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Review Article

A review of therapeutic potentials of sweet potato: Pharmacological activities and influence of the cultivar

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Abstract

Sweet potato (Ipomoea batatas) is a global food crop, now being recognized as a functional food due to several of its nutraceutical components. Several experimental studies have reported that sweet potato can generally be beneficial in the prevention or treatment of chronic diseases through its antioxidant, anti-inflammatory, immunomodulatory, anticancer/antitumour, antimicrobial and antiulcer activities. Studies on the haematinic effect of potato leaves and their ability to enhance some haemotological parameters are reviewed in this paper. Furthermore, the review provides an overview of the significance and influence of cultivar on the composition and pharmacological activities of sweet potato. Sweet potato contains a lot of beneficial phytochemicals, some of which are peculiar to certain varieties. There is, therefore, a need for the continuous evaluation and selection of cultivars with the appropriate phytochemical composition and bioactivities to be able to fully explore the medicinal value of sweet potato. Studies aimed at the isolation, characterization and toxicological evaluation of its bioactive compounds may help to strengthen and confirm the possible role of sweet potato as a health promoting food and an alternative remedy for chronic diseases. This review highlights the pharmacological reports on different forms of sweet potato and their potential medicinal values.

Keywords: *Sweet potato, Cultivar influence, Chronic diseases, Ipomoea batatas, Diabetes, Anti-cancer, Haematological effect*

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INTRODUCTION

Sweet potato, *Ipomoea batatas* (L.) Lam, is a perennial crop which belongs to the morning glory family or Convolvulaceae [1]. It is a popular staple food of the tropical and subtropical areas with a nutritional benefit evidenced by increase in its cultivation and consumption [2]. Sweet potato is mostly harvested for its tubers. However, the leaves are also sometimes consumed as an alternative to other leafy vegetables. It is the sixth most important food crop in the world and it contains phytochemicals, which are important for human health [3,4]. Other than their nutritional benefits such as a rich source of dietary fibre, antioxidants, vitamins, and minerals, sweet potato root tubers also contain no saturated fats or cholesterol. Islam, 2014 reported that sweet potato leaves contain more polyphenols than any other commercial vegetables such as spinach, cabbage, and lettuce. He stated that, the leaves of sweet potato contain at least 15 anthocyanins and 6 polyphenolic compounds [3].

Several reports have indicated that the phytochemicals in sweet potato possess multifaceted actions, including anti-oxidant, anti-mutagenic, anti-inflammatory, antimicrobial and anti-carcinogenesis and thus are important for several health-promoting functions in humans [5]. Different varieties of sweet potato are grown worldwide and these are generally characterized by the different flesh colours with varying phytochemical compositions. Different varieties of a plant may inherently differ in their nutritional values and in the bioactivities of phytochemicals present in the plants [6,7]. The nutritional value and medicinal potentials of sweet potato are gaining the attention of so many research groups as the quest for natural remedies from plants as well as the understanding between diet and health increases worldwide. Sweet potato plant alongside being primarily a food resource may as well be exploited for its medicinal properties due to its high nutritive and therapeutic properties.

ORIGIN, DISTRIBUTION AND PRODUCTION OF SWEET POTATO

Sweet potato, although native to tropical regions in America is an important and global food crop which is cultivated in more than 100 countries, with the primary or main commercial producers in China, Indonesia, Vietnam, Japan India, Tanzania and Uganda [8]. Limpopo, Mpumalanga (Nelspruit), KwaZulu-Natal and Western Cape provinces are the major production areas in South Africa [9]. Sweet potato is mainly grown in developing countries which account for a 95 % of the global output. China accounts for about 65 % of the world's sweet potato. In most parts of Africa, production of sweet potato is often done on a small or subsistence level. Nonetheless, there are high productions in Lake Victoria area in East Africa (Rwanda, Uganda, Burundi and Congo), Nigeria, Ghana and Madagascar [10].

Sweet potato yields maximum and better quality roots on a well-drained, sandy or silt loam soil. It requires both warm days and nights for optimum growth and root development [11]. Storage root development of sweet potato also depends on good soil aeration. Good soil aeration can be achieved by good field choice and bedding before transplantation. It is very sensitive to alkaline and saline conditions which influence growth. Soil pH between 5.6 and 6.6 is very good for the production of sweet potato. [12].

NUTRITIONAL VALUE OF SWEET POTATO

Sweet potatoes are rich in complex carbohydrates, dietary fiber and beta carotene (a precursor of vitamin A), vitamin B6, and vitamin C (Table 1). In addition to this, various parts of the crop have been reported to also contain mineral nutrients such as zinc, potassium, sodium, manganese, calcium, magnesium and iron [13]. According to Food and Agricultural Organisation (FAO) [14], sweet potato leaves and shoots are good sources of vitamins A, C and B2 (riboflavin), and lutein. Orange sweet potato varieties have higher beta carotene content than those with light colored flesh and their increased cultivation is being encouraged in Africa where Vitamin A deficiency is a challenging health issue. On the other hand, purple-fleshed sweet potato has been reported to contain anthocyanins, which possess antioxidant activities [15]. Although the protein content of sweet potato is low (~2 %) as in most tropical root and tuber crops, sweet potato still contains more protein than cassava and plantain [13]. The leaves have relatively high protein content (25-30 % of dry matter) compared to other leafy vegetables. The leaves also have higher levels of polyphenols than any other commercial vegetables [3]. Polyphenols have a strong role in the prevention of degenerative diseases especially cancer and cardiovascular diseases through their antioxidant activities [16].

Table 1: Nutritional value of sweet potato [17]

Proximate parameter	**Nutritional value per 100 g**	
	Root tuber	***Leaf***
Water	77.28	86.81
Energy (kcal)	86	42
Carbohydrates(g)	20.12	8.82
Protein (g)	1.57	2.49
Total fiber (g)	3	5.3
Total lipid (g)	0.05	0.51
Vitamins		
Vitamin A (IU)	14187	3778
Thiamine (mg)	0.078	0.156
Riboflavin (mg)	0.061	0.345
Niacin (mg)	0.557	1.130
Vitamin B6 (mg)	0.209	0.190
Folate (B9) (µg)	11	1
Vitamin C (mg)	2.4	11
Vitamin K (µg)	1.8	302.02
Minerals		
Calcium (mg)	30	78
Iron (mg)	0.61	0.97
Magnesium (mg)	25	70
Phosphorus (mg)	47	81
Potassium (mg)	337	508
Sodium (mg)	55	6
Lipids		
Fatty acids, total saturated (g)	0.018	0.111
Fatty acids, total monounsaturated (g)	0.001	0.020
Fatty acids, total polyunsaturated (g)	0.014	0.228

Source: United States Department of Agriculture National Nutrient Database (2015)

VARIETIES/ CULTIVARS OF SWEET POTATO

Today, there are several cultivars of sweet potato known and cultivated around the world. These cultivars come in different colors, shapes, sizes and also vary in taste and texture. There are three major categories of sweet potato cultivars. The staple types which are white, red/purple skinned with white/cream flesh and are characterized by their high starch content. There are also the desert types which are orange skinned, orange fleshed and are characterized by their high beta carotene content [9]. Different cultivars of sweet potato are also characterized by their colours, width, thickness and shapes of the leaves [18]. In Southern Africa, formal sweet potato breeding was initiated in 1952 [19] and the most commercially successful has been Blesbok, a purple-skinned high yielding cultivar with low dry matter content [20].

There are several cultivated varieties of sweet potato in the United States but one of the leading and the most widely cultivated is the carrot coloured and orange-silver skinned cultivar known as Centennial. Beauregard and Jewel are also dominant varieties of sweet potato that is being popularly consumed in the United States [21]. In China, where sweet potato breeding is now aimed at improved nutrition in animal feed and high starch content, a large number of new cultivars are emerging each year. ‘Xushu 18” which was bred for high resistance against sweet potato root rot disease caused by *Fusarium solani* still remains the most cultivated variety in China [22]. In sub-Saharan Africa, sweet potato is a major food crop now being bred for improved nutrition. An example is the increased production of orange cultivars to combat vitamin A deficiency [23]. Globally, several improved cultivars of sweet potato have been developed by collection of the best local farmer varieties as well as the introduction of best cultivars from other parts of the world. As in all other plants, objective of breeding in sweet potato is mostly for improved nutritional benefit, high yield, long storability and, resistance to pest and diseases [24].

PYTOCHEMICALS IN SWEET POTATO

The major phytochemicals that are generally present in sweet potato are flavonoids, terpenoids, tannins, saponins, glycosides, alkaloids, steroids and phenolic acids. These constituents may vary with varieties depending on flesh and skin colours. Orange varieties are particularly rich in beta-carotene, while purple sweet potato contains higher anthocyanin content than other varieties of sweet potato [25]. Beta carotene is a terpenoid with a strongly colored red-orange pigment abundant in plants and fruits. Anthocyanins are members of the flavonoid group of phytochemicals responsible for the red, purple and blue pigments in many fruit and vegetables [26]. The antioxidant activities of sweet potato have mostly been attributed to their anthocyanin and beta-carotene contents. Structures of common phytochemicals in sweet potato are shown in Fig 1. Peonidin and cyanidin are examples of anthocyanins present in purple sweet potato. In a metabolite profiling study done by Park and colleagues [27], peonidin and cyanidin were only detected in purple fleshed sweet potato but not in the white and orange varieties. Luteolin, a flavonoid was found in orange and purple varieties but was absent in the white ones.

Phenolic acids such as chlorogenic, isochlorogenic, caffeic, cinammic, and hydroxycinammic acids are also generally present in sweet potato. Phenolic acids have been associated with color, sensory qualities, nutritional value as well as antioxidant properties of foods [28]. They are more abundant in purple fleshed sweet potato than in the other colors varieties [27]. Other important chemical compositions of sweet potato include starch, protein, vitamins, minerals and dietary fibre. The dietary fibre; hemicellulose and cellulose are also vital components of sweet potato due to its protectant abilities against colon cancers and vascular diseases [13]. Vitamin A is abundant in orange fleshed sweet potato and hence an appropriate food source to address vitamin A deficiency [29]. High content of vitamin B6 in the root tubers help in reducing the blood levels of homocysteine, an amino acid which has been implicated as a risk factor in cardiovascular diseases [30].

MEDICINAL POTENTIALS OF SWEET POTATO

Many studies have reported different medicinal potentials of sweet potato. These properties have been attributed to either a single or combined effect of the phytochemicals present in the plant. In traditional medicine, sweet potato has been used to treat many diseases such as oral infections, inflammatory diseases [31] and also in the management of diabetic conditions [32]. In recent times, pharmacological potential of sweet potato has been investigated and demonstrated by different *in vitro*, animal models and a few human studies.

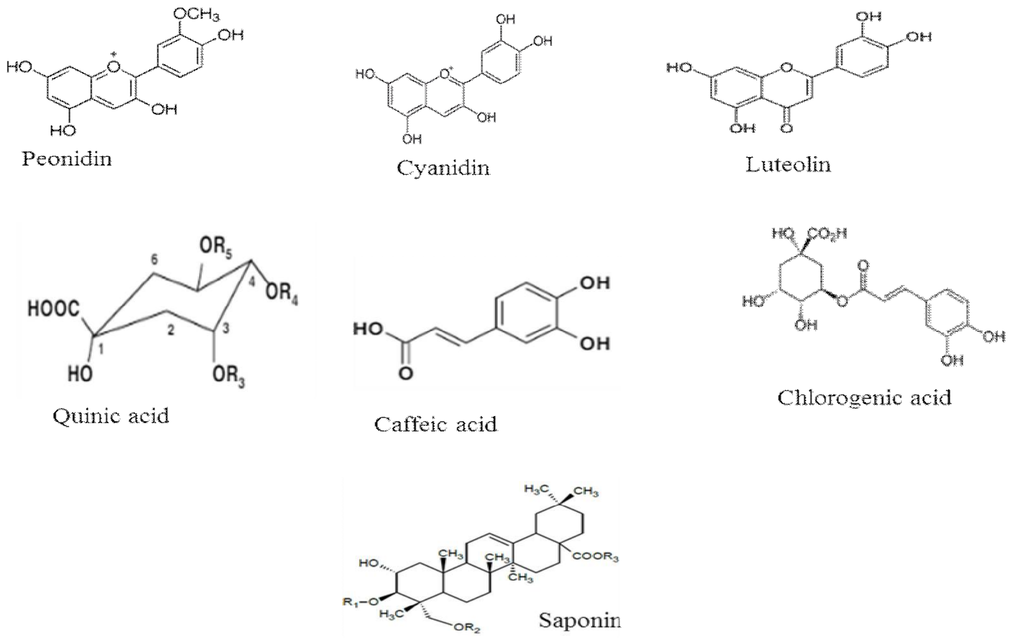

Figure 1: Some common phytochemicals in sweet Potato

Anti-oxidant activities

Phytochemicals such as flavonoids and related phenolic compounds which are generally present in sweet potatoes have been reported to have multiple biological effects, such as antioxidant activity. Purple-fleshed variety has been reported to contain anthocyanins, which possess antioxidant activity [15]. Antioxidants act as scavengers of free radicals reactive oxygen species inside the cell [33]. Many evidences suggest that degenerative diseases such as cancer, asthma, diabetes, senile dementia and eye disease have their origin in deleterious free radical reactions [34].

The free radical scavenging activity of extracts from the leaves of 8 cultivars of sweet potato was confirmed using 1, 1-diphenyl-2-picrylhydrazyl (DPPH) assay. The antioxidant activity of the leaves' extract correlated with the total polyphenol content [35]. Fidrianny *et al* [36] concluded from their study that n-hexane, ethylacetate and ethanol extracts of leaves from different cultivars of sweet potato showed free radicals scavenging activity. In the root tubers of sweet potato, antioxidant activity has also been demonstrated in different cultivars [37,38]. A stronger antioxidant activity was reported in the peels of white and purple varieties when compared to the flesh samples [39], showing that the skin of sweet potato root tubers are also rich source of anti-oxidative phytochemicals.

Anti-diabetic effect

There are studies that have suggested that sweet potato has the potential of lowering the blood glucose level. In some animal and human studies, different forms of sweet potato have been reported to help in maintaining blood sugar levels and lowering insulin resistance. 'Caiapo' is a dietary supplement and a crude extract of white skinned sweet potato which has been sold and consumed for a long time in Japan as a remedy for diabetes [40]. 'White star' a sweet potato cultivar indigenous to Pakistan and 'Beauregard' which is indigenous to the United States lowers glucose blood level in diabetic patients [41]. The leaf extract of sweet potato reduces significantly the level of blood glucose and hepatic enzymes activities in Alloxan-induced diabetic rats [42]. This agrees with the result of a recent study by Pal *et al* who reported that the aqueous extract of the leaves of sweet potato shows significant improvement in the blood glucose profile of diabetic rats [43].

The blood glucose lowering effect of white skinned sweet potato in type 2 diabetic patients has been linked to an increase in blood levels of adiponectin; an adipocyte hormone that serves as an important modifier of insulin metabolism [44]. Patients with poorly-regulated insulin metabolism and insulin insensitivity tend to have lower levels of adiponectin, and individuals with healthier insulin metabolism tend to have higher levels [45]. Generally, the anti-diabetic property of sweet potato has been attributed to its phytochemical content, Zhao *et al* [46] isolated flavone from the leaves of sweet potato and evaluated its effects on different markers of diabetes, there was a significant decrease in the fasting plasma insulin and blood glucose level and significant increase in the insulin sensitive index in non-insulin dependent diabetic rats.

Anti-cancer potential

Extracts from different parts of sweet potato have also been reported to exhibit anticancer and antitumor properties. Sweet potato extract inhibits proliferation and induces apoptosis in prostate cancer cells *in vivo* and *in vitro* [47], this anticancer activity was attributed to the high polyphenol content of the extract. Similarly in a very recent study, purple fleshed sweet potato extract was found to have inhibitory effect on the growth of MCF-7 (breast cancer) and SNU-1 (gastric cancer) cancer cell lines [48]. The therapeutic potential of purple fleshed sweet potato has mostly been attributed to its high anthocyanin content. Anthocyanins or anthocyanin-rich extracts have displayed inhibitory effect on cancer cell growth in various cancer cells [49]. A group of researchers also reported that purified protein from the storage root of sweet potato promotes dose- and time-dependent inhibition of human colorectal cancer SW480 cell proliferation, migration and invasion [50].

Anti-ulcer potential

Ulcer is characterized by the shedding of inflamed tissue from the skin or mucous membrane [51]. Methanol extract of sweet potato roots showed gastroprotective activity against aspirin-induced ulcer in Wistar rats in a dose dependent manner [52]. The flour of sweet potato roots potentially prevented ethanol-induced gastric ulceration by suppressing edema formation and partly protecting gastric mucosa wrinkles [53]. In another *in vivo* study, ethanolic extract of sweet potato roots shows antacid-like action against a pylorus ligation and cold restraint stress induced ulcer in animal models [54].

Effect on cardiovascular system

The oxidation of low-density lipoprotein can cause complications which can result into atherosclerosis leading to cardiovascular disease [55]. Sweet potato leaf extract was able to suppress low density lipoprotein oxidation *in vitro* and in human subjects, this suppression was attributed to the antioxidant activity of phytochemicals present in the leaves [35]. Anthocyanin which is an abundant phytochemical in purple fleshed sweet potato has been reported to be able to reduce the risk of coronary disease [55].

Effect on immune system

Sweet potato extracts have also been reported to have modulatory effects on the immune system and health. Ethyl acetate fractions of bioactives extracted from two different cultivars of sweet potato exhibited immunomodulatory activities in a cultivar dependent manner in mice splenocytes [56]. Hanieh *et al* [57] reported that dietary supplementation of purple sweet potato improved immune response after immunization in chickens. Similarly, the consumption of purple sweet potato leaves was able to modulate T-lymphocyte functions, lytic activity of natural killer cell and antibody production in a study involving 16 healthy human adults [58]. Reports of immunomodulatory studies on sweet potato are mostly on purple skinned potato cultivars.

It has been postulated that extracts from purple sweet potato improve immune dysfunction possibly by modulating antioxidant defense systems [59]. A dietary supplement with purple sweet potato extract increased the activity of the antioxidant enzymes, superoxide dismutase and glutathione peroxidase in in LP-BM5 murine leukemia virus-induced murine acquired immune deficiency syndrome [59]. The cooked leaves of sweet potato leaves also showed immunomodulatory effect when consumed by basketball players during a training period. The plasma concentration of polyphenols in the players increased significantly during this period coupled with a significant increase in the cytotoxic activity of nature killer cells, and secretion of interferon (IFN)-γ [60].

Antimicrobial effects

Although reports of the antimicrobial activities of sweet potato root are limited, antimicrobial activity of the leaves has been reported in a number of studies. Adsul *et al* [61] reported that acetone and ethanol extracts of sweet potato leaves showed antimicrobial activity against *Salmonella typhimurium* and *Pseudomonas aeruginosa* respectively, while n-hexane and ethyl acetate extracts do not show any antimicrobial activity against the said strains. Mbaeyi-nwa and Emejulu tested the antimicrobial activity of peptone, water and ethanol extracts of sweet potato leaves against *E. coli, S. typhi, S. aureus, A. niger, Penicillium* spp., *P. aeroginosa* and *K. pneumonia*. They reported that the water extract exhibited high antimicrobial activity by inhibiting the growth of all the organisms except *E. coli* and *Penicillium* spp at different concentrations of the extracts [62]. Dietary fibre from the root of sweet potato also showed inhibitory effect against the growth of food-borne bacteria [63] while antimicrobial film made with sweet potato starch incorporated with varying levels of potassium sorbate or chitosan exhibited inhibitory effects on *E. coli* [64].

Anti-inflammatory potential

The potential of purple sweet potato extract to inhibit inflammatory brain diseases by suppressing lipopolysacharide (LPS) induced inflammatory responses have been demonstrated by a number of studies, pretreatment with purple sweet potato extract was able to inhibit the production of pro-inflammatory molecules in LPS activated BV-2 microglial cells [65]. Purple sweet potato colour extract was able to suppress the proinflammatory molecules by inhibition of phosphorylated extracellular signal-regulated kinase (ERK), phosphorylated c-Jun nterminal kinase (JNK) expression and nuclear factor kappa B (NF-kB) activation in a group of LPS- stimulated mice [66].

Haematological effects

Sweet potato leaf is used in traditional medicine as a remedy for anaemia due to it haematinic effects [67]. In a recent study by Montejo *et al*, sweet potato leaves powder diet increased the packed cell volume, haemoglobin levels and red blood cells in mice [68]. Similarly, an earlier study reported a significant increase in packed cell volume, white blood cells and platelets of rabbit fed with sweet potato extract [67].

VARIATION IN CHEMICAL COMPOSITION AND BIOACTIVITY OF SWEET POTATO CULTIVARS

The level and activity phytochemicals in plants have been confirmed by various studies to often vary among cultivars of the same species. Different cultivars of the same plant species adapt very differently to their environment, even though they are native of the same environment. These variations in adaptation may consequently affect the nutritional status and also the level of phytochemicals of closely related genotypes of a species [69]. For instance, a number of experiments have shown that although most pomegranate varieties have similar composition of phytochemicals, the level or amount of the phytochemicals may depend on the cultivar [70, 71]. Also in guava, the antioxidant activity and phytochemical composition of *P. guajava* vary significantly depending on to cultivar and pulp color [6].

In sweet potato, variation in phytochemical composition and bioactivities in selected cultivars have also been reported by a number of studies [41,15,38]. The caffeic acid content differs significantly across 24 cultivars of sweet potato [72] while the total and individual phenolic acid among 6 sweet potato cultivars investigated by Padda and Picha [73] vary significantly across the cultivars. A recent comparative study by Shekar *et al* of orange and white fleshed sweet potato revealed increased levels of protein, flavonoids, anthocyanins and carotenoids in orange fleshed sweet potato than in white fleshed sweet potato [7]. They also reported that although differential proteomic analysis indicated several spots common to both cultivars, certain spots were peculiar to either the orange fleshed or the white fleshed sweet potato.

Similarly in the analysis of 4 different (purple, red, yellow and white) sweet potato cultivars, the highest antioxidant activity was recorded in the purple variety while other parameters investigated vary significantly across the different cultivars [38]. Studies have indicated that the antioxidant activity in purple fleshed sweet potato is relatively higher than other varieties of sweet potato [73,74,]. Different cultivars of sweet potato with varying flesh colors also exhibited varying antimicrobial activities. 'White star' a Pakistani cultivar of sweet potato showed better anti-diabetic potential than 'Beuragard' a US cultivar as shown from the postprandial glucose level and insulin response in diabetic patients [41]. Although most reports of the anti-hyperglycemic potential of sweet potato leaves do not specify the variety of the plant used, the antidiabetic activities of sweet potato tuber has mostly been associated with the white skinned variety [75,40]. In general, the orange varieties have high beta-carotene content and the ability to combat vitamin A deficiency. The reports of anti-inflammatory and immunomodulatory activities are mostly associated with the purple fleshed sweet potato variety (Table 2). As in other plants, proper analysis and selection of cultivars with the optimal and desired phytochemical compositions would remain crucial to exploring the medicinal/therapeutic potential of sweet potato.

WHAT NEXT?

A major challenge in the investigation of medicinal plants is the need to identify the chemical nature of bioactive compounds responsible for the overall biological activity exhibited by the plant [79]. Even though some studies have made use of specific bio-actives such as anthocyanin from sweet potato, most

Table 2: Reports of pharmacological activities of sweet potato

Investigation	Cultivar colour description	Form of sweet potato used	Type of study/subject	Results
Antidiabetic activity of flavone extracted from the leaves leaf[46]	N/S	Flavone extracted from the leaf	Non-insulin dependent diabetic rats	Modulate the metabolism and lowers blood glucose level
Antioxidant activities[16]	Cream, white, orange ,yellow and purple	Hydrophilic and lipophilic fractions of Hexane extract of root tubers	*In vitro* assays	Highest antioxidant activity recorded in purple fleshed and the lowest in white fleshed varieties
Immunomodulatory effects after immunization in chickens [57]	Purple	Sweet potato powder as dietary supplementation	Chickens	Immune response of chicken after immunization was improved
Wound healing and antiulcer properties[51]	White	Tuber flour	Wistar rats	Shows wound healing potential
Effects on level of blood glucose and Hepatic Enzymes [42]	N/S	Aqueous extract of leaf powder	Mice	Lowers blood glucose, reduces the activity of hepatic enzymes
Antihyperglycemic and antidyslipidemic potential [43]	N/S	ethanolic, ethanolic: aqueous and aqueous extracts of leaves	Mice	Improvement in blood glucose profile
Antidiabetic efficacy and hypoglycemic mechanisms[75]	White	Aqueous extract of the whole tuber	Streptozotocin induced- diabetic rats	Increase in serum insulin level and reduced fasting plasma glucose
Anti-Inflammatory and Anticancer activities [48]	Purple	Crude anthocyanin extracts	*In vitro*, cancer cell lines	Inhibit the growth of cancer cells and proinflammatory cytokines
Characterization, antioxidant and antitumor activities [76]	Purple	Three polysaccharides extract	Cell line	Inhibit the growth of tumour cells
Immunomodulatory and antioxidant effects on induced murine acquired immune deficiency syndrome [59]	Purple	Aqueous and ethanol extract of root tubers	Mice	Show potential to improve immune dysfunction by modulating antioxidant defense systems.
Effect on apoptosis and Inflammatory Adipokine Expression [77]	Purple	Hot water extract of the leaves	3T3-L1 cell line	Induced apoptosis and downregulated inflammation-associated genes
Antifungal activities of Anthocyanins from Sweet Potato [78]	Purple	Anthocyanin extract with preservatives	*In vitro* assay	Enhance antifungal activity

N/S - not specified in the study

researches on sweet potato have focused on the pharmacological screening of the flour or crude extract of both leaves and the root tubers. Further studies looking at isolation and characterization of bioactive compounds should be an important follow up step to pharmacological screenings in sweet potato.

Finally, the impact of dietary intake of the different cultivars of sweet potato as a whole food on disease indicators such as oxidative stress in humans over an extensive period needs to be evaluated time can be investigated. A positive result can actually encourage consumers to embrace sweet potato as a disease preventing food crop especially in areas where it is readily available. Incorporation of the nutritionally rich cultivars of sweet potato into the daily diet might on a long term prevent the incidence of chronic diseases.

CONCLUSION

Sweet potato is a global food crop that can be explored for its nutritional and medicinal value. This review highlights the important biological activities of sweet potato which are highly influenced by cultivar type. Cultivation of sweet potato genotypes with superior health-promoting and medicinal properties can decrease the need for transgenic modifications. Cultivars with high biological activities can be used to develop high nutraceutical value products or provide the platform for the identification and isolation of certain bioactive constituents which may serve as a starting or model molecule for the production of semi or novel synthetic drugs. Knowledge of the general pharmacological activities of sweet potato and the peculiar bioactivities of the different cultivars will facilitate optimal exploration of the medicinal value of sweet potato. Most of the studies that were reviewed were carried out *in vitro*, more *in vivo* studies involving humans, clinical studies should be set up to validate the potential use of sweet potato in combating degenerative diseases. In depth toxicological studies should be carried out to determine the safety of bioactive constituents of sweet potato extract. This will strengthen the interest of research in exploring the medicinal worth of sweet potato beyond its food resource value.

DECLARATIONS

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Conflict of Interest

No conflict of interest associated with this work.

Contribution of Authors

The authors declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by them.

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