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**ASCORBIC ACID, TOTAL POLYOHENOLS AND
ANTIOXIDANT ACTIVITY OF *FICUS CARICA* FRUITS**

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Introduction

- Figs are the fruit of the *figus* tree, which is part of the mulberry family (*Moraceae*), and are commonly known as “*Borai*” in Hausa speaking language.
- In Nigeria it is commonly found in Northern states of Sokoto, Kebbi, Zamfara, Katsina, Kano, and Jigawa.
- Large number of *Ficus carica* are being used as food and for medicinal properties especially amongst people where these species grow.
- In Nigeria the fruits are orally taken by local peoples for treatment of stomach ulcer, and skin related diseases.



Objectives

The aim of this research is to study the medicinal potential of *Ficus carica* fruits as supplement to therapeutic agents against some diseases. The objectives of which are to:

- determine the total polyphenols,
- determine the ascorbic acid (vitamin C) content,
- determine the tocopherols (vitamin E) content,
- determine the flavonoids, antioxidant activity and DPPH free radical scavenging activity.

Methodology

Fresh fruits of *Ficus carica* were collected from Kalambaina area, Wamakko Local government area, Sokoto State, Nigeria. Five (5) trees were randomly selected and only ripped fruits were collected from different branches of the trees, as described by Hassan and Umar (2004). The sample was collected in black polythene bags and transported to laboratory.

The dried pulp was removed and crushed into powder with the help of pestle and mortar. Fifty grams (50g) of the powdered pulp were then soaked into 500cm³ methanol and allowed to stand for four days at 4⁰C. The extract was centrifuged at 1000rpm for 5minutes, filtered and then concentrated to dryness using rotary evaporator. The percentage extract was calculated using equation 1.

$$\% \text{ Extract} = \frac{\text{Weight of extract}}{\text{Sample weight}} \times 100 \dots \dots \dots (1)$$

Experimental settings

- Sampling and Sample treatment was carried out according to Hassan and Umar (2004); (Alan, 1996).
- Preparation of the extract according to (Motlhanka *et al.*, 2012).
- The total polyphenol was determined using modified Folin-Ciocalteu colorimetric method (Singleton *et al.*, 1999).
- The method reported by Olajire and Azeez (2011) was used to determine the vitamin C contents.
- The method reported by Maciej (2007) was adopted for determination of Vitamin E.
- The method reported by Kim *et al.* (2003) was adopted for determination of flavonoids.
- The total antioxidant capacity of the extract was determined by adopting the method reported by Pan *et al.* (2007).
- The free radical scavenging activity of the extract was assessed by decolorization of methanolic solution of 2,2-diphenyl-1-picrylhydrazyl (DPPH) according to Oliveira *et al.* (2009, 2011).

Results and Discussion

Parameter	Concentration
Yield	$8.24 \pm 1.45\%$
Total polyphenols	$384 \pm 3.11\text{mgGAE}/100\text{g}$
Total Flavonoids	$21.63 \pm 1.89\text{mgQE}/100\text{g}$
Ascorbic acid (Vitamin C)	$37.00 \pm 1.59\text{mg}/100\text{g}$
Tocopherols (Vitamin E)	$0.7 \pm 0.1\text{mg}/100\text{g}$
DPPH scavenging activity	$66.82 \pm 7.80\%$
Antioxidant activity	$560.25 \pm 2.89\%$

Results and Discussion

- **The Percentage Yield**

The percentage yield of the extract was $8.24 \pm 1.45/100\text{g}$ of the fruit pulp which is an indication that the fruits contain some important nutritional or medicinal phytochemicals.

- **Total Polyphenols**

In food, polyphenols contribute to the bitterness, astringency, color, flavor, odor and oxidative stability. Studies suggested that long term consumption of diets rich in plant polyphenols offered some protection against development of cancers, cardiovascular diseases, diabetes, osteoporosis and neurodegenerative diseases (Kanti and Syed, 2009).

Results and Discussion

- **Total Flavonoids**

The result obtained indicates that *Ficus specie* fruits are important sources of flavonoids which are responsible for the attractive colors of flowers, fruits and leaves and also possess biological activities such as ant-inflammatory, anti-carcinogenic and antiatherosclerotic activities (Olajire and Azeez, 2011).

Ascorbic acid (Vitamin C)

The vitamin plays an important role in activating the immune response, wound healing, osteogenesis, detoxification, iron absorption, collagen biosynthesis, preventing the clotting of blood vessels and in many other metabolic processes (Tomita *et al.*, 2005).

Results and Discussion

- **Tocopherols (Vitamin E)**

The vitamin E contents of the fruits indicate that *Ficus specie* fruits can contribute to inhibition of lipid peroxidation, membrane stability, fluidity and permeability and to protect the photosystem II from oxidative damage by scavenging lipid peroxy radicals and singlet oxygen (Assunta *et al.*, 2015).

DPPH scavenging and Antioxidant activities

The antioxidant activity of the fruit extract ($560.25 \pm 2.89\%$) is probably due to its phenolic contents. It is a well-known fact that phenolic compounds are constituents of many plants, and they have attracted a great deal of public and scientific interest because of their health promoting effects as antioxidants (Hollman and Katan, 1999).

Conclusions & Recommendations

- The study provides information about phenolic composition, flavonoids content, antioxidant capacity, ascorbic acid and tocopherol content.
- The results obtained indicated that the fruits if properly utilized can be a potential source of dietary Polyphenols, flavonoids, ascorbic acids, and tocopherols which are important antioxidants and therefore their consumption should be stimulated.
- The plant is gradually going into extinction, making it quite rare to find in our environment. Therefore, there is need to encourage its domestication through government agencies there by making information on its nutritional and medicinal value available.

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