

# Phytochemical Composition of the Leaves of Aerial Yam (*Dioscorea bulbifera* L.)

Success Eni Kalu<sup>1</sup>, Aniefiok Ndubuisi Osuagwu<sup>2</sup>, Reagan Bisong Agbor<sup>2</sup>

<sup>1</sup>Department of Biological Sciences, Clifford University, Owerrinta

<sup>2</sup> Department of Genetics and Biotechnology, University of Calabar, Calabar

DOI: 10.29322/IJSRP.9.02.2019.p8633

<http://dx.doi.org/10.29322/IJSRP.9.02.2019.p8633>

**Abstract-** A large population of the world today depend on plant and plant resources food and as remedy for health challenges and wellbeing. Plants naturally contain in them phytochemicals which prevent and protect them against infections and diseases and these phytochemicals have been reported very useful for human's health and wellbeing. They are extracted from plants and used as lifesaving drugs for several disorders.

Aerial yam (*Dioscorea bulbifera*) is an indigenous plant grown by few for food. It grows very rapidly and can adapt to different environmental conditions. It is used traditionally to treat ailments like diarrhea, dysentery, and cholera (Cobley, 1962). Information also has it that it is used by rural diabetes patients.

The phytochemical composition of the aerial yam was determined. The plant bulbils was collected from local farmers in Ohafia Local Government Area of Abia State and planted in a green house. Leaves samples were collected and phytochemical screening carried out. The result revealed that , out of the ten (10) phytochemicals screened for which included alkaloids, glycosides, saponins, tannins, flavonoids, reducing compounds, polyphenol, phlobatannins, anthraquinones and hydroxymethyl anthraquinones, only plobatannins, anthraquinone and hydroxymethyl anthraquinone were absent.

*Dioscorea bulbifera* which is almost going to an extinct in the Niger-Delta region of Nigeria should be cultivated to prevent its extinction. The plant does not just provide energy food but also rich in phytochemicals which can be used for human wellbeing.

**Index Terms-** aerial yam (*Dioscorea bulbifera*), composition, phytochemicals

## I. INTRODUCTION

Plants are vital for human health and wellbeing. More than 80% of the world's population today relies on plant as herbal remedy for the various ailment and health challenges (WHO), and plants used as remedy for the various health challenges contain in them bioactive compounds called phytochemicals. Phytochemicals occur naturally in leaves, roots and stems of plants where their function is to help the plants fight against foreign bodies thereby preventing and protecting them from various diseases. Likewise, in human, they bring about defence mechanism that prevent and protect them from various diseases. Phytochemicals consists of primary and secondary constituents. The primary constituents include chlorophyll, proteins, sugars and amino acids while the secondary constituents include alkaloids,

flavonoids, phlobatannins etc. (Krishnaiah *et al.*, 2007). The secondary constituents have been reported useful for human's health and wellbeing. For instance, alkaloids are used as anaesthetic. They act as lifesaving drugs in some serious disorders like heart failure, cancer, malaria and diabetes (Gilbert, 2017). Flavonoids possess many useful properties including anti-microbial, anti -allergic, anti -tumour and anti-inflammatory activities (Mohammad and Elham, 2013). Tannins serves as a coagulant aid (Ozacar and Sengil, 2002), acts as an anti-oxidant and anti-fungal activities (Nouioua Wafa *et al.*, 2016).

Aerial yam (*Dioscorea bulbifera*) is cultivated for its cheap source of carbohydrate by a few local farmers especially females in the Niger Delta region of Nigeria. It grows quickly and has the ability to adapt to different environmental conditions (Osuagwu *et al.*, 2013). It has been used traditionally to treat ailments like diarrhea cholera and dysentery (Cobley, 1962). Information from the rural dwellers has it that, it is quite useful for diabetes patients. This study therefore aim at determining the phytochemical constituents (secondary) of the leaves of *Dioscorea bulbifera*.

## II. MATERIALS AND METHODS

### Collection of *Dioscorea bulbifera* bulbils and planting

The bulbils of *Dioscorea bulbifera* was collected from local farmers in Ohafia Local Government Area of Abia State and planted in poly bags filled with a known weight of dry loamy soil. The bags were placed in a greenhouse and watered everyday with 250ml of distilled water till sprouting and emergence. After emergence, the plants were watered weekly till fully grown and leaves sample collected.

### Sample preparation

The leaves of the plant collected were washed with water to remove debris and air dried at room temperature. The dried leaves samples were ground into powder using mortar and pistil.

### Preparation of the extracts

10g of the powdered sample was transferred into a conical flask and 100ml of distilled water was added and left for 24 hours, after which, it was filtered to have the aqueous extract. The same procedure was repeated but with ethanol to have the ethanol extract. These were properly labelled.

### Screening for phytochemicals

The aqueous and ethanol extracts were used respectively to carry out the phytochemical screening using standard procedures as describe by Sofowara (1993). The phytochemicals screened for included flavonoids, polyphenols, Anthraquinones. Tannins,

alkaloids, saponins, glycosides, reducing compounds, phlobatannin and hydroxymethyl anthraquinone.

### III. RESULT

The result for the screening of the phytochemicals constituents of the leaves of *Dioscorea bulbifera* is shown in the table 1 below. The result reveals that the leaves of the plant contained the following phytochemicals screened for:

1. Alkaloids
2. Glycosides
3. Saponins
4. Tannins
5. Flavonoids
6. Reducing compounds
7. Polyphenols

**Table 1 Phytochemical screening of the leaves of *Dioscorea bulbifera***

S/n	Chemical constituents	Ethanol extract	Aqueous extract
1.	Alkaloids	++	+
2.	Glycosides	+	++
3.	Saponins	+	++
4.	Tannins	++	+
5.	Flavonoids	+	++
6.	Reducing compounds	++	++
7.	Polyphenols	+++	+++
8.	Phlobatannins	-	-
9.	Anthraquinones	-	-
10.	Hydroxymethyl Anthraquinones	-	-

+	Present
++	Present in excess
+++	Present in much excess
-	Absent

### IV. DISCUSSION

It is evident from the result that the leaves of *Dioscorea bulbifera* are rich in various phytochemicals. Alkaloids and saponins reported common phytochemicals in the leaves of plants (Kavit et al., 2013) were shown present among others in the plant. These phytochemicals have been reported to exhibit unique properties in plants as well as in human health and wellbeing. For instance, alkaloids acts as lifesaving drugs in disorder like malaria, diabetes etc. (Gilbert, 2017).

The presence of these phytochemicals in *Dioscorea bulbifera* could account for its ability to adapt to various

environmental conditions. This plant could be used by pharmaceuticals for the extraction of the various phytochemicals for drugs for the various ailment and even in industries. This then calls for its cultivation to avoid extinct as it could be quite useful both for food especially in this era of climate change and for other purposes.

### V. CONCLUSION

*Dioscorea bulbifera* have the potential of providing food security in this era of climate change shown by its rapid growth and ability to adapt to different environmental condition. It is rich in phytochemicals and could be used by the pharmaceutical sector. Its cultivation should be encouraged.

### REFERENCES

- [1] Cobley, L. S. (1962). An Introduction to the Botany of Tropical Crops. Longman, London
- [2] King- Thom Chung; Tit Yee Wong; Cheng-I Wei; Yao-wen Hclang; Yuan Lin (1998). Tannins and Human Health: A Review. *Critical Reviews in Food Science and Nutrition*. 38(6): 421-464
- [3] Krishnaiah, O; Sarbatly, R; Bono, A. (2007). Phytochemical anti-oxidants for health and medicine: A move towards nature. *Biotechnology Molecular Biology Review*. 1:97 – 104
- [4] Mohammad Asif and Elham Khodadadi @013). Medicinal uses and chemistry of flavonoid contents of some common edible plants. *Journal of paramedical Sciences*. 4(3): 119 – 138
- [5] Nouioua Wafa; Gaamoune Sofiane ; Kaabache Mouhamed (2016). The anti-oxidant and anti-microbial activities of flavonoids and tannins extracted from *Phlomis bovei* De Noe. *European Journal of Experimental Biology*. 6(3): 55- 61
- [6] Osuagwu, A. N; Okigbo, A. U; Ekpo, I. A; Chukwurah, P.N; Agbor, R. B (2013). Effect of crude oil pollution on growth parameters chlorophyll content and bulbils yield in Air potatoe (*Dioscorea bulbifera* L.) *International Journal of Applied Science and Technology*. 3(4): 37 -42
- [7] Ozacar, M and Sengil, I. A. (2002). The use of Tannins from Turkish Acorns (*Valonia*) in water treatment as a coagulant and coagulant aid. *Turkish Journal of Engineering and Environmental Sciences*. 255 -263
- [8] Sofowara, A. (1993). Medicinal plants and Traditional Medicine in Africa. Spectrum Books Limited, Ibadan, Nigeria

### AUTHORS

**First Author** – Success Eni Kalu, Department of Biological Sciences, Clifford University, Owerri, Email:

kalusuccess121@yahoo.com Phone no: 08039311320

**Second Author** – Aniefiok Ndubuisi Osuagwu, Department of Genetics and Biotechnology, University of Calabar, Calabar

**Third Author** – Reagan Bisong Agbor, Department of Genetics and Biotechnology, University of Calabar, Calabar