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THE HEALTH BENEFITS OF WATERMELON

Watermelon (Citrulus lantus) is an important horticultural crop which belongs to the Cucurbitaceae family. The nutraceutical potential of watermelon has been illustrated by several researchers, which makes it a better choice of functional food. Watermelon has been used to treat various ailments, such as cardio-vascular diseases, aging related ailments, obesity, diabetes, ulcers, and various types of cancers. The medicinal properties of watermelon are attributed by the presence of important phytochemicals with pharmaceutical values such as lycopene, citrulline, and other polyphenolic compounds. Watermelon acts as vital source of l-citrulline, a neutral- α amino acid which is the precursor of l-arginine, an essential amino acid necessary for protein synthesis. Watermelon is a natural product that contains high level of antioxidants and may prevent oxidative damage in tissues due to free radical generation following an exposure to ionizing radiation. The present study aimed to investigate the radioprotective effects of watermelon. Watermelon is a member of the Cucurbitaceae family native to tropical areas of Africa near Kalahari Desert. Botanists refer it as a «pepo» which is a fruit having a thick rind and fleshy center. It is largely consumed as refreshing summer fruit, much appreciated by the consumers because of its refreshing capability, attractive color, delicate taste, and high water content to quench the summer thirst. According to Oberoi, D. and Sogi S., watermelon fruits yield 55.3 % juice, 31.5 % rind, and 10.4 % pomace. Carotenoids such as lycopene and β -carotene are responsible for the red and orange colors of the watermelon, respectively. The sweetness of watermelon is mainly due to a combination of sucrose, glucose, and fructose. Sucrose and glucose account for 20–40 % and fructose for 30–50 % of total sugars in a ripe watermelon.

Keywords: watermelon, nutrients, antioxidants, diseases, and consumption.

Introduction

Objectives of the Research

1 To develop my talent in research, review of some essential information about the health benefits of watermelon, history of watermelon & so on.

2 Understanding the health benefits of the watermelon.

3 Preparing of new information related to the subject and understanding the subject easily.

Watermelon (*Citrullus lanatus*) has association with cucumber, pumpkin, squash and gourds; belonging to family Cucurbitaceae. Watermelon is a good source of antioxidants and nutrients. In addition to supporting hydration, it may also promote many aspects of health and prevent certain health conditions. Fruit quality traits of sweet watermelon are crucial for new product development and commercialization. Fruit of this plant is major consumed portion and variations in growth characteristics determine its end use quality. Considering the nutritional profile, consumption of 100 g watermelon provides 30 kcal. It contains almost 92 % water and 7.55 % of carbohydrates out of which 6.2 % are sugars and 0.4 % dietary fiber. It is enriched with carotenoid, vitamin C, citrulline, carotenoids and flavonoids and fat and cholesterol free, thus considered as low caloric fruit. Additionally, watermelon is rich source of β -carotene acts as an antioxidant and precursor of vitamin A. Besides the presence of lycopene, it is a source of B vitamins, especially B1 and B6, as well as minerals such as potassium and magnesium. Watermelon contains phenolics quite comparable with that of other fruits. It is an inexpensive and nutritious source that is readily available to all socio-economic groups of Afghanistan throughout the summer season. Its consumption depends on number of factors e.g. availability, income, age, gender, racial and ethnic norms. In this context, per capita consumption in Asian communities is almost 3 times greater as compared to other part of globe [8].

Watermelon, a widely commercialized fruit, is famous for its thirst-quenching property. The broad range of cultivars, which give rise to distinct color and taste, can be attributed to the differences in their chemical profile, especially that of the carotenoids and volatile compounds. In order to understand this distribution properly, water extracts of red and yellow watermelon pulps with predominantly polar metabolites were subjected to proton nuclear magnetic resonance ($^1\text{H-NMR}$) analysis [11]. Watermelon is a natural product that contains high level of antioxidants and may prevent oxidative damage in tissues due to free radical generation following an exposure to ionizing radiation [4].

Formation and prevention of diseases in a human body A healthy and normal human body is sustained by all the biochemical reactions that take place in the cells and organelles of our bodies. Ijah et al. reported that oxidation reaction leads

to formation of Table 1. Phytochemical content of fresh watermelon juice per 100 g. Parameter Value Reference Energy 30–46.2 Kcal. Carbohydrates.

Materials and methods

This study, which was conducted under the title (The health benefits of watermelons) in the year 2023 is collecting from more different modern Biological and Agricultural books and important and essential articles. To a great extent, I have tried to gather precise and accurate information related to the health benefits of watermelon, and importance of watermelon and explain them in a few words.

Watermelon is a member of the Cucurbitaceae family native to tropical areas of Africa near Kalahari Desert. Botanists refer it as a “pepo” which is a fruit having a thick rind and fleshy center. It is largely consumed as refreshing summer fruit, much appreciated by the consumers because of its refreshing capability, attractive color, delicate taste, and high water content to quench the summer thirst. According to Oberio and Sogi, watermelon fruits yield 55.3 % juice, 31.5 % rind, and 10.4 % pomace. Carotenoids such as lycopene and β -carotene are responsible for the red and orange colors of the watermelon, respectively The sweetness of watermelon is mainly due to a combination of sucrose, glucose, and fructose. Sucrose and glucose account for 20–40% and fructose for 30–50 % of total sugars in a ripe watermelon [5].

Formation and prevention of diseases in a human body A healthy and normal human body is sustained by all the biochemical reactions that take place in the cells and organelles of our bodies. Ijah et al. reported that oxidation reaction leads to formation of Table 1. Phytochemical content of fresh watermelon juice per 100 g. Parameter Value Reference Energy 30–46.2 Kcal. Carbohydrates. 7.6–11.6 g. Protein 0.6–0.9 g. Total fat 0–0.15 g. Cholesterol 0.00–0.01 mg. Dietary fiber 0.4–0.61 g. Vitamin A 569–864.88 IU. Vitamin C 8.1–12.31 mg. Lycopene 3.38–11.34 mg. Sodium 0.0–0.001. Ash 5.2–5.4 %. Moisture 93.12–95.2 %. Calcium 7 mg. Iron 0.24 mg. Magnesium 10 mg. Potassium 112 mg. Phosphorus 11 mg. Diseases and associated health benefits of some quality parameters. Disease Parameter Outcomes Reference Obese postmenopausal women Citrulline Improved cardiac autonomic function in sedentary obese postmenopausal women, increase plasma arginine. Hypertension Lycopene Improved plasma agitation [1] Stroke Vitamin C Stroke reduction. Breast cancer patients Lycopene Serum lycopene associated with decreased risk. Osteoporosis Lycopene Can counteract the damaging effects of oxidative stress which causes osteoporosis. Liver disease Vitamin C Decrease of 58.2 % serum alanine aminotransferase and 49.4 % of high sensitivity C-reactive protein and also minimize damage and slow disease progression. Human metabolism Vitamin C Least risk of inadequacy or adverse health effects. CVD mortality β -carotene Reduced the hazard ration in CVD

and coronary heart diseases. High cholesterol in macrophage cell line Lycopene Lowered cholesterol synthesis. Low libido Citrulline Improve erectile functions. Flue and scurvy Vitamin C Prevents and treats variety of ailments, scurvy, and a simple cold [1, 20] Eye health Vitamin A Enhances optimal eye functioning. INTERNATIONAL JOURNAL OF FOOD PROPERTIES 357 free radicals in a human body. Free radicals are highly unstable atoms, ions, or molecules that actively react with other molecules and affect the normal functioning of the deoxyribonucleic acid (DNA) and cell membrane. The cellular redox process of free radicals and reactive molecules leads to the formation of reactive oxygen species (ROS) that plays a dual role as both toxic and beneficial compounds. In fact, chemical reactions, free radicals, and some redox reactions are a source of oxidative stress of macromolecules in living cells. This leads to damage of the cellular components including lipids, DNA, and proteins. This destruction results in diseases such as CVD, cancer, and neurodegenerative diseases. CVD is reported to be the major cause of death in the European countries; it is further forecasted that in 2030 the number of deaths due to cardiovascular disorders will be around 23.6 million. Modifiable factors (e.g. high cholesterol, obesity, arterial hypertension, and diabetes) as well as non-modifiable factors such as age, race and heredity are factors that accelerate formation of diseases in a human body. In addition, Kulczynski et al. reported that, life style risk factors such as snacking on unhealthy food, eating habits, lack of exercise, smoking, and alcohol intake also have significant effect on formation of diseases. It is believed that a balanced diet which includes adequate nutrients and phytochemicals is crucial in inhibiting the damage effects of free radical through improvement of body's antioxidant status. Romdhane et al. reported that antioxidants are molecules capable of scavenging oxidation reaction. Antioxidants have the ability to trap ROS and prevent its formation. They are also capable of inhibiting and neutralizing free radicals and their actions by (1) electron transfer; (2) electron addition, which results in radical adduct formation; and (3) hydrogen atom transfer at level of prevention, interception, and repair of diseases. Phytochemicals such as lycopene and β -carotene have shown to have antioxidant, antiinflammatory, and hypotensive properties; therefore, their inclusion on diet results in positive effects on the human body. They (1) prevent oxidative changes in the plasma lipoprotein structure, (2) prevent macular degeneration and the development of cataracts, (3) prevent oxidized LDL formation, (4) reduce the nitrogen oxide bioavailability and they synthesis prostacyclin (PGI₂), which causes blood vessels to relax and become reduced. They may also enhance the immune system function and inhibit tumor progression in some cancers. Synthetic antioxidants such as butylated hydroxyanisole and butylated hydroxytoluene are often used in the food, cosmetic,

and pharmaceutical industries. However, these antioxidants are expensive and are reported to be detrimental to human health resulting in dangerous health effects, including liver damage and carcinogenesis. The risks and concerns associated with the use of synthetic antioxidants and antimicrobials have triggered the interest of consumers toward consumption of food rich in natural antioxidants as an alternative. Accumulating evidences favor the use of natural antioxidants and presume them to be safer than synthetic antioxidants because they display little or no toxic side. As a result, attention in identifying natural sources of antioxidants that can be used as potential inhibitors of diseases with less side effects has increased. Watermelon contains sufficient nutrients and phytochemicals which have antioxidant properties and therefore helpful in the prevention of diseases such as hypertension and arthritis. In fact, many researchers proved that consumption of watermelon is a practical approach leading to the reduction of chronic disease. These properties make watermelon as a useful functional ingredient [5].

The diverse evidence, combined, indicates that northeastern Africa is the center of origin of the dessert watermelon, that watermelons were domesticated for water and food there over 4000 years ago, and that sweet dessert watermelons emerged in Mediterranean lands by approximately 2000 years ago. Next generation ancient DNA sequencing and state-of-the-art genomic analysis offer opportunities to rigorously assess the relationships among ancient and living wild and primitive watermelons from northeastern Africa, modern sweet dessert watermelons and other *Citrullus* taxa [10].

The Health Benefits of watermelon

Watermelon is a good source of antioxidants and nutrients. In addition to supporting hydration, it may also promote many aspects of health and prevent certain health conditions. Fruit quality traits of sweet watermelon are crucial for new product development and commercialization. Sweet watermelon fruit quality traits are affected by the compositions of phytochemical compounds, phytohormones, and fruit flesh firmness which are affected by genes, the growing environment and their interaction. These compositions determine fruit ripening, eating quality, and postharvest shelf-life [7].

Watermelon is a rich source of amino acids and other nutrients. Our current study indicated that watermelon rind had higher total free amino acids than flesh; however, the free amino acids in watermelon rind had less diversity [1].

Watermelon is a natural product that contains high level of antioxidants and may prevent oxidative damage in tissues due to free radical generation following an exposure to ionizing radiation [4].

The present review deals with various nutraceutical potentials of watermelon and its importance as an antioxidant, anti-cancerous, cardiovascular protectant, anti-inflammatory properties.

Watermelon is a member of the gourd family (Cucurbitaceae) and falls under the Food patterns equivalents database (FPED) category of citrus, melons, and berries. While in the past watermelon was typically thought of as a seasonal fruit in the US, now watermelon is available year-round. It contributes certain nutrients, with 100 g providing 112 mg of potassium, 8.1 mg of vitamin C, 28 mg of vitamin A, 10 mg of magnesium, 3 µg of folate and 0.4 g of dietary fiber contributing upwards of 4 % of daily potassium, 11–37 % of vitamin C, and 4–10% of vitamin A as well as greater than 1 % of magnesium and dietary fiber recommendations in adults and children [3].

1 Cardiovascular Protection

Cardiovascular diseases are the leading cause of increasing death rate worldwide. Moreover, the cost of treating cardiovascular disease is high. Therefore, adapting a lifestyle with cardio-friendly diet would decrease the risk factors associated with the disease. Fruits and vegetables can combat the negative effects of cardiovascular diseases. L-citrulline and L-arginine possess the capacity to alleviate the inflammation and oxidative stress. However, direct intake of L-citrulline and L-arginine could lead to gastro-intestinal discomforts such as nausea and diarrhea. Therefore, the consumption of fruits rich in L-citrulline (precursor of L-arginine, an essential amino acid for protein synthesis) such as watermelon is important to obtaining the necessary nutrition. Supplementation of whole watermelon in powder form improved the lipid profiles, antioxidant status, and anti-inflammatory properties of high fat fed rats [6].

Previous studies support the effectiveness of watermelon extracts for improvement of vascular function in middle-aged men and women [9–13]. In a previous randomized placebo-controlled trial specifically examining postmenopausal women, sixweek supplementation with watermelon extract also resulted in reduced arterial stiffness [14]. However, these studies investigated effects of the intervention in people with pre-existing hypertension and obesity. Watermelon interventions in normotensive adults have produced equivocal results [15]. Because age and menopause are independent risk factors for vascular dysfunction [16, 17], the present study aimed to investigate effects of watermelon juice supplementation on clinical measures of vascular health [2].

The watermelon is also helpful to lessen some other metabolic syndromes owing to vitamin A, B6, C, magnesium, potassium. These along with lycopene are health promoting functional ingredients associated with reduced risk of

cardiovascular disorders. Heart attacks, ischemic strokes and atherosclerosis are faced through the oxidation of low-density lipoprotein and their curing has been observed though high consumption of lycopene. High intake of lycopene lowered the thickness of the internal layer of the blood vessels thus reducing the risk of myocardial infarction. Consumption of watermelon is more advantageous as lycopene is readily available through watermelon [8].

2 Watermelon as a Functional Food in Obesity Management and Anti-Diabetic Snack

Obesity is an alarming public health issue worldwide which is linked to crucial metabolic ailments including diabetes and lifestyle-related diseases. Modern lifestyle and un-healthy food habits including several fast foods and processed food with higher levels of sugar in routine diet are major contributing factors for obesity. According to the National Diabetics Statistics Report (2020) published by Centers for Disease Control and Prevention (CDC), 45.8 % of adults in USA are obese, among which 10.5 % of the population suffer with diabetes. Diabetes can be classified into two types (1 and 2) depending on the etio-pathogenesis. Type 1 diabetes is characterized by the destruction of pancreatic B cells due to the autoimmune response of the body leading to the insulin deficiency, whereas type 2, the most common form of diabetes involving resistance to insulin. The chronic hyperglycemia resulting from the diabetes leads to retinopathy, neuropathy, nephropathy, peripheral vascular diseases, cerebrovascular diseases, and ischemic heart diseases. However, the oxidative stress level and inflammatory responses in the body play a vital role in the development of the abovementioned complications [6].

The effects of watermelon (*C. lanatus*) juice treatments on the GSH concentration of alloxan-induced diabetic rat showed a significant reduction in the GSH levels of the diabetic rats when compared with the control as shown in Figure 4. This depletion in blood glutathione concentration is attributing primarily to the alloxan injected in the rats, which act as a xenobiotic and an inducer of diabetes. Both xenobiotics and normal metabolism are known to deplete antioxidants as they are consumed in the course of scavenging reactive species generated [9].

Numerous experimental studies and surveys have indicated that patients with hyperglycemia are more prone towards the risk of coronary complications. In this context, elevated oxidative stress and LDL oxidation are the major contributory factors. That watermelon lycopene extract significantly improves lipid and glycemic metabolism. Recent research studies have marked obesity and diabetes as the major public health problems in most of the countries. The diabetes prevalence is so high and estimated that its level raised from 135 to 300

million by the years 1995 to 2025. During the progression of obesity, adipokines (cytokines and chimiokines) are synthesized that play an important role in general body physiology. Massive development of adipose tissue leads to inflammation resulting from the excessive production of chimiokines and cytokines thus leading to type II diabetes. Lycopene is a lipophilic carotenoid stored in adipose tissues thereby reduces the pathologies linked with obesity and hyperglycemic conditions. The lycopene based functional drinks have potential to reduce malignant transformation of oxidized cholesterol in diabetic state. The lycopene decreases diabetes in linear fashion by managing glucose abnormalities. Lycopene owes ability to decrease body glucose and raise insulin level in type II diabetes. In an investigation, studied the impact of oral supplementation of lycopene in normal rats for twenty-eight days. The lycopene was daily supplied in doses as 0, 200, 500 and 2000 mg/kg body weight by gavage. No significant signs of abnormality were noticed for hematology, urinalysis and organs weight. However, a decline in glucose value was observed at higher lycopene dose. The significant differences in body glucose were noted between control and lycopene treated rats i.e. 205.6 ± 44.3 and 132.1 ± 35.9 mg/dL, respectively. Conclusively, they confirmed lycopene as an ameliorating factor for hyperglycemia [8].

3 Anti-Ulcerative Colitis Property of Watermelon

Ulcerative colitis is one of the inflammatory bowel diseases occurring broadly which causes the mucosal inflammation in the entire bowel system. The characteristic feature of ulcerative colitis is the destruction of goblet cells, crypts, and development of ulcers. In addition, ulcerative colitis in the chronic stages can develop into the deadly colorectal cancer, which is the second leading cancer with high death rate. Apart from colorectal cancer, ulcerative colitis is also associated with the onset of other related ailments such as rheumatoid arthritis, ankylosing spondylitis, and psoriasis [6].

4 Anti-Oxidant Properties of Watermelon

Several cascades of biochemical reactions are continuously undergoing in the cells and organelles of a human body. The constant metabolic reactions generate highly reactive free radicals in the system as inevitable by-products. These free radicals have the tendency to react with the macromolecules such as proteins, lipids, and also with the DNA molecules and affects their normal functions. The cellular redox reactions generate reactive oxygen species which can act as beneficial secondary signaling Molecules 2020, 25, 5258 5 of 15 molecules, but in excess cause oxidative stress in the cells [6].

5 Anticancer Properties of Watermelon

Cancer is a dreadful disease with high fatality rate in many nations worldwide. The association between the active components of diet with the expression of

genes in several metabolic pathways can influence the molecular mechanism of carcinogenesis in biological system. For instance, the lycopene, an active component in watermelon can indulge in the modulation of cancer development by the inhibition of DNA mutation and acting against the metastasis of the tumor [6].

6 Macular diseases

Macular degenerative disease onsets with the thinning of macula layer of retina thereby resulting in gradual decrease in vision. The symptoms include appearance of yellow spots. There are two types of age-related macular degeneration (AMD) including wet and dry. However, dry AMD is more prevalent further in turns to wet AMD when new blood vessels develop to reduce the dryness of macular layer. The development of such vessels favors hemorrhage, swelling, and scar on the eye tissue. The utilization of carotenoids or their rich sources can reduce the risk of macular and other degenerative disorders. In an experimental study of macular degeneration, subjects with low lycopeneserum concentrations were at high risk. Lycopene is also effective against immunodeficiency diseases like HIV and cerebral damage microangiopathy in Austrian stroke [8].

Results and discussion

Total polyphonic content

Polyphenols commonly known as polyphenolic compounds, are defined as structural class organic chemicals characterized by the presence of large multiples of phenol structural units including phenolic acids, flavonoids, stilbenes, and lignans. Total polyphenols of fresh watermelon juice are reported to be 16.94–20.23 mg GAE/100 ml. Increasing scientific evidence has suggested that due to their antioxidant properties, daily consumption of foods and beverages rich in polyphenols induces positive effects on human health, which results in having specific biological activities affecting gene expression, cell signaling, and adhesion. They have the ability to stop the formation of ROS in a human body. García-Pérez et al. have stipulated that the benefits of preventing or repairing the damages inflicted by ROS and free radicals in the body such as obesity and diabetes are usually attributed to activity of phenolic compounds. Their study further suggested that these benefits are related to mechanisms of modulation of multiple signaling pathways in pancreatic β -cells skeletal myofibers hepatocytes, adipocytes, and antioxidants effects. In vitro and in vivo studies have proven that polyphenols possess anticancer and antiinflammatory activities. It has shown to be effective in prevention of psoriasis disease, a skin disorder affecting up to 2 % of the world's population driven by the immune system. Moreover, it results in protective effects against a series of diseases such as diabetes, neurodegenerative disorders, osteoporosis, inflammation, arthritis, high arterial pressure, and headaches. However, the health effects of polyphenols depend

on both their respective intakes and their bioavailability. Thus consumption of watermelon juice can serve as a medicinal alternative. Polyphenols have evoked considerable interest among nutritionists, food manufacturers, and consumers because of their safety and potential therapeutic value. Research is still ongoing to identify and characterize which of the hundreds of existing polyphenols are likely to be contained by watermelon [5].

Watermelon preservation

Watermelon is perishable in nature because of its high pH (5.2–6.7) and high water activity ranging between 0.97 and 0.99. It is therefore susceptible to pathogenic microorganism due to the gram-positive bacteria, which are very sensitive to low acidity. Watermelon can be considered a potentially hazardous food owing to its low acid nature. as a result, the preservation of watermelon juice is important. To extend the shelf life and increase utilization, watermelon juice is processed into various products considering consumer's need for safe, nutritious and convenient food. However, processing can result in loss of watermelon nutrients and phytochemicals. In the fruit juice industry, high temperature, short time processing is mostly applied. Although this method is effective in minimizing microorganisms and enzymes, it degrades the nutritional and antioxidant content of the fruit juices. Currently, numerous researches have been done on utilization of innovative processing technologies that rarely affect low molecular weight molecules like color, aroma compounds, minerals, nutrients, and antioxidants during units of operation. Heat is reported to negatively affect the quality parameters of watermelon because of its thermo-sensitive nature. Temperature of above 78°C is reported to have detrimental effect on color change, separation of particles, as well as change in flavor. As a result, alternative processing technologies that are cost efficient and do not compromise quality of the product should be applied during processing. Since watermelon quality parameters are easily depleted by heat treatment. non-thermal processing methods must be utilized to minimize the degradation. Opposed to thermal technology, nonthermal processing is effective in retention of nutrients, flavor, and color during processing. High-pressure processing and pulse electric field are among processing methods that can retain the quality parameters. A combination of ultrasound and moderate heat known as thermosonication is also more effective in enzymatic and microbial inactivation without affecting juice quality.[59] Heat processing transforms lycopene and β -carotene from trans configuration cis isomers. making them more bioavailable [5].

Future perspectives

Even though watermelon was found to be the highest source of lycopene and citrulline among all fruits, research has found that at least 85 % of our

dietary lycopene is supplied by tomato and tomatobased products; therefore, there is a need to produce more watermelon-based products. Since watermelon shows compatibility with other fruits, it can be used together with those fruits to manufacture products that are more commercial. Research has indicated that the lycopene content of watermelon is not totally depleted by processing methods. Therefore, lycopene can be extracted from the watermelon to be used in pharmaceuticals and food manufacturing industries as an ingredient. Monitoring quality attributes of watermelons during processing is still an ongoing research in order to produce high-quality products. Moving forward into the future, it is important to determine the internal qualities of watermelon as affected by maturity and processing in order provide intensive understanding to food processors [5].

Conclusion

This study clarifies that the watermelon (*Citrullus lanatus*, Family Cucurbitaceae) is the fruit and plant of a vine-like (climber and trailer) herb originally from southern Africa. This flowering plant bears an accessory fruit of a type that botanists call a *false berry*. The Health Benefits of Watermelon: Helps you stay hydrated, packed with nutrients and beneficial plant compounds, anticancer effects, improve heart health, reduce inflammation and oxidative stress, help prevent macular degeneration, relieve muscle soreness, aid skin health, improve digestion. The watermelon is also helpful to lessen some other metabolic syndromes owing to vitamin A, B6, C, magnesium, potassium. These along with lycopene are health promoting functional ingredients associated with reduced risk of cardiovascular disorders. Heart attacks, ischemic strokes and atherosclerosis are faced through the oxidation of low-density lipoprotein and their curing has been observed though high consumption of lycopene.

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ҚАРБЫЗДЫҢ ДЕНСАУЛЫҚҚА ПАЙДАСЫ

Қарбыз (Citrulus lantus) – Cucurbitaceae тұқымдасына жататын маңызды бау-бақша дақылы. Қарбыздың тағамдық әлеуеті бірнеше зерттеушілермен сипатталған, бұл оны функционалды тағамның жақсы таңдауына айналдырады. Қарбыз жүрек-тамыр аурулары, қартаюға байланысты аурулар, семіздік, қант диабеті, ойық жаралар және әртүрлі ісік түрлері сияқты әртүрлі ауруларды емдеу үшін қолданылған. Қарбыздың емдік қасиеттері ликопен, цитрулин және басқа да полифенолды қосылыстар сияқты фармацевтикалық құндылықтары бар маңызды фитохимиялық заттардың болуымен байланысты. Қарбыз ақуыз синтезі үшін қажетті маңызды амин қышқылы L-аргининнің прекурсоры болып табылатын бейтарап альфа амин қышқылы L-цитрулиннің маңызды көзі ретінде әрекет етеді. Қарбыз – антиоксиданттардың жоғары деңгейін қамтитын табиғи өнім және иондаушы сәулелену әсерінен кейін бос радикалдардың пайда болуына байланысты тііндердің тотығу зақымдалуын болдырмайды. Бұл зерттеу қарбыздың радиопротекторлық әсерін зерттеуге бағытталған. Қарбыз – Африканың Калахари шөлінің маңындағы тропикалық аймақтарында туған асқабақ тұқымдасының мүшесі. Ботаниктер оны «непо» деп атайды, ол қалың қабығы мен ет ортасы бар жеміс. Ол негізінен сергітетін жазғы жеміс ретінде тұтынылады, оны сергітетін қабілеті, тартымды түсі, нәзік дәмі және жазғы шөлді қандыру үшін жоғары су мөлшері үшін тұтынушылар жоғары бағалайды. Д. Оберои мен С. Согидің мәліметтері бойынша, қарбыз жемістері 55,3 % шырын, 31,5 % қабығы және 10,4 % сығынды береді. Ликопен және β-каротин сияқты каротиноидтар қарбыздың қызыл және қызғылт сары түстеріне жасап береді, тиісінше, қарбыздың тәттілігі негізінен сахароза, глюкоза және фруктозаның тіркесіміне

байланысты. Піскен қарбыздағы қанттың жалпы мөлшерінің 20–40 % сахароза мен глюкоза, ал фруктоза 30–50 % құрайды.

Кілтті сөздер: қарбыз, қоректік заттар, антиоксиданттар, аурулар және тұтыну.

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ПРЕИМУЩЕСТВА АРБУЗА ДЛЯ ЗДОРОВЬЯ

Арбуз (*Citrulus lantus*) – важная садовая культура, принадлежащая к семейству *Cucurbitaceae*. Несколько исследователей продемонстрировали нутрицевтический потенциал арбуза, что делает его лучшим выбором функциональной пищи. Арбуз использовался для лечения различных заболеваний, таких как сердечно-сосудистые заболевания, болезни, связанные со старением, ожирение, диабет, язвы и различные виды рака. Лечебные свойства арбуза объясняются наличием важных фитохимических веществ с фармацевтической ценностью, таких как ликопен, цитруллин и другие полифенольные соединения. Арбуз действует как жизненно важный источник L-цитруллина, нейтральной альфа-аминокислоты, которая является предшественником L-аргинина, незаменимой аминокислоты, необходимой для синтеза белка. Арбуз является натуральным продуктом, который содержит высокий уровень антиоксидантов и может предотвратить окислительное повреждение тканей из-за образования свободных радикалов после воздействия ионизирующего излучения. Настоящее исследование было направлено на изучение радиозащитного действия арбуза. Арбуз является членом семейства тыквенных, произрастающим в тропических районах Африки недалеко от пустыни Калахари. Ботаники называют его «пепо» – фрукт с толстой кожурой и мясистым центром. Его в основном употребляют в качестве освежающего летнего фрукта, который высоко ценится потребителями из-за его освежающих свойств, привлекательного цвета, нежного вкуса и высокого содержания

воды для утоления летней жажды. Согласно Д. Оберои и С. Соги, плоды арбуза дают 55,3 % сока, 31,5 % кожуры и 10,4 % жмыха. Каротиноиды, такие как ликопин и β -каротин, отвечают за красный и оранжевый цвета арбуза соответственно. Сладость арбуза в основном обусловлена комбинацией сахарозы, глюкозы и фруктозы. Сахароза и глюкоза составляют 20–40 %, а фруктоза – 30–50 % от общего количества сахаров в спелом арбузе.

Ключевые слова: арбуз, питательные вещества, антиоксиданты, болезни и потребление.

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