Review Article

Importance of Sorghum as Pathya Ahara (Healthy diet) in lifestyle disorders-A review article

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Abstract :

In today's era, the disturbance in proper body functions has become prevalent due to changes in lifestyle, stress, and the consumption of junk food. Consequently, a significant number of individuals are suffering from lifestyle disorders such as diabetes, hypertension, obesity, and skin disorders. The most effective way to combat these health issues is by incorporating nutritionally rich millets into our daily diets. Millets are exceptional due to their abundance of dietary fiber, antioxidants, minerals, phytochemicals, polyphenols, and protein, which act as a remedy against health-related disorders. Sorghum, the world's fifth most important cereal, is predominantly cultivated in developing countries, particularly in Africa and Asia. It serves a dual purpose as both a food and feed grain. Sorghum is utilized in various food items to enhance their performance, nutrition, and health benefits. The aforementioned review article highlights the utilization of sorghum in the management of diabetes mellitus as a *Pathya Ahara* (beneficial diet) with taste-enhancing properties. Additionally, sorghum is employed to combat skin aging due to its antioxidant, anti-inflammatory, and anti-aging properties. Furthermore, sorghum proves to be a beneficial dietary option for individuals with piles, as it possesses antimicrobial and antibacterial properties.

Key words-sorghum, Diabetes, healthy diet, *Pathya Ahara*

Introduction

There has been a phenomenal rise in various lifestyle disorders during the past decade, there has been a remarkable increase in lifestyle disorders such as Diabetes, obesity, and HTN. Among all nations, India has been the most affected by this gradual and widespread pandemic of lifestyle disorder. Scientific evidence supports the idea that consuming millet can help reduce the progression of prediabetes, leading to improved glycaemic control, reduced body mass index (BMI), and decreased risk of atherosclerotic cardiovascular disease[(1)]. Millets are an excellent source of energy, providing protein, fatty acids, minerals, vitamins, dietary fibre, and polyphenols. Among the various types of millets, sorghum holds significant importance. It is believed to have been to have 1st domesticated in North Africa, potentially in the northern regions of Ethiopian regions around 1000 BC.[(2)] Today, sorghum is cultivated in warmer climatic areas worldwide and ranks as the 5th most important serial grain Globally, following wheat, maize, rice, and barley.[(3)] It serves as a valuable source of feed and Fodder, particularly in traditional, smallholder farming, while also gaining popularity as a feed crop in high-put commercial farming and as a biofuel crop.[(4)] Sorghum is often referred to as the camel's crop and is a major dry land cereal crop with versatile uses such as Food, Feed, Fodder, and bioethanol production. Its nutritional benefits make it a valuable addition to many lifestyle disorders diets.

Material and methods:

The research methodology involved a thorough review of Classical Ayurveda texts such as *Raj Nighantu, Adarsh Nighantu, Shaligram Nighantu, and Bhojkutuhal; these texts* were examined to gain and understanding of *Guna* (characteristics) and uses of Sorghum vulgare. Specifically, the *Dhanya Varga* from *Adarsha Nighantu* was reviewed to explore the uses of sorghum Additionally, the *Shalyadi Varga* from *Shaligram Nighantu was examined* to understand the properties of sorghum. The *Sutra* from *Kshemkutuhal* was also reviewed to identify the various uses of sorghum. Furthermore, an article on the taxonomy, Distribution, and habitat of sorghum was thoroughly reviewed. Google Scholar was reviewed to gather information on the uses of sorghum as *Pathya Ahar*a (Healthy diet) in multiple diseases. Taxonomy of sorghum revealed that its Latin name sorghum vulgare and it belongs to Family Poaceae It falls under the Subfamily sorghum.[(5)] In terms of Distribution and habitat, it was found that Seventeen out of 25 species of sorghum are native to Australia however some species can be found in Africa, Asia Mesoamerica and certain islands in the Indian and Pacific oceans.[(5)] Composition of sorghum includes various components such as Fat, proteins, carbohydrates, starch, tannic acid tannins, vitamins, tyrosine, Lysine, methionine, Na, and Ca.[(6)] Lastly, Sorghum is known by different names in different languages. In *Sanskrit* it is called *Yavanaala;* In Hindi it is called *Jowar*, In marathi it referred to as *Jwar* , In Gujrati it is called as Jwar ,In English it is called great millet.[(7)]

Fig no.-1
Provides a Visual Presentation Related Topic

Nutritive value of sorghum(Table No .1)

Protein	10.4	Iron	4.1
Carbohydrate	72.6	Vitamine	47
Fats	1.9	Thiamine	0.37
Energy	349	Riboflavin	0.13
Calcium	25	Niaciamide	3.1
Phosphorus	222	Follic acid	20

Guna(characteristics) and Karma(uses) explained in Samhita *(Table no.2)*

Kaiydev nighantu	यावनालो देवधान्यं जूर्णाहवो जुहुलोऽनलः।[8] तानीयको जूर्णकाय तिनिका जुन्हुलिस्तथा ।।१०५।। बरको बरका जूर्णा वेणुपत्री प्रशातिका । कषाया मधुरा रुक्षा रक्तपित्तकफापहाः ।।१०६।। अवृष्याः लघवः शीता क्लेदघ्ना वातकोपनाः कै. नि ।।१०७।।	*Kaiydev nighantu concluded that Yavnal* is *Laghu* in nature easy to digest, *Kashaya* (astringent) in *Rasa* use in *Raktapitta* (epistaxis),*Kledghna* in nature so can use in skin disorder, diabetes**.**
Raj nighantu	धवलो यावनालस्तु गौल्यो बल्यस्त्रिदोषजित् । वृष्यो रुचिप्रदोऽर्शोघ्नः पथ्यो गुल्मव्रणापहः ।।६२।। रा. नि.[9]	Rajnighantu Concluded that *Yavnal* used as taste enhancer *Yavnal* use in *Arshas* (piles).
Priya nighantu	यावनालस्तु जुर्णाहो मधुरो रुक्षशीतलः। शुक्रघ्नतुवर क्लेदनाशन वातवर्धनः ।। प्रि.नि.[10]	Priynighantu Concluded that *Yavnal* has *Kledghna* properties.
Bhojkutuhal	स्याधावनालरसपाकभवो गुडोडयंक्षारः कषायमधुरः कफवातहरि। पित्तप्रदः सततमेव निषेव्यमाणः कण्डुकुष्ठजननोस्त्रविदाहदायि भोजकुतुहल ।।[11]	Bhojkutuhal Concluded that is *Kashaya*, *Madhura* in *Rasa*. It is useful in itching, and *Kustha* (skin disorder). Concluded that *Yavnal* used as a taste enhancer and also used in *Arshas* (piles).

Discussion:

According to Kaiyadev Nighantu, *Yavnal* is considered *Laghu* (light) in nature and easy to digest. It has a *Kashaya* (astringent) taste and is used in treating *Raktapitta* (epistaxis). It also possesses *Kledghna* properties, making it beneficial for skin disorders and diabetes. Rajnighantu states that *Yavnal* acts as a taste enhancer and is used in the treatment of *Arshas* (piles). Priya Nighantu concludes that *Yavnal* has kledghna properties and is beneficial in treating *Kleda* (excessive discharge) and *Vata* disorders. Bhojkutuhal describes *Yavnal* as having a combination of sweet, sour, and astringent tastes. It is beneficial for balancing *Kapha* and *Vata Dosha* and is known for its cooling properties. It is also used in the treatment of skin disorders.

Uses of sorghum as *Pathya Ahara* (diet)

Sorghum is widely utilized as a *Pathya Ahara*, or a beneficial diet, due to its various uses and health benefits. It is not only consumed as a standalone food item but also incorporated into other food products to enhance their nutritional value and promote better health. For instance, sorghum is commonly used to produce food products such as biscuits, bread, and muffins. It is also a popular ingredient in beverages and bakery items. Additionally, sorghum is extensively used in poultry as animal feed for cows, buffaloes, fish, and dogs. Furthermore, sorghum can be utilized as a healthy functional component in pasta, a well-known international staple meal typically made from durum wheat semolina.[12] This inclusion of sorghum adds complex carbohydrates and poorly digesting carbohydrates to the pasta, making it a healthier option. Among cereals, sorghum stands out due to its composition of phytochemicals such as phenolic acids, policosanols, anthocyanins, tannins, and phytosterols. These phytochemicals play a crucial role in promoting human health and provide antioxidant activity. Sorghum has also been found to be beneficial in managing various lifestyle disorders. It can be used as a diet food for individuals with diabetes, as it contains phenolic compounds that aid in glucose metabolism. Studies have shown that the intake of sorghum phenolic extracts can reduce blood sugar levels and improve glucose metabolism. The hypoglycemic effect of sorghum extracts is comparable to that of the hypoglycemic agent glibenclamide. Moreover, sorghum exhibits anti-inflammatory properties due to its high tannin content. It has been observed to reduce edema development in rodents by inhibiting cyclooxygenase 2 (COX-2) and decreasing vascular permeability. Additionally, sorghum's protein impact and its effect on cytokines contribute to its relaxing effects. In conclusion, sorghum serves as a versatile and beneficial dietary option. Its incorporation into various food products enhances its nutritional value, while its phytochemical composition and antioxidant activity contribute to improved human health. Furthermore, sorghum's potential in managing lifestyle disorders, such as diabetes, and its anti-inflammatory properties make it a valuable addition to a healthy diet.[13]

Pharmacological effects of sorghum

Pharmacological effects of sorghum Anti-inflammatory Sorghum, with its high tannin content, has been proven to inhibit cyclooxygenase 2 (COX-2), resulting in a reduction in edema development in rodents. This inhibition of COX-2 activity leads to decreased vascular permeability and edema, as well as a decrease in neutrophil invasions.[14] In-vitro studies have shown that the protein impact of sorghum is responsible for its relaxing effects, while cytokines are primarily affected.[15] Diabetes is a condition characterized by elevated blood sugar levels. Research has indicated that sorghum contains phenolic compounds that assist in the glucose metabolism of animals. Studies conducted on mice have demonstrated that the consumption of sorghum phenolic extracts can decrease the area under the blood sugar and glucose curve. The hypoglycemic effect of phenolic extracts from sorghum is comparable to that of the commonly used hypoglycemic agent glibenclamide in the control group.[16] Cardiovascular diseases and dyslipidemia inhibition Sorghum grains contain a significant amount of bioactive phenolic compounds, which contribute to the protective effects of sorghum against dyslipidemia and cardiovascular diseases (CVDs). The lipids present in sorghum, such as phytosterols and policosanols, have been shown to improve cardiovascular health by regulating the synthesis, absorption, and elimination of cholesterol.[17] Incorporating sorghum lipids into the diets of hamsters has been found to enhance cholesterol elimination and reduce cholesterol levels in the liver.[18] Skin disorders Sorghum is renowned for its antioxidant, anti-inflammatory, and anti-aging properties, making it a beneficial treatment for various skin disorders.[19] The polyphenols found in sorghum contribute to its effectiveness in addressing different skin conditions. Piles Sorghum possesses antimicrobial and antibacterial properties, making it a useful option for treating piles (haemorrhoids).[20]

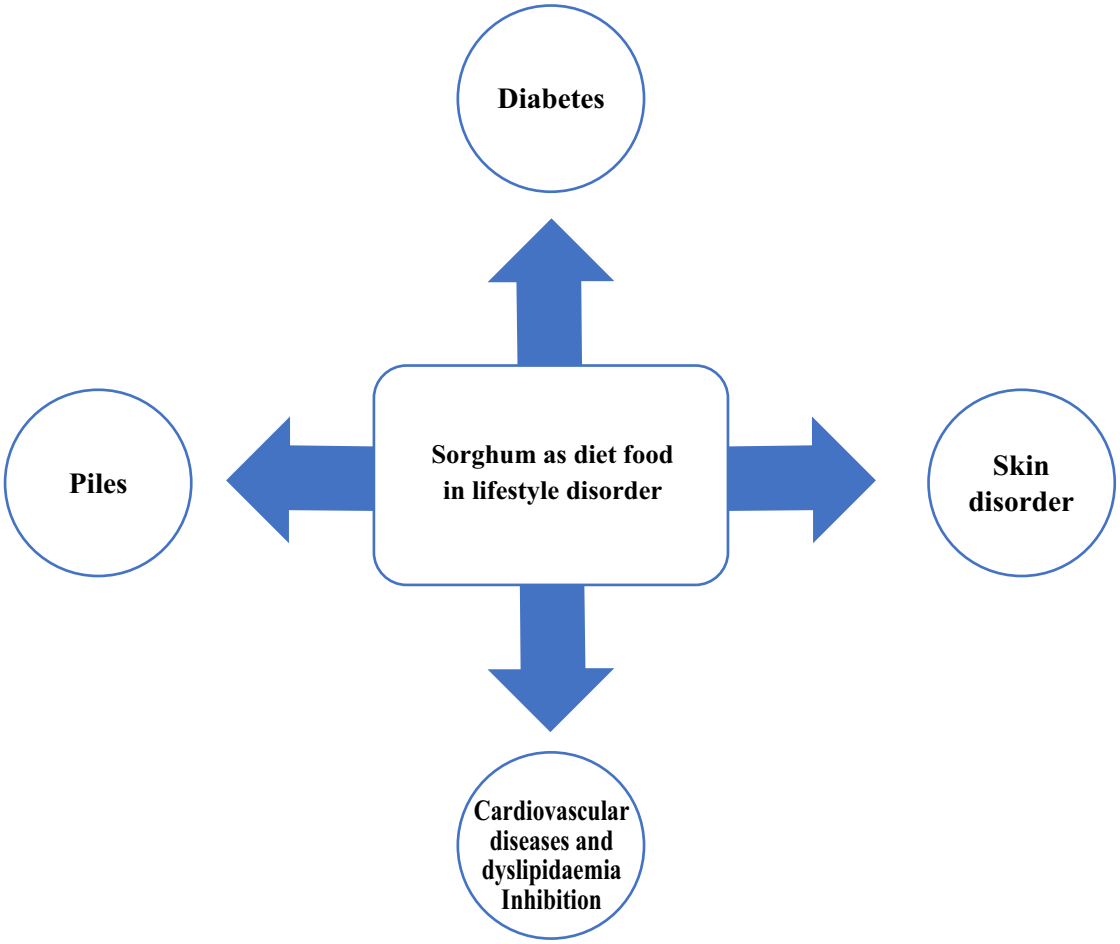

Fig.no 2 sorghum as diet food

Conclusion:

Nowadays, a growing number of individuals are experiencing lifestyle disorders such as diabetes, hypertension, and skin diseases due to changes in their lifestyles, diets, and increased stress levels. It is crucial to incorporate certain food items into our daily diets that can naturally help us combat these lifestyle disorders. The current generation has developed a habit of consuming fast food like pizza, burgers, and pav bhaji from a young age, remaining unaware of the food products made from sorghum. Unfortunately, the consumption of sorghum for food purposes has been declining due to changes in food habits and an increase in its usage for industrial purposes. Therefore, this article aims to review the utilization of sorghum as a diet food (*Pathya Ahara*) in managing conditions such as diabetes, skin disorders, and piles. It emphasizes the need to focus on such underutilized crops to ensure food and nutritional security sustainably in the future.

Conflict of Interest: Nil

Source of Support: Nil

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