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# Phytochemical Screening and Antioxidant Activities of Purple and White Skinned Sweet Potato *(Ipomea Batatas)*

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## Abstract

The purpose of this study was to isolate the phytoconstituents of purple and white skinned sweet potato (*Ipomea Batatas*).The extracts from the four different samples of *Ipomea batatas* exhibit saponins, steroids, flavonoids. Alkaloids and cardiac glycosides. The extracts from the sweet potato samples in tannic acid equivalent showed higher activities at 30.55356 mg/g for white cooked sample, 30.38581 mg/g for purple cooked, 19.6022 mg/g for purple raw and 12.14953 mg/g for white raw. It could be concluded that the food sample contain an array of essential nutrients as well as phytochemicals which make them possess antioxidant function as well as other bioactivity.

**Keywords:** *Ipomea batatas*, saponins, steroids, flavonoids, alkaloids, cardiac glycosides, tannic acid equivalent, essential nutrients, phytochemicals, antioxidant and bioactivity.

## Introduction

*Ipomoea batatas* belongs to the convolvulaceae family. Sweet potato is the common name for Ipomea batatas. Sweet potato originated from tropical America. It is one the most important crops in the world not only because of its considerable amount of nutrient, but also phytochemicals in its root and leaves. Also, it has its advantages of high yielding, drought tolerance, and wide adaptability to various climate and farming systems over the world. Thus it has been widely used for food and industrial application [1].

Sweet potato's tubers contain nutritional materials in include carbohydrates (starches and simple sugars), protein, fat and fat soluble vitamins and significant amounts of carotenes [2, 3]. It has been discovered that sweet potato's tubers have anti-diabetic, anti-oxidant and anti-proliferative

properties due to the presence of valuable nutritional and mineral components [4, 5].Because they have a low glycemic index Furthermore, Ipomoea batatas tubers, which are steady item in the Americans' diet, appear to be very beneficial in the diet of diabetics and consumers with an insulin resistance [6, 2].

Recent research has shown that when sweet potato is passing through the digestive tract, the potato cyanidins and peonidins and other color-related phytonutrients may be able to lower the potential health risk posed by heavy metals and oxygen radicals. That risk reduction is important not only for individuals at risk of digestive tract problems like irritable bowel syndrome or ulcerative colitis but for all persons wanting to reduce the potential risk posed by heavy metal residues (like mercury or cadmium or arsenic) in their diet [7].

This study adds to the fundamental scientific knowledge through phytochemical screening and quantification of antioxidant activities of purple and white skinned *Ipomea batatas.*

## Materials and Methods

### Collection and Preparation of Plant Materials

White and purple skin sweet potato (*Ipomoea batatas*) were obtain ned from the King's market and FUTA South gate, Akure, Ondo State, Nigeria respectively and the authentication of the samples was carried out at the department of crop soil and pest management (CSP), Federal university of technology, Akure, Ondo State, Nigeria. The chemicals used were analar grades while the water was glass distilled. The equipments were the one in use in related departments where each phase of the experiments was carried out.

### Sample Treatment and Preparation

Two varieties of sweet potato (white fleshed, purple fleshed) were washed thoroughly with clean water, peeled and sliced into small pieces. Steaming at 100$^{o}$C was done for 15 min to prevent subsequent browning and then sun-dried for about 3-6 weeks. The dried samples were blended into powder separately, the two blends were then stored in a re-sealable bag and labelled before use.

### Preparation of Extract

5 grams of the different proportions of purple and white skinned sweet potato blends was mixed with 80ml methanol and kept overnight. The suspension was filtered and the filtrate was made up to 100ml with methanol. Sample solutions were stored in a refrigerator at low temperature in amber bottles and served as the stock solution for subsequent analyses.

### Preliminary Phytochemical Analysis

The preliminary phytochemical analysis of the crude extract of the potato was carried out using standard procedures as described by Trease and Evans with slight modification [8].

## Result and Discussion

The preliminary phytochemical screening of the purple and white skinned sweet potato is summarized in Table 1.

The result shows the presence of saponins, steroids, flavonoids, alkaloids and cardiac glycosides in all the samples. Terpenoid is absent in the white raw and purple cooked samples while Phlobatamins is absent in all the samples.

Phytochemicals also work with dietary fibre to protect against diseases by helping to slow down the aging process and reduce risk of many diseases, including cancer, heart disease, stroke, high blood pressure, cataracts, urinary tract infections and osteoporosis [9]. Research has demonstrated that nutrition plays a crucial role in the prevention of chronic diseases, as most of the existing chronic diseases can be related to diet.

**Table 1.Phytochemical screening of the purple and white skinned sweet potato**

| Samples | Alka | Flav | KKT | Sal | Phl | Sap | Ste | Tan | Ter |
|---|---|---|---|---|---|---|---|---|---|
| WC | + | + | + | + | _ | + | + | + + | + |
| WR | + | + | + | + | _ | + | + | + + | _ |
| PC | + | + | + | + | _ | + | + | + | _ |
| PR | + | + | + | + | _ | + | + | + + | + |

[Alka = Alkaloids, Flav = Flavonoids, KKT = Keller-Killani test, Sal = Salkwoski, Phl = Phlobatamins, Sap = Saponins, Ste = Steroids, Tan = Tannins, Ter = Terpenoids]
[WC = White cooked, WR = White raw, PC = Purple cooked, PR = Purple raw]
[+ = Present, - = Absent, + + = Highly positive]

Saponins are important therapeutically as they are shown to have hypolipidemic and anticancer activity. Saponins are also necessary for activity of cardiac glycosides. Steroidal saponins are used in the commercial production of sex hormones for clinical use [10].

Steroids (anabolic steroids) have been observed to promote nitrogen retention in osteoporosis and in animals with wasting illness [11, 12].

Flavonoids are important group of polyphenols widely distributed among the plant flora. The pharmacological effects of flavonoids include CNS activity, cardiotonic, lipid lowering, antimicrobial and antiulcer and numerous reports support their use as antioxidants or free radical scavengers [13].

Alkaloids have pharmacological applications as an esthetics, antitumor, antihypertensive, CNS stimulants and often used as medications and recreational drugs [14].

Cardiac glycosides are one of the most naturally occurring plant phytoconstituents that have found therapeutic applications as arrow poisons or cardiac drugs [15].

Terpenoids are among the most widespread and chemically diverse groups of natural products. They are flammable unsaturated hydrocarbons, existing in liquid form commonly found in

essential oils, resins or oleoresins [15]. They have anti-inflammatory, sedative, insecticidal or cytotoxic activity [16].

The result of the total phenol (mg/100g) of raw and cooked purple and white skinned sweet potato sample extracts in tannic acid equivalent (Figure 1) showed higher activities at 30.55356 mg/g for white cooked sample, 30.38581 mg/g for purple cooked, 19.6022 mg/g for purple raw and 12.14953 mg/g for white raw.

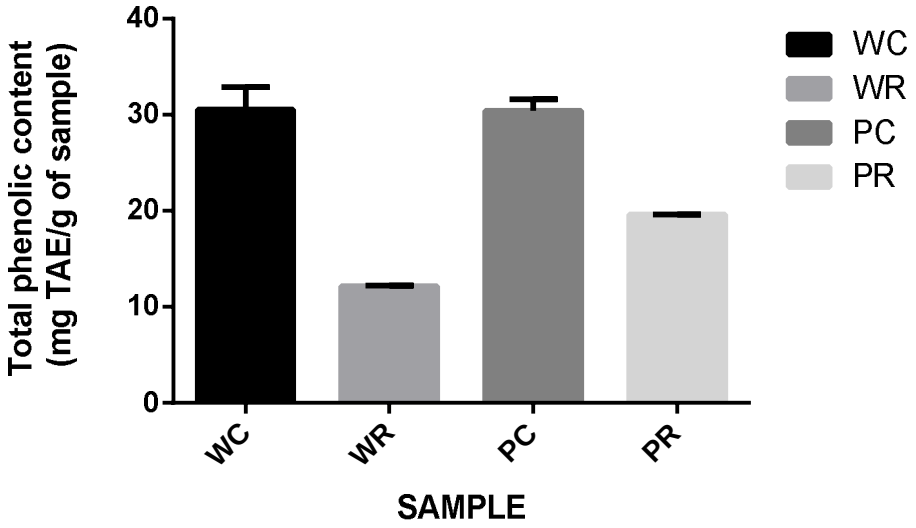


**Figure 1.Total phenolic content of cooked and raw purple and white skinned sweet potato**

## Conclusion

The phytochemical screening and antioxidant analysis of the various sample of sweet potato is indicative of the fact that the food samples contain an array of essential nutrients as well as phytochemicals which make them possess antioxidant function as well as other bioactivity. These compounds contribute to the health benefits associated sweet potato. This can be beneficial in promoting good health as well as reducing the risk of various diseases.

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