatgrass juice contains antioxidant vitamins A, C, E can treat the issues identified with cerebrum and heart. Wheatgrass juice is useful in joint inflammation, kidney stones, graying or hair loss, dental diseases, loss of motion, asthma, skin sensitivities, leukemia, and different cancers (Fahey *et al.*, 2005) [26].

Profile of Sorghum Grass Juice and Its Therapeutic Potentials Roles

Classification of The Sorghum Grass

Kingdom: Plantae
Clade: Angiosperms
Clade: Monocots
Clade: Commelinids
Order: Poales
Family: Poaceae
Subfamily: Panicoideae
Supertribe: Andropogonodae
Tribe: Andropogoneae
Genus: Sorghum

Sorghum is the fifth most important oat in absolute world creation. It can develop and create in the hotter area of the world (Anglani, C. 1998) [1].

Sorghum is poorly digested by newborn children, however on the off chance that it enhanced with nourishments high in lysine, can be a satisfactory weaning sustenance. Sorghum proteins become less absorbable in the wake of cooking. Sorghum, similar to different cereals, is a good source of B vitamins, such as thiamine, riboflavin, vitamin B6, biotin and niacin; however, refining produces misfortunes of all vitamin B (Lakshmi, K. B. also, Vimala, V. 1996) [5].

The sorghum grass juice develops in several segments for 7 days. A careful examination of weight control plans with deficient iron and iron showed that they were equivalent in iron measurement. The phytochemical examination of the extract revealed the proximity of alkaloids and saponins. The association of the extract produced the essential increase in hemoglobin, the volume of full cells and sufficient red platelets in iron and in groups that lacked iron (ATO ladiji *et al.* 2007) [30].

The breakdown of starches into direct sugars is the explanation behind diabetes. Sorghum has a high percentage of tannin which limits the retention of starch by the organism that coordinates the level of glucose and insulin in the body.

Sorghum alters these measures that kill jumps and spikes in glucose levels and also maintain the complexities of well-being and stunned diabetics.

Profile of Barley Grass Juice And Its Therapeutic Potentials Roles

Classification of The Barley Grass

Kingdom: Plantae
Clade: Angiosperms
Clade: Monocots
Clade: Commelinids
Order: Poales
Family: Poaceae
Subfamily: Pooideae
Genus: Hordeum
Species: H. vulgare

Barley (*Hordeum vulgare* L.) is the fourth most important cereal crop in the world and has the highest dietary fiber content; its malt for functional food is not only the world's largest material for beer, but also often used as one of Indian medicine. Regular consumption of whole grain barley and its hydroalcoholic extract reduces the risk of chronic diseases (diabetes, cancer, obesity, cardiovascular disease, etc.), based on phytochemicals including β -glucan, phenolic acids, flavonoids, lignans, protocols, phytosterols, and folate (Hallfrisch, J. *et al.* 2003) [3]. Barley with preventive inflammatory and cardiovascular diseases has exhibited activities against all human platelet agonists inhibited both cyclooxygenase and lipoygenase pathways of arachidonic acid metabolism, which elevated the SOD and GSH-Px activities (Yawen Zeng *et al.* 2018) [27].

Barley Grass Benefits

Hong, H. et. Alabama. (2004) [4] studied the useful effects of a malted grain extract (MBE) on glycemia, results of this test that MBE helps a large number of diabetes reactions in mice innate powerful and can offer certification as a corrective improvement for the diabetes mellitus not dependent on insulin.

Digestive Health

A healthy digestive system is one of the cornerstones of good health; Barley Grass is a natural source of organic sodium which is needed by the lining of the stomach to produce hydrochloric acid (without which our food cannot be digested). Also rich in digestive enzymes, these substances can help to reduce toxic and indigestible materials in food. This tender young grass is also extremely high in chlorophyll, a natural cleanser to the body which will help to counter the effects of eating processed foods and give an overall energy boost.

Anti-diabetes

Barley grass juice contains a good amount of fibers which are able to maintain blood sugar levels by Saponarin; dietary fiber, Ca; AMP-activated protein kinase, polyamines; GABA; SOD. Flavonoids especially saponarin and lutanarin in BG have antidiabetic effect; regulate blood pressure; protect liver; have antidepressant, anticancer, anti-inflammatory, antioxidant, and hypolipidemic effects; prevent cardiovascular diseases; have antihypoxia and anti-fatigue effects.

Detoxification

Extremely alkalizing and wealthy in fundamental vitamins and minerals, Barley Grass is an inexhaustible wellspring of

chlorophyll - an intensify that changes over daylight into vitality inside the plant. At the point when chlorophyll is consumed it discharges a stream of oxygen into the circulatory system, detoxing the collection of destructive poisons and polluting influences, it can tie to and flush out dangerous chemicals and heavy metals.

Barley Grass juice offers security from radiation and cell harm, recovering harmed cells and tissues. It is such an incredible cleanser, that it is prescribed to begin gradually to maintain a strategic distance from detox symptoms, for example, headaches, rashes and nausea. This is normal and is generally activated by the arrival of poisons from the cells and tissue, be that as it may, should these symptoms persevere it is exhorted you contact your health care professional.

Immune Boosting

Barley Grass is naturally high nutrients that help to support the immune system, such as vitamins, minerals, amino acids, antioxidants and enzymes. It is extremely high in vitamin C which is significant to the general health of the body in its efforts to fend off contaminations – both bacterial and viral. White platelets contain multiple times the amount of vitamin C than different cells and require steady replenishment to keep the resistant framework working to its ideal limit.

Nearby other invulnerable supporting vitamins and minerals, Barley Grass is high in the amino "arginine". This is particularly successful in helping the body mend from consumes, injuries and wounds.

Antioxidants and Functional Ingredients of Barley Grass

Barley grass is the most yields of γ -tocopherol, glutathione and succinate content by same qualities encoding enzymes of the pathways delivering antioxidant metabolites. The antioxidant phytonutrients of barley grass include the superoxide dismutase, 2-O-glucosyl isovitexin (2-O-GIV), and protoheme. Flavonoids (lutonarin and saponarin) with antioxidative effects have been isolated from young barley, in which lutonarin and saponarin contents in barley grass increase with UV exposure. Barley grass possesses strong antioxidant activities, which can prevent diseases caused by oxidative damage such as various cancers, inflammations, and cardiovascular diseases. Isoorientin and orientin possessed potent antioxidant effects with IC_{50} values of 20.765 ± 651.1 and 27.565 ± 657.36508 M (DPPH) and 5.765 ± 650.3 and 8.265 ± 650.36508 M (ABTS), respectively. Barley leaves extracted by methanol and ethanol may be alternatives to synthetic antioxidants in the food industry. Barley leaf powder can be incorporated into raw minced pork as natural additives to retard oxidation. Feeds supplemented with barley leaves containing antioxidants enhanced pork quality by increasing the levels of unsaturated oleic and gondoic acids. Further researches are indispensable to resolve lots of problems, such as a better understanding of the interconnection between other 20 functional ingredients and preventing chronic diseases in clinical trials as well as ecological contribution. The major pathological mechanism of coevolution between preventive chronic diseases and young barley grass juice for functional foods of human beings (Yawen Zeng et. al. 2018) [27].

Grasse Juices as Antidiabetic Agents: A Comparison

Rattanamanee Chomchan *et al.* (2016) [28] revealed that wheatgrass contained higher protein and fat measurements. The wheat grass, sorghum grass and barley grass juices showed the group of phenol, tannin and saponin, but not

alkaloid, flavonoid, sterol, terpenoid, coumarin and cardiovascular glycoside. Wheatgrass juice can be recognized by its greater extent of ascorbic destroyer and chlorophyll. Both grass juices were found to be equivalent to the phenolic acids analyzed by HPLC including pyrogallol, destructive vanillin, destructive syringe and destructive ferule. Of course, wheatgrass juice has revealed that the cancer prevention agent works better. This can be proposed by the synergistic effects of destructive ascorbic, chlorophyll and phenolic mixtures in wheat grass juice, while essential compounds indicated that the practices of cancer prevention agents in the pasture were phenolic mixtures.

Wheat grass, sorghum grass and barley grass juices suggested in this research play an important role for anti-diabetic potentials. It contains a high chlorophyll, amino acids, minerals, vitamins and compounds. It seems that the new juice has against the movement of the cancer, which threatens the action of the ulcer, the action of the cellular reinforcement, against the arthritis. It also contains a large amount of chlorophyll (Hughes and Letner, 1936) [32]. The consequences of this research work could be important to make green herbs (wheat grass and barley grass) and this articles increasingly widespread and attractive to buyers. (Avirup Mondal and Dipali Saxena, 2016) [31].

Wheat grass juice and barley grass juice, including sorghum grass juice that is used as a sustenance in the soil, since they have physiological benefits and reduce the danger of incessant diseases. The unrefined materials of these juices are of poor quality and are available reliably. This research works on the physico-chemical properties of wheatgrass juice and barley grass juice. Since both herbal juices give it an unstoppable taste and an extreme taste, it is successfully mixed with other natural sweet juices to make it grow. When we mixed the juice of two or three herbs simultaneously, there was no change in the appropriate, the juice of the wheat grass and the juice of the barley grass, then provided a taste and a shade better than those provided by the type of juice single concentrate and was enough for professionals. The experts who participated in the review did not take medical problems into account.

The effects of treatment with wheatgrass juice may be a direct result of the movement of characteristic cancer prevention agents in red platelets (RBC), cellular reinforcement work and related ramifications for the cellular chemical limit and reliability level. The treatment of the juice of two herbs is better by virtue of the dispersions related to the stomach, for example shows its effect live. It is an incredible diuretic in the fervor of the rectal dust bite. No real side effects were found in the juices of green herbs that appeared to be innovative and protected as a single or as an additional support for the treatment of dynamic ulcerative colitis.

Conclusions

The wheatgrass, Sorghum grass and Barley grass juices are highly nutritive and has shown advantageous effects in many diseases such as diabetes, cancer, ulcer, rheumatoid arthritis, hyperlipidemia, thalassemia, anemia, kidney stone, digestive problems skin diseases, asthma etc. Due to the high amount of chlorophyll it is highly oxygenated and improves the function of heart and lungs. It Moreover, wheatgrass Sorghum grass and Barley grass juices have been reported as the most extravagant wellspring of vitamins, enzymes, minerals, amino acids, follow components, phytochemical components and a glycoprotein P4D1 and so on which can invigorate the fix of DNA and RNA if there should be an occurrence of their harm.

These information support that wheatgrass, Sorghum grass and barley grass juice are wealthy in GABA, flavonoids, SOD, K-Ca, vitamins, and tryptophan, which are known to assume an essential role in numerous chronic diseases.

Every one of them all in all give a decent remedial oxidative potential against a wide scope of ailments including chronic diseases. The ongoing numerous researchers reporting its antioxidant, against joint, hostile to hyperlipidemic or cardio-defensive, hostile to diabetic, calming and immunomodulatory exercises have made this restorative plant more significant in herbal research. In the present audit endeavor is made to concentrate on the similar investigation of helpful oxidative capability of wheatgrass Sorghum grass and Barley grass juices against the different chronic diseases here primarily centered around antidiabetic effectiveness. To conclude that the wheatgrass, Sorghum grass and Barley grass juices is apparently encouraging home grown prescription and Extensive research is needed to study its useful application in various diseases for future research work. There are lot of literature on wheatgrass but not as much on Sorghum grass and Barley grass juices, it needs to be future research.

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