PHYTOCHEMICALS AND PHARMACOLOGICAL ACTIVITY ON TRITICUM AESTIVIUM

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ABSTRACT

Common wheat (Triticum Aestivium) one of the most consumed cereal grains, is known for its uses in backing and cooking in additional to its medicinal uses. As this plants medical benefits are enormous and scattered this narrative review was aimed at the pharmacological and phytochemicals Triticum aestivium linn(commonly known as wheat grass) is a perennial plant that belongs to family Gramineae having various medicinal and nutritional application .generally , triticum aestivium is utilized in southwest asia as therapeutic agent to treat high blood pressure , cancers, obesity, diabetes, gastritis , ulcers , pancreas ,liver problem, asthma , eczema., haemorrhoids , skin problem ,etc. numerous phytochemicals are present in plant , including phenols , flavonoids, vitamins , protein , minerals , etc rutin and gallic acid are the main active constituents isolated from triticum aestivium and have been proven to possess notable anti cancer , anti ulcer, anti inflammatory , antioxidant , and anti arthritic activity . pharmacological in vivo and in vitro studies revealed that the extract possessed significant antioxidant, anti-inflammatory, antioxidant, anti-arthritic, anti-ulcer, cytotoxicity, and antidiabetic activities.

Keywords: *Food and Drug Administration (FDA) , Food and Agriculture Organization (FAO) , (WG) Wheatgrass , Vitamin K (Vit K) , Tritium aestivium (TA)*

INTRODUCTION:

According to the World Health Organization, medicinal plants include those that possess certain qualities that make them suitable for therapeutic use, as well as chemicals that have the potential to be the basis for a medicine (Kumar & Janagam, 2011). Herbal remedies have been used for medical conditions since ancient times. They have always been unique in the way that diseases are treated (Oladeji, 2016). Over 80% of individuals, according to the WHO, manage their illnesses with non-allopathic medicines (Kadir, Sayeed, & Mia, 2013). The term "kabirajee" refers to the use of medicinal herbs to treat illness in Bangladesh. The expertise of using medicinal plants to treat illnesses is passed down from generation to generation among rural people, even with the advancements in science and technology in pharmaceuticals

200 families are included. Herbal medicine, which is sometimes referred to as botanical medicine or herbalism, involves using herbs for their medicinal or therapeutic qualities.

Plants or plant parts that are prized for their savory, fragrant, or medicinal properties are called herbs. The diverse active compounds that herb plants make and contain have physiological effects. Finding new, ecologically friendly bioherbicides and pharmaceuticals can result from preliminary screening of phytochemicals, which is an important first step in identifying the bioactive components of medicinal plants. Among the cereal grasses of the Gramineae (Poaceae) family, wheat (Triticum species) is the most edible grain crop worldwide. Since Wheatgrass is a young grass in the wheat family that is much richer in nutrients than other types of grass, researchers have discovered(1)

FIG NO.1

The utilization and exploration of pharmaceuticals and nutritional additives sourced from plants have surged. The past few years (Cowan, 1999). Pharmacological screening of plant extracts is an important field of medical study because plant products are becoming more and more attractive as safer substitutes for synthetically generated medications. Pre-screening samples for biological activity in the lab is standard procedure when examining a plant extract for potential therapeutic use(2)The Food and Agriculture Organization (FAO) of the United Nations predicted in 2013 that global wheat production would be approximately 700 million tons and global cereal production would be approximately 2500 million tons (FAO, 2014). Global consumption of grains and their processed products makes them significant sources of energy. Most diets include grains as the main source of carbs, along with some proteins, oils, dietary fiber, and other minerals. Because of the health benefits of whole grains, research papers from trade, governmental, non-profit, and health groups have promoted increasing use of these products during the past few decades. 2013; Shahidi & Chandrasekara, 2014; Rolle et al. United States Food and Drug Administration (FDA) states that cereal grains made up of crushed, flaked, cracked, or intact caryopsis(3)When the main structural components—the starchy endosperm, germ, and bran—are present in the same relative amounts as when the caryopsis is intact, the product should be regarded as whole grain (FDA, 2006). Plant embryos are found in the germ, while starch and storage proteins are found in the endosperm. Bran serves as the exterior layer that shields the interior of the from weather, pests, molds, and other microorganism attacks.has storing proteins and starch in it.The outermost layer, known as the bran, shields the inside of the against weather-related damage, insect infestation, mold, and other microbial attacks. Scientific evidence supporting wheatgrass's status as a "functional food" is becoming more widely available and is becoming a hot study issue. Herbal or "alternative" medicine is getting more and more popular.Juice from wheat grass (WGJ) (4)

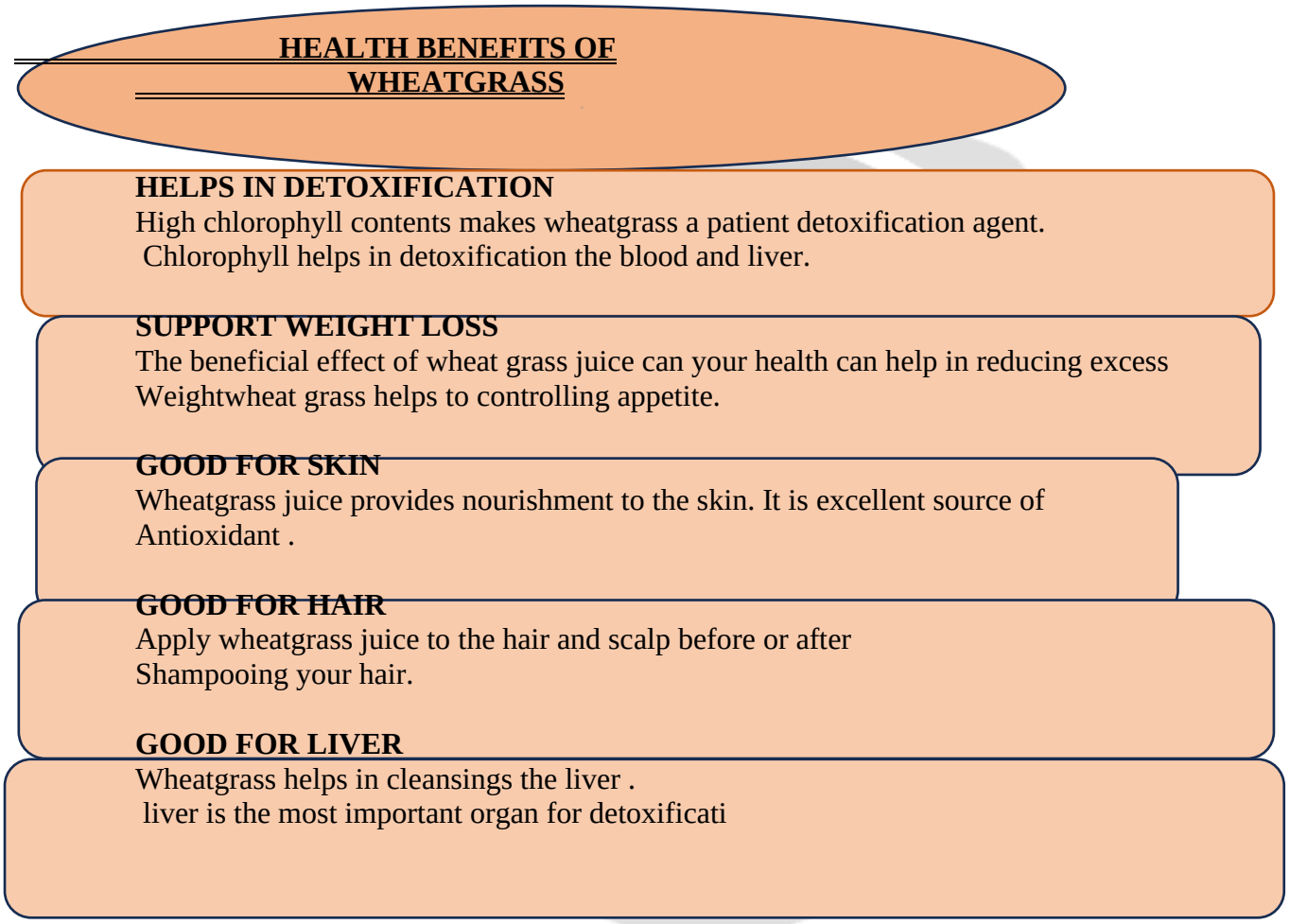
seeds (T. aestivum). Wheat grass canbe traced back in history over 5000 years in ancient Egypt and perhaps even throughout the early Mesopotamian era.

The young, leafy blades of wheat are said to have been sacred to the ancient Egyptians, who frozen them to improve their health and vigor. The experiments carried out by agricultural chemist Charles Schnabel on his hens using wheatgrass to nurse them back to health led to the introduction of wheat grass consumption in the western world in the 1930s 1. The fully grown stalk of T. aestivum L. is known as wheat grass. Familia Gramineae is where it belongs. There are several varieties of wheat produced by the annual and biennial grass genus Triticum.

indigenous to southwest Asia2. Almost everywhere in the world, common or bread wheat is commonly grown. There are generally between 15 and 20 known species, 8 of which are said to exist in India. Wheat grass is inexpensive and a great source of many nutrients, including vitamins, proteins, minerals, antioxidants, and therapeutic properties for a body that is healthy and renewed. (5)A high concentration of chlorophyll, minerals (calcium, potassium, iron, magnesium, sodium, and sulfur), vitamins (A, B, C, E, and K), and active enzymes3 are found in wheat grass. It improves blood alkalinity and speeds up metabolism. Wheat grass's chlorophyll concentration boosts immunity and aids in the body's detoxification. The three principal benefits of wheat grass fo advised for

individuals with long-term conditions such as joint discomfort, constipation, hypertension, diabetes, bronchitis, sterility, bleeding, obesity, flatulence, and atherosclerosis, as well as obesity, Parkinson's disease, and asthma. Treatment for cancer can also benefit from it. Part of Dr. Ann Wigmore's herbal therapeutic nutritional approach, the usage of WGJ for therapeutic purposes was created and made popular. Incorporating wheat grass into a raw food diet, according to Wigmore, would help the body rid itself of pollutants while supplying the right ratio of nutrients overall. Ann Wigmore's "The Wheatgrass Book," which eventually turned into something of a bible among devotees of health supplements, helped revive interest in wheatgrass use in the 1970s, especially in its fresh juice. Ann Wigmore founded the renowned Hippocrates educational program.(6)
consumed in the form of juices, powders and extracts for thehealthy growth of human body. Wheat grass juice i Mother Nature's best remedy. Wheat grass juice, two ounces, contains the nutritional First Phytochemical Examination of Wheat Grass Leaf

HEALTH BENEFIT OF WHEATGRASS



PHARMALOGICAL ACTIVITY:-

FIG NO.2

Pharmacological activity of Triticum Aestivum :

A dietary supplement called wheatgrass juice (WGJ) is made from ordinary wheat, specifically Triticum aestivum L. WGJ is a watery form of the plant that is made by juicing the young shoots, right before they reach the jointing stage. The supplement can be taken on its own or combined with fruit juices.

Dependig on the provider, it is sold commercially in liquid, powdered, or concentrated forms.(7) Research reveals that WGJ may have some medical potential; trials with high antioxidant levels were reported in the scientific literature (Falcioni et al. 2002). (2011); Rana et al. (2006); Kulkarni et al. Both in vitro and in vivo studies have shown that it possesses anti-cancer capabilities (Alitheen et al. 2011; Arya and Kumar 2011; Aydos and colleagues 2011; Bar-sela and

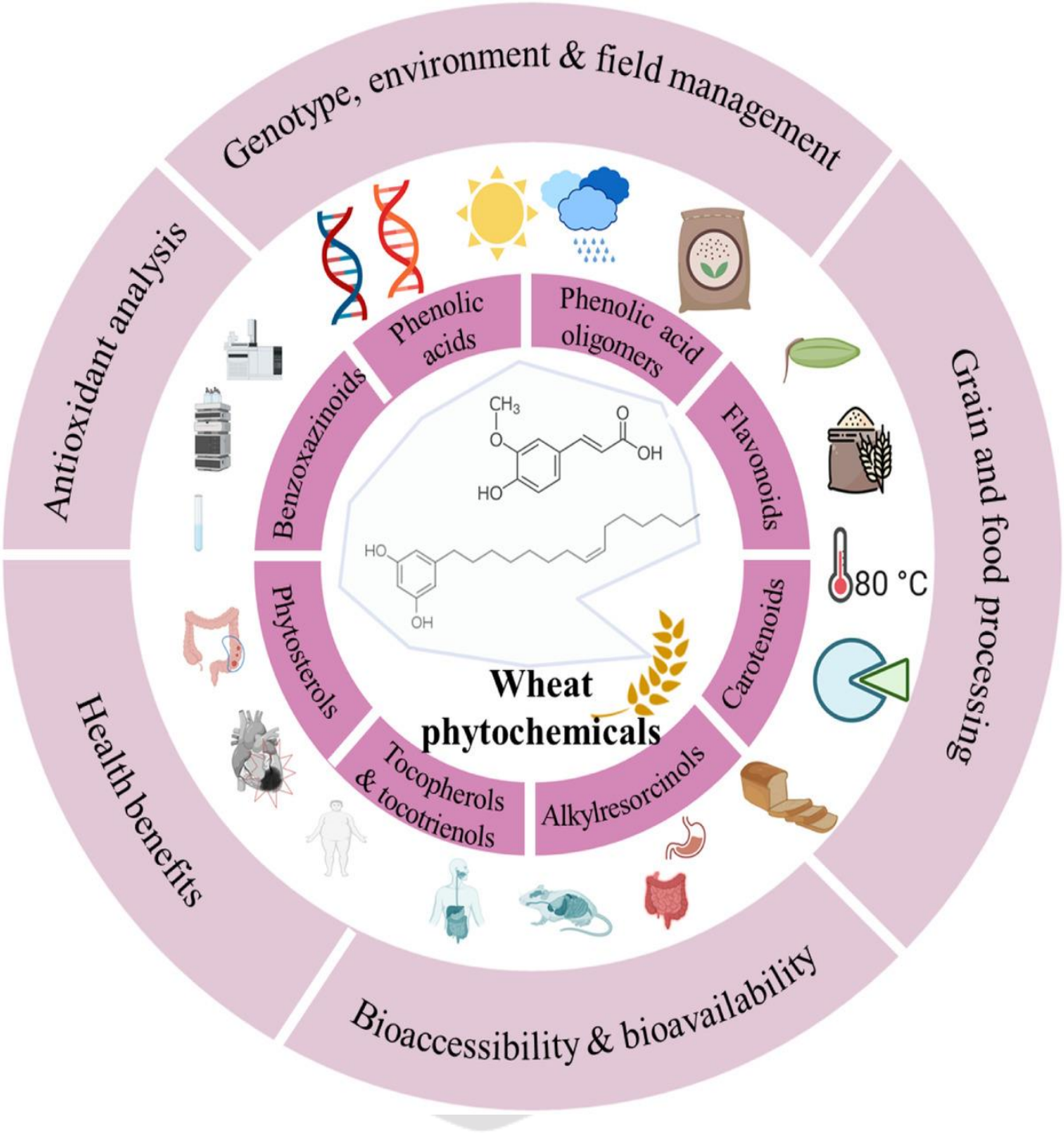

Genotype, environment & field management
Grain and food processing
Bioaccessibility & bioavailability
Health benefits
Antioxidant analysis
Phenolic acids
Phenolic acid oligomers
Flavonoids
Carotenoids
Alkylresorcinols
Tocopherols & tocotrienols
Phytosterols
Benzoxazinoids
Wheat phytochemicals
80 °C

FIG NO .3

those with thalassemia. Singh et al. (2010); Marwaha et al. (2004) In much of the anecdotal literature, the benefits of WGJ have been linked to its high chlorophyll content. Research on the health advantages of chlorophyll has been conducted on humans as well as animals, with results demonstrating anti-cancer properties in the former. In rat colons, chlorophyll prevented haem-induced cytotoxicity and lowered epithelial cell turnover, or hypoproliferation, per two research published in 2005 by de Vogel et al. According to the first (2005a), sodium copper chlorophyllin was unable to mimic this action, which was exclusive to natural chlorophyll.(8)The second study (2005b) discovered that both spinach and chlorophyll produced cytotoxic inhibition and came to the conclusion that eating green vegetables may lower the incidence of colon cancer because chlorophyll shields the harmful(9)Interest in chlorophyll as a class of plant pigments with possible chemopreventive effects has increased due to the link between diets high in phytochemicals and the prevention of cancer (Ferruzzi et al. 2006). The effects of chlorophyll (Chla) and chlorophyllin (CHL) on the pharmacokinetics of low dosage aflatoxin in human volunteers were studied by Jubert et al. in 2009. Aflatoxin is a carcinogenic mycotoxin linked to the establishment of parasitic mould. In this investigation, extracts from Chla and CHL were given to human volunteers in low amounts. The study's result was that co-consuming CHL and Chla may reduce the bioavailability of aflatoxin ingestion in people.(10) These results, however, seem to indicate that not many research have tried to measure the fresh weight chlorophyll contents of plant components.

in veggies did not appear to be widely available in the literature. In As one of the most important crops for human nourishment in the majority of temperate regions of the world, common wheat (Triticum aestivum L.) has the problem of being produced more sustainably with fewer amounts of external inputs. On the other hand, genetic variety within the crop stand is a component of a broader approach to enhance wheat performance since diversity has the ability to act as a buffer against both biotic and abiotic stresses. Climate change events pose a significant threat to wheat productivity.(12)
stresses. Producing bakery goods, especially bread, uses a significant portion of common wheat. throughout contrast to pasta's 27 g/d consumption, bread is consumed on average 125 g/d throughout Europe 1. Despite a decline in consumption throughout time, bread remains one of the most beloved and widely consumed foods. In essence, this cuisine is made up of proteins, fiber, and complex carbohydrates. Consuming whole grains and whole-grain products is really linked to a lower prevalence of chronic diseases like diabetes, cancer, and cardiovascular disease, according to epidemiological research 2. Granted, phenolic acids, such as p-coumaric, vanillic, and ferulic acids, are recognized as the primary antioxidants in wheat and have a key role in the grain's overall antioxidant capacity.(13)

WHEATGRASS TAXONOMICALS CLASSIFICATION :(14)

Kingdom :plantae

Division: magnoliphyta

Class: liliopsida

Order: poales

Family: poaceae (Gramineae)

Subfamily: pooideae

Tribe : triticeae

Genus: Triticum

Species: t. aestivum

ECOLOGY

Triticum is the genus of biannual annual grasses that are native to southwest Asia and the Mediterranean region. It produces a variety of wheat cultivars. It is carefully grown, mostly in developing nations, alongside the temperate zones of Europe and North America. Common bread wheat, T aestivum, is grown extensively virtually everywhere. Generally speaking, 15 to 20 species are documented.
which eight are known to be present in India. A popular beverage in the US, Europe, and other industrialized nations is wheatgrass juice. (15)

RELIGIOUS HISTORY AND SYNONYMS

Berries of Triticum aestivum Linn. Referred to as a wheat grass, it goes by the Sanskrit name godhuma and the Hindi name gehun, gehun, kanak. Cooking halwa—a sweet dessert offered to the gods—as well as puri and chapattis are made with wheat flour3, (16)

GENERAL DESCRIPTION

Similar to this grass are several types of grass. These grasses have simple, sunken or succinct, depilated aerial stems that are 1.2 meters tall. Thick, 20–38 cm foliage that is visible to the naked eye measures 1.3 cm. The lemmas are less than 1.3 cm long, spiky or spikeless; the glumes are truncated, smooth, and inflexible; the spikes are dorsal, elongated, aciculate, compact, and planate; the rachis is sturdy, affixed to the spikelets, and it bears two to five flowers that are scarcely overlapping. In contrast to palea, which is joined and as long as a lemma, caryopsis is a free-threshing, mushy or hard, white or red (hexaploid) mature plant11. (17)

PHYSICAL CHARACTERISTICS

It has an unpleasant taste11, a dark green or brilliant green color, and a distinctive smell. 6. CULTURE Wheatgrass grows fast both indoors and outdoors. One common method for producing sprouts indoors is to use potting mix to support the growth of the plants on a trayLeaf harvesting occurs when a new leaf appears. These can be removed to promote the growth of the second crop of shoots. In rare cases, a third cutting can occur, but this time there will be less sugar (18)

BIOACTIVE COMPONENTS

It contains bioflavonoids including luteolin, quercetin, choline, amygdalin, and apigenin10.The different types of phytoconstituents include phenolic compounds like buthylhydroxyanisole, syringic acid, p-hydroxybenzoic acid, abscisic acid, caffeic acid, ellagic acid, gallic acid, fumaric acid, and ferulic acid; additionally, there are glycosides, steroids, terpenoids, tannins, flavonoids, alkaloids4, α-dihydroxycarotene, alkyl resorcinols, lignin, fatty oil, phospholipids, glycolipids,

polysaccharides-glucans, and saponins, arabinoxylan, starch, total dietary fiber, and β-glucan17–19. In addition, gamma sitosterol, caryophyllene, squalene, and kumarin are found in wheatgrass. (19)

VALUE OF WHEATGRASS'S NUTRITIONAL CONTENT

Vitamin A: It gives the skin a radiant glow, prevents sickness, and gives the epidermis a blaze. It enhances eye vision and gets rid of dark circles under the eyes and black patches on the skin. Moreover, it guards against eye, nose, and throat conditions. Along with providing protection from dangerous contaminants, it aids in hair development. It is essential for healthy development, reproduction, and eye sight.(20)

B vitamins:

They help in digestion. It helps in the treatment of depression, sleeplessness, anorexia, early aging, and mental and digestive issues..

vitamin C :

Vitamin K: These vitamins aid the body in the fight against cancer and lung cell damage repair. For the Lemons, limes, and oranges are among the many citrus fruits that grow there. If anything, wheatgrass has more vitamin C than oranges. Because of its strong antioxidant properties, it is used to treat everything from cancer to colds. For healthy teeth, gums, and bones, it is mostly valuable in treating scurvy; it also helps to cure wounds and sores.

vitamin E :

inhibits the healing of wounds and causes sterility, infections, and muscular deterioration. Antioxidants abound in it. Pregnancy is the time when it's most important to cure dysmenorrhea, diabetes, cancer, and heart disease,

as well as to stave against abortions. (21)

blood to coagulate, vitamin K is necessary. The body's metabolism, anemia, and early aging are all fought off by B complevitamins.(22)

TABLE NO. 1 (23)

VITAMINS	USES
Vitamin A	It improve skin glow ,it helps to hair growth
Vitamin B	It is improve digestion
Vitamin C	It is a antioxidant , it is help to improve common cold
Vitamin E	Helpful for protection for heart
Vitamin B complex & Vitamin K	It is essential for blood clotting, helpful for protection of heart

MSM :-

a sulfur-containing substance that is eliminated in processed food. MSM facilitates the body's ability to absorb vitamins, boosts oxygen levels, aids in detoxification, lowers inflammation, and lessens allergies.
Amino acids and Proteins: Proteins are the body's building components and are necessary for both muscular strength and graceful movement. Proteins are used to obtain hormones, plasmas, and antibodies. Amino acids support healthy blood production, digestion, and heart health.(24)

Enzymes:

They help with reflux disease. These enhance digestion, delay the onset of aging, and promote physical well-being. (25)

Zinc:

Beneficial in prostate-related illnesses and helpful for maintaining healthy hair.(26)
Calcium: It is necessary for healthy teeth and bones and keeps the blood's pH stable. It aids in the treatment of conditions such as slow motion, coldness, body edema, varicose veins, bleeding, etc. It also controls the heart's rhythm. (27)
Iron:

an essential component of life. A low iron level leads to anemia. Pregnancy requires this vital mineral to avoid sleeplessness, fatigue, sluggishness, pale skin, and excessive perspiration.
Magnesium:

It's essential for healthy muscular and bowel movements. It aids in the body's cleansing process.
Sodium:

It controls the acid-base balance and the ECF volume. It keeps the body's electrolyte and water balance intact.(28)

TRADITIONAL USES :(29)

and communicate with live cells. There are six main classes into which phytochemicals fall. According to Huang, Xiao, Burton-Freeman, & Edirisinghe (2016), they are carbohydrates, lipids, terpenes, phenolic acids, alkaloids, and saponins. (31) These are broken down into smaller categories. Less than 20% of plants are

researched despite over 50,000 structures being recognized, according to documented studies. (2011) Yazdani, Tan, Abidin, and Jaganath.

Numerous of these phytochemicals are employed in conventional or herbal therapy because they are pharmacologically active. For instance, the salicins in willow bark have the ability to lessen pain and inflammation. (32) It is now referred to as the medication aspirin after being artificially synthesized (Kawale & Koche, 2010). Patients with following mentioned chronic ailments are preferred to use Wheat grass therapy :

- Asthma
- Atherosclerosis
- Parkinson's disease
- Obesity
- Sterility
- Diabetes
- Constipation
- Hypertension

PHYTOCHEMICALS :

Phytochemicals are substances found in plant roots, fruit, bark, or leaves that are created in small amounts by secondary metabolism in plants (Elijah, Onyechi, & Nkechi, 2010). They are created in little quantities and aid in the growth and development of plants by offering defense against bacteria, insects, and other stressful situations (Martinez et al., 2017) (30).
Within the phytochemicals, certain phytochemical substances demonstrate the capacity to engage in biological activity Proanthocyanidins from cranberries are used to treat urinary tract infections, just as quinine from cinchona bark is used to treat malaria (Martinez et al., 2017).

Plants contain phytochemicals called saponins, tannins, flavonoids, alkaloids, anthraquinone, and cardiac glycosides (Soetan & Aiyelaagbe, 200)

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