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Chemical Profile of an Anti-malarial Concoction "Udu" used in Umunchi Autonomous Community in Isiala Mbano L.G.A of Imo State, Nigeria

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Abstract
The chemical profile of "Udu", an anti-malarial concoction used in Umunchi autonomous community in Isiala Mbano L.G.A of Imo State, Nigeria was investigated. Results obtained revealed the presence of alkaloids (1.22±0.03mg/100ml) flavonoids (1.48±0.04mg/100ml), saponins (0.96±0.01mg/100ml), tannin (1.05±0.08mg/ml), cyanogenic glycosides (0.29±0.12mg/100ml) and phytates (0.10± 0.00mg/100ml). Oxalates were not detected. Vitamin A (Retinol), vitamin B_1(Thiamin), vitamin B_2 (Riboflavin), vitamin B_3 (Niacin), vitamin C (Ascorbic acid), vitamin E (Tocopherol) and important mineral elements like sodium, calcium, magnesium, potassium, phosphorus, zinc, iron, and manganese were detected in the studied concoction. Cadmium, lead and chromium were not present in the concoction. This study has shown the chemical profile of "Udu". These chemical constituents may be behind its medicinal property.

Keywords: Udu, concoction, phytomedicine, phytochemicals, minerals, vitamins

INTRODUCTION

Phytomedicine, which is the sum total of practices using herbal processes to treat diseases based on past experience as well as observations handed down from generation to generation, has been used in healthcare delivery in many parts of the world, including Africa (Edem, 2009). With the rising cost of orthodox medicine, Elujoba *et al*., (2005) had noted that effective health delivery cannot be achieved in Africa, unless orthodox medicine is complemented with traditional medicine. Phytomedicine makes use of medicinal plants as raw materials. Most of these plants are known to possess bioactive constituents like phytochemicals vitamins and minerals (Okigbo and Mmeka, 2006; Biswas and Mukherjee, 2003; Okwu and Ekeke, 2003; Sofowara, 1993). It is generally assumed that these bioactive constituents contribute the protective effect of medicinal plants (Okwu and Josiah, 2006; Okwu and Ekeke, 2003). Extracts from roots, barks, seeds, fruits and leaves of these plants are used in the preparation of syrups, infusions and concoctions in traditional medicine against diseases like malaria, hepatitis, pile, liver cirrhosis, etc, (Ogu and Agu, 1995; Iwu, 1986).

"Udu" an antimalarial concoction used in Umunchi, is one of such concoction prepared from the mixture of leaves of different medicinal plants in phytomedicine. "Udu" is prepared with leaves of *Gongronema latifolium*, *B. coriacea*, *Psidium guajava*, *Carica papaya*, *Musa paradisiaca* and *Citrus sinensis*. The efficacy of "Udu" has earned it a lot of local names within the community where it is used. To mention but a few are "Ogbunumuru oria" (Killer of many diseases), "Ogwuiba" (Drug for malaria), "Mmirinsoiba" (Holy water for malaria) etc, (personal assertion).

Due to the importance of "Udu" concoction in Umunchi community, the present study investigated the chemical profile by quantifying its phytochemicals, vitamins and minerals.

MATERIALS AND METHODS

Location: Isiala Mbano L.G.A., is located between latitude 7.00' and 7"25' North and Longitude 5.35' and 51.45' East in Imo State, Nigeria. Within these latitudes and longitudes lies Umunchi village.

Plant Collection: The *G. latifoluim*, *C. papaya*, *P. guajava*, *M. paradisiaca*, *C. sinensis*, and *B. coriacea* leaves were collected from a farm in Umunchi in Isiala Mbano L.G.A. of Imo State ,Nigeria and were properly identified by Dr. F. N. Mbagwu, of the Department of Plant Science and Biotechnology, Imo State University Owerri, Imo State, Nigeria.

Sample Preparation: The collected and identified leaf samples were properly washed to remove dirt, after which they were used for the preparation of the concoction.

Concoction Preparation: Twenty grams each of the identified leaves were weighed and placed in a medium sized sterilized pot; two dm^3 of pure water was added and boiled for one hour. The coloured solution obtained after boiling was carefully decanted

into a sterilized bottle after it was allowed to cool. The prepared concoction was used for the analysis.

Determination of Phytochemical Composition: The phytochemicals in "Udu" were determined using standard methods described by AOAC (1990).

Determination of Vitamins: The vitamins present in "Udu" were determined using the methods described by Okwu (2005).

Determination of Mineral Composition: The major minerals comprising calcium, phosphorus, sodium, potassium, magnesium, and trace elements (Iron, zinc, copper, manganese, chromium, cobalt, cadmium and lead) were determined according to the methods of Shahidi *et al*. (1999).

RESULTS AND DISCUSSION

Table 1 shows phytochemical composition of "Udu" concoction. The presence of phytochemicals in plants and their effects medically and nutritionally have been reported (Akinmoladun *et al.* 2007; Okigbo and Mmeka, 2006; Okwu and Josiah, 2006; Biswas and Mukherjee, 2005; Edeoga *et al*. 2005; Okwu, 2004; Okwu and Ekeke, 2003; Obadoni and Ochuko, 2001 Akwaowo *et al*. 2000; Sofowora, 1993; Akinde, 1986). 'Udu' concoction is rich in alkaloids, flavonoids and tannins. Pure and isolated alkaloids are used as analgesics, antispasmodics and bactericides (Okwu, 2005; Stray, 1998). Alkaloids exhibit marked physiological activity when administered to animals. Flavonoids are free radical scavengers which prevent oxidative cell damage. They have strong anti-cancer activity and protects against all stages of carcinogenesis (Okwu, 2004; Salah *et al.*,1995). Tannins have astringent properties, hasten the healing of wounds and inflamed mucous membrane (Okwu and Okwu, 2004). Saponins are known for their foaming capacity and bitter taste. They also inhibit Na^+ efflux by the lockage of the entrance of the Na^+ out of the cell. This leads to higher Na^+ concentration in the cells, activating a Na^+- Ca^+ anti- porter in cardiac muscle. The increase in Ca^+ in flux through this anti-porter strengthens the concentrations of heart muscle (Schneider and Woliling, 2004).

The knowledge of cyanogenic glycoside contents of food is vital because cyanide is an effective cytochrome oxidase inhibitor and interferes with aerobic respiration in the system (Onwuka, 2005). This may not be observed with "Udu" due to its low cyanogenic glycosides content. Phytates chelate with elements thereby having significant effects on the utilization of minerals in the system. They also react with basic protein. Oxalates can remove calcium from blood in form of kidney stone, and can result in kidney damage (Onwuka, 2005; Savage, 1993).The observed low content of phytates and absence of oxalates in "Udu" may affect their above named effects in the system.

Table 1. Phytochemical composition of "Udu"

Phytochemical (mg/100ml)	Concentration
Alkaloids	1.22±0.03
Flavonoids	1.48±0.04
Saponins	0.96±0.01
Tannins	1.05±0.08
Cyanogenic glycosides	0.29±0.02
Oxalates	ND
Phytates	0.10±0.00

Values are means ± standard deviations of triplicate determinations.
ND=Not Detected

The vitamins observed in "Udu" are presented in Table 2. Vitamins are important in the body as their deficiencies adversely affect the metabolism of the body. Okwu (2005) noted that though vitamins are required in trace amounts, they are very essential for the body metabolism. Vitamins used therapeutically can be of immense help in fighting disease and speedy recovery (Uswazo and Tanuto, 2006). Vitamins become important when they are needed in the body. The various functions of these vitamins for example vitamin A (Retinol) helps to regulate cell development, promote bones and teeth development, and boosts body immune system. It is needed particularly for good vision and healthy skin. It also improves the body's healing ability. Vitamin B_1 (Thiamin) helps the body to produce energy, keeps the mucous membranes healthy and protects the nervous system. Vitamin B_2 (Riboflavin) is essential in keeping the skin, nervous system and digestive system healthy. Vitamin B_3 (Niacin) aids the body to fight infections, heal wounds and builds cells. Vitamin C (Ascorbic acids) is required for healthy skin, bones, and muscles. It plays an important role in the manufacture of collagen, which is the connective tissue that holds bones together whereas vitamin E (Tocopherol) is essential for absorption of iron, slowing of ageing process, and fertility. (Uswazo and Tanuto, 2006; Paul and Pearson, 2005; Tanu, 1998).The above named benefits may be possible with "Udu" since these vitamins were observed in appreciable amounts in it. The vitamin E (Tocopherol) content of the studied concoction may be linked to its ability to remedy reproductive problem as claimed by the cross-section of youths interviewed in Umunchi community where this concoction is used.

Table 2: Vitamin composition of "Udu" (mg/100ml)

Vitamin	Composition
Vitamin A(Retinol)	0.87±0.07
Vitamin B_1(Thiamin)	2.38±0.21
Vitamin B_2(Riboflavin)	1.96±0.11
Vitamin B_3(Niacin)	1.35±0.62
Vitamin C(Ascorbic acid)	3.10±1.62
Vitamin E(Tocopherol)	17.05±1.28

Values are means ± standard deviations of triplicate determinations.

The mineral contents of "Udu" as revealed in Table 3, classify it as a mineral rich concoction. These minerals become important when their usefulness is considered in the system. Calcium, magnesium and phosphorus are important for bones and tooth developement. Manganese and zinc are for enzymes and hormones. Sodium and potassium are for body fluid whereas iron is for hemoglobin formation (Olusanya, 2008; Okwu and Morah, 2004). Dahl (1972) noted that high content of sodium in a recipe is not beneficial due to the direct relationship between sodium intake and hypertension. The value of sodium (80.00±12.01mg/l) observed in "Udu" may not pose any threat to the cardiac system in the body due to a higher value of calcium which may neutralize the its effect (Schneider and Woliling, 2004). The absence of chromium, lead and cadmium in "Udu" may be an indication that it is free of toxic metals.

Table 3: Minerals present in "Udu" concoction (mg/l)

Mineral	Composition
Sodium	80.00±12.01
Calcium	112.43±0.12
Magnesium	0.42±0.01
Potassium	720.00±6.21
Phosphorus	0.38±0.07
Zinc	4.10±1.23
Iron	2.42±0.13
Manganese	0.32±0.00
Cadmium	ND
Lead	ND
Chromium	ND

Values are means ± standard deviations of triplicate determinations.
ND=Not Detected

CONCLUSION

In conclusion, the present study has shown that "Udu" concoction is rich in phytochemicals, vitamins and important mineral elements. These constituents may be behind its medicinal property.

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