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SWEET POTATO: NATURE'S BLESSING FOR SUPPORTING HEALTHY AGEING WITH PHYTO CHEMICAL REVIEW

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ABSTRACT

In earlier days, people lived physically demanding lives and relied on food from organic farms, so they were immune to lifestyle disorders. On contrary, the quick development of science and technology has shown benefits to human life in every aspect. People nowadays work incredibly hard to make ends meet, so their hectic schedules keep them physically and mentally exhausted. Due to lack of time, people rely on fast food, commercially processed foods to satiate their hunger. To enhance their flavour and increase shelf life, these are excessively loaded with chemical preservatives and additives. In comparison to the listed nutritional value, these foods either have very little or no supplements. Because of their false perception as a balanced diet, most people are drawn to these foods. As a result, many age-related diseases occur at much younger ages, like Alzheimer's disease, osteoporosis, type 2 diabetes, cancer, atherosclerosis,

and cardiovascular disease. The incidence of each of these illnesses dramatically increases with age. People live hectic, sedentary lives, and instead of changing their diets, they usually wind up in hospitals with a long list of adverse prescriptions. Many foods found in nature are being disregarded by the so-called highly educated people, despite including them in a regular diet that can help prevent a number of illnesses. One of nature's treasures is Sweet potatoes that promote healthy aging. With the goal of promoting healthy aging, this review seeks to elucidate the phytochemical composition, biological processes, medicinal properties, and nutritional value of sweet potatoes.

Keywords: Sweet potato, Healthy aging, Age related diseases, Nutritional value, phytochemical

INTRODUCTION:

Sweet potatoes, which support good aging, are one of nature's treasures. The scientific classification of this creeping dicotyledonous plant is as follows: Kingdom: Plantae; Division: Magnoliophyta; Class: Magnoliopsida; Order: Solanales; Family: Convolvulaceae; Genus: Ipomoea; Species: batatas. Known scientifically as *Ipomoea batatas* (L.) Lam **[1]**. Plant is remarkable because it produces the globally consumed, nutrient-rich tuberous roots. This food crop can grow and produce tuberous roots in unfavourable soils with little initial investment, making affordable **[2]**. Because of its unique qualities and high nutritional content, NASA has specifically selected this crop to be grown as a candidate crop in space **[1]**.

METHODS

The subsequent data about sweet potatoes leaves and tuber has been compiled and its colour types, phytochemical constituents, and therapeutic activity has been tabulated below.

Root & Leaves of Sweet potato

Sweet potato roots are believed to contain starch, followed by simple sugars like fructose, glucose, sucrose, and maltose. It also contains high levels of iron, dietary fibre, complex carbohydrates, and vitamins, including beta-carotene, B2, A, C, and E. Elevated blood levels of vitamin A increases retinol activity, essential nutrient for visual acuity. The body also needs this vitamin to keep mucous membranes and skin in healthy condition. Its richness in vitamins, minerals, and carbohydrates rewards hard workers. Due to its phytonutrient level, individuals with stomach cancer may be able to prevent health issues arise by free radicals **[4]**. Nutrient content in the leaves is higher than in the tuber itself. Significant amounts of minerals, vitamins A, dietary fibres, antioxidants, zinc, potassium, sodium, manganese, calcium, magnesium, iron, nutrients like crude protein, crude fat, crude fibre, ash, carbohydrates, moisture contents seen. Due to high potassium content, it can

relieve muscle cramps. Magnesium present in it supports nerve health, relaxation, and peace. Magnesium is one of the essential minerals for reducing stress and elevating mood. It also supports the health of the bones, muscles, and nerves **[5]**. It's leaves has abundant amount of lutein, play good role for eyes like reducing the risk of progression of cataracts and anti-aging macular degeneration. They fight free radicals, which delays the onset of disease and early aging, in addition to being an excellent source of vitamin C and antioxidants. Polyphenols in leaves showed evidence of antioxidant, antimutagenic, anticancer, anti-diabetic and antibacterial activities in vivo & vitro study. Utilizing physiological benefits, leaves offer defence against oxidation-related diseases like cancer, allergies, aging, HIV, and cardiovascular problems **[3]**. Protein contents of sweet potato leaves and roots range from 4.0% to 27.0% and 1.0% to 9.0%, respectively **[1]**.

Table 1: Description of Sweet Potato according to colour [2], [3]

S. No.	COLOUR	PHYTO-CHEMICAL CONSTITUENTS	UTILITY
1.	Yellow or Orange flesh	Rich in Hydroxycinnamic acids, referred as phenolic acids. • Pro-Vitamin A compound i.e. β-carotene. • High vitamin C	Treat hypovitaminosis A, Replenishes nutritional deficits similar to retinol
2.	Purple-fleshed	Rich phenolic include antioxidant and anti-inflammatory acylated anthocyanin like cyanidin and peonidin. • Polyphenol content.	Antioxidant activity, Anti-inflammatory activity.
3.	Overall	• Starch • Great source of energy, fibre, vitamin B5 (pantothenic acid), vitamin B6 (pyridoxine), and potassium	Primary Energy source so body use it as fuel.

Table 2: Description of Phyto chemical constituents in Sweet Potato [1]

S. No.	PHYTO-CHEMICALS	ACTION
1.	Anthocyanin like cyanidins and peonidins.	Anti-inflammatory and antioxidant properties
2.	Polyphenol compounds from methanolic and hydromethanolic (extracts of tuber flour)	Antioxidant properties, hepatoprotective, antimutagenic, radical scavenging, hypoglycemic qualities, antibacterial and antihistamine effects.
3.	Caffeineylquinic acid (sweet potato leaves)	Hindrance of human cancer cell like stomach, colon, promyelocytic leukaemia
4.	Coumarins include aesculetin, scopoletin, and umbelliferon	Scopoletin ceases growth of prostate adenocarcinoma cells (PC3). Hepatoprotective, antioxidant, acetyl cholinesterase inhibitory and spasmolytic.
5.	Triterpenes	Anti-fungal action
6.	b-amyrin acetate	Antinociceptive effects
7.	Flavonoids	Protects against lung and mouth cancers
8.	Vitamins like riboflavin, niacin, pantothenic acid (vitamin B5), pyridoxine (vit.B6), thiamine (vit.B1) etc.	Co-factors in metabolism of calcium, magnesium, manganese, potassium, proteins, and carbohydrates.

Table 3: Description of Therapeutic properties in Sweet Potato [1], [6]

S. No.	THERAPEUTIC PROPERTIES	PHYTO-CHEMICALS OR PARTS OF PLANT
1.	Anti-Diabetic activity, glucose regulation, and pancreatic cell function	Sweet potato tuber White fleshed sweet potatoes.
2.	Anti-Diabetic activity	peel (Caiapo), and flesh of sweet potato
3.	Improved lipid profiles	Sweet potato tuber
4.	Increases Adiponectin (hormone protein)	Sweet potato tuber
5.	Anti-cancer properties (colorectal,kidney,gall bladder, breast, lung)	Sweet potato tuber
6.	Cardiovascular properties	Sweet potato extract
7.	Haemolytic activity with improved phagocytic function & serum immunoglobulin conc.	Purified sweet potato polysaccharide (PSPP) extracts in roots.
8.	Gastro-protective properties.	Methanolic extract of tubers.
9.	Anti-ulcer activity	Sweet potato tubers.
10.	Anti-inflammatory activity (rheumatoid arthritis and osteoarthritis)	polyphenols (anthocyanin)

Comparison with other types of potatoes:

In comparison to other potato varieties, sweet potatoes offer 90 calories per 100 grams, while other varieties, such as *Solanum tuberosum*, only provide 70 calories per 100 grams. Furthermore, compared to S. turberosum, it is observed to have a higher amylose to amylopectin ratio. Even people with diabetes can benefit from amylose as a healthy food ingredient because it raises blood sugar levels more gradually than simple sugars. This tuber has been praised for putting no cholesterol or saturated fats and for being a great source of flavonoids, phenolic compounds like beta-carotene, and vitamin A. It is also rich in dietary fibre, antioxidants, vitamins, minerals **[4]**. White-fleshed sweet potato showed higher values of crude protein, fibre, total phenolic content (TPC), total flavonoids content (TFC), ferric reducing antioxidant power (FRAP) and DPPH (2,2-Diphenyl-1-picrylhydrazyl) while, White-fleshed potato showed lower values in comparison **[9]**.

IMAGES OF SWEET POTATO:

Fig.1.https://www.seattletimes.com/life/food-drink/a-guide-to-sweet-potato-varieties-how-to-choose-prep-and-store-them/

Fig 2.The Leafy, Vitamin-Packed Green you've never eaten plus a recipe—for beginners. By Perri O. Blumberg

Fig 3.U-ichiro Murakami/Flickr.com

SWEET POTATO RECEIPES:

Fig.4. Bowl of oven roasted Sweet Potato with rosemary and thyme stock photo

Fig.5. Love & lemon (sweet potato fry)

Fig.6.Homemade Dehydrated Sweet Potato Chips

Fig.7. Sweet Potato Pasta Sauce with Spaghetti Posted by Stephanie Lundstrom on Oct 26, 2022, Updated Nov 04, 2022

Fig.8. Healthy Baked Orange Sweet Potato wedges with dip sauce, herbs, salt and pepper on wooden board stock photo

Fig.9.https://recipes.timesofindia.com/recipes/sweet-potato-paratha/rs62313534.cms

CULINARY INGREDIENT:

Fig.10.Sweet potato smoothe

Fig.11.Sweet potato flour

Fig. 12. Sweet Potatoes Vodka
By Barbara Ensrud | September 01, 2013

Fig.12. Fermented Spicy Sweet Potatoes
June 20, 2015 by Cathy Arkle

DISCUSSION:

Root tuber flesh comes in a range of hues, like beige, white, red, pink, violet, yellow, orange, and purple. Purple, orange, and yellow sweet potatoes varieties have beneficial bioactive compounds. The hypovitaminosis A in the susceptible population is treated with beta-carotene, which is currently prevalent in large amounts in yellow and orange sweet potatoes. Vitamin A also appears to improve the efficacy of retinol **[1]**. Lutein rich in leaves reduces the risk of cataract and anti-aging macular degeneration. Additionally, polyphenols found in leaves have shown antibacterial, anti-diabetic, anti-mutagenic, and antioxidant qualities. They are thought to primarily derive their energy from starch, which the body uses as fuel. It is seen that leaves have more nutrients than the tuber itself. Its high potassium content has been observed to provide relief from muscle cramps. While magnesium helps to maintain the health of muscles, nerves, and bones **[5]**. Sweet purple's phytochemical constituents, anthocyanin, such as cyanides and peonidins, have strong anti-inflammatory and antioxidant qualities that may be useful in treating rheumatoid arthritis and osteoarthritis. They can also be included in an anti-hypertensive diet to prevent atherosclerosis **[1]**. While caffeineylquinic acid in its leaves has been shown to inhibit the effects of human cancer cells and coumarins like scopoletin inhibited the growth of human androgen –independent prostate adenocarcinoma cells. Its flavonoids safeguard against oral and lung cancer. Sweet potatoes exhibit more potent anti-diabetic effects than diabense due to significant reduction of negative diabetes markers. Additionally, they have shown a low glycaemic index (GI), which implies that they might be a good food for diabetics **[1]**. Owing to its strong cytotoxic activity, this compound could be a promising start in the search for a medication to treat lung cancer. Because the levels of glutathione, superoxide dismutase, catalase, and glutathione perioxidase have significantly increased, the tubers have also been shown to be gastro-protective. When considered collectively, it provides over 90% of the nutrients required by the majority of people per calorie. They are a good source of vitamins (like 100% of the recommended daily allowance for vitamin C and 49% of the RDA for vitamin A), minerals (like 10% of the RDA for iron and 15% of the RDA for potassium and carbohydrates) **[4]**.

The physicochemical composition of naturally occurring tuberous roots reveals the presence of multiple nutrients, including vitamins, minerals, fibres, and bioactive compounds; on the other hand, the leaves exhibit a high concentration of starch, complex carbohydrates, fibres, minerals,

and vitamins. Studies conducted in vitro and in vivo indicate that the unique chemical components of sweet potatoes can prevent and treat a variety of ailments, including those related to osteoporosis, type 2 diabetes, cancer, atherosclerosis, eye disorder risk—namely, the progression of cataracts and anti-aging macular degeneration—as well as cardiovascular disease due to its anti-inflammatory, anti-cancer, anti-diabetic properties, etc. thereby serving in the management of broad range of ailments. Owing to their high nutritional value, there are numerous options to incorporate these vegetables in regular meals and add flavour with recipes. Their leaves are usually eaten raw as salad, while root is consumed in many different ways. i.e., baking, dehydrating, boiling and frying are common culinary techniques utilized worldwide. It appears that, despite an increase in the proportion of some minerals and vitamin C, the micronutrient density stands constant even after cooking. Sweet potatoes have proven their range of uses as a culinary ingredient serving as a base or ingredient for a wide variety of dishes, including pasta, dairy products, baked goods, sweets, starches, fermented preserves, and alcoholic drinks **[2], [7], [8]**. Overall, it promotes healthy aging by protectively maintaining users' health.

CONCLUSION:

Many research teams have prioritized the development of medicinal-based herbs and pharmaceuticals in recent years. However, one shouldn't disregard that many of nature's gifts, including fruits and vegetables, also have medicinal qualities. The primary focus of the current study has been the phytochemicals found in sweet potatoes, which are crucial for promoting healthy aging and providing a platform for future research initiatives.

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