Evaluation of Phytochemical and Physicochemical Analysis of Local Herbs for Treatment of Various Ailments.

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Abstract

Ethno-botany is the basic idea about the medicinal properties of plants, identification of its active compounds and their standardization towards production of new drugs. This study aimed at Evaluating the Phytochemical and Physicochemical parameters of some selected Local herbs purchased from two different markets in Igbo-ora (Towobowo and Oja-Ibode) Ibarapa Central Local Government Area (LGA), Oyo state. Solvents of different polarity gradient to extract were used for the samples compositions. Spectrophotometric methods of analysis were used to determine both qualitative and quantitative phytochemical and physicochemical parameters. The results revealed that all selected phytochemicals were present qualitatively. Total phenols in mg/100g ranges from 6.492±0.114-20.762±0.002mg/100g. Tannins with range value of 21.146±0.000-60.838±0.000mg/100g, Alkaloids ranged between 3.19±0.02-4.32±0.06mg/100g, Flavonoids had the range value of 9.176±0.12-12.304±0.004mg/100g while Saponins value ranged from 2.80±0.07-5.67±0.00 respectively. Results of physicochemical analysis showed; pH ranges from 4.35±0.01 to 5.81±0.00, Moisture content ranged between 3.72±0.01-7.80±0.01mg/100g, Ash with range value of 7.34±0.02 to 21.05±0.02mg/1000g, percentage Residue on Ignition had the range value of 0.64±0.03 to 3.15±0.02%, Water Soluble Ash had the range value of 0.16±0.00-2.53±0.03%, Hexane extracts have the range value 0.02± 0.00 to 0.09±0.00%, Ethanol extracts have the value ranging from 0.11±0.01 to 0.96±0.03% while aqueous extracts have the range value of 1.20±0.02 to 12.25±0.08% respectively. In conclusions, the of Phytochemical analysis of the selected sample showed that the samples are potential source of Phytochemical compounds required for synthesis of some drugs used in the treatment of malaria, typhoid, fever and other related diseases. It can be recommended that further work should be done to on the anti-microbial effect of the plant raw materials in pharmaceutical industry.

Key words: *Medicinal plants, phytochemical, physicochemical, Medicinal plants, Pharmaceutical industry.*

Introduction

Plants are the major sources of most raw materials required for traditional medicines (WHO, 2003). From time immemorial, mankind has been developed traditional medicinal system, using the knowledge of medicinal plants throughout the world (Petrovska, 2012) and these plants with their products have also progressively played important roles in the health care systems of the people living in developing countries (Harvey *et al.,* 2015). Drug related researches make use of the ethnobotany to search for the pharmacologically active and natural substances, which has led to the discovery of hundreds of beneficial synthentic drug fr the treatment of diseases. These include the

popular drugs like aspirin, opium, quinine (Shermah and Hash, 2001). Plant synthesizes hundreds of chemical and biochemical compounds used for defence against insects, herbivorous organisms mammals, fungi and pathogenic organisms (Stepp,2004). Medicinal plants are faced with both specific threat of over collection to meet the demand and the general threat, due to destruction of habitat and climate change (Ahn, 2017). The non-nutrients chemicals or bioactive components are referred to as phytochemicals and are responsible for the plants therapeutic effect such as anti-oxidant, antimicrobial, anti-inflammatory and anti malarial activities (Negi et al., 2011). However, plant medicines raise safety concerns and cause adverse effects and even death in extreme cases, through the side-effects produce by their active compounds (substances), by overdose, in appropriate prescription or by adulteration (or contamination) of the extract composition. (Nekvindova and Anzenbacher, 2007). Microbial infection is observed to be a significant cause of mortality and morbidity in spite of advancement in synthetic medicine and new antifungal agents (Mc Neil et al., 2001). Since microbial strains with multiple antibiotic resistance are currently increasing worldwide and have led to a situation whereby some of the antimicrobial agents are losing efficacy against microorganisms (Mian, 2003). Herbal drugs are now considered as substitute in such situations. Now it is of great importance to explore the most effective means of treatments of microbial infections. Researchers therefore take much attention in folks medicine in search of better drugs against microbial infections (Srinivasan*et al.,* 2001). The continuous spread of disease resistance organism to some of the synthetic drugs poses a serious threat to disease control processes. Some drugs are no longer considered effective in the treatment of human diseases (Ahn, 2017). Although vaccines could be the best long term control option, most of them are still undergoing clinical examinations and trials. Development of novel drugs now becomes urgent as a result of increasing number of drug resistant parasites. The high cost of diseases treatment has made the poor masses of underutilized (inclusive) Nigeria to be heavily reliant on traditional practitioners and medicinal plants for the treatment of diseases and ailments. Globally, traditional healers are using various medicinal plants for the treatment of diseases; however, this practice is not really completely recognised by modern medicine (Ayinde *et al.,* 2007).

The aim of this study is to evaluate of phytochemical and physicochemical properties of local herbs (*Cassiaalata*, *Theobromacacao*, *Aristolocha*) for treatment of some of illness.

MATERIALS AND METHODS

Sample collection:
The experiment was carried out at the Research Laboratory of Oyo State College of Agriculture and Technology, Igboora, Oyo State, Nigeria. The area falls within south-west region of the state. Materials used for the research work were local herbs powder, distilled water, conical flask, beakers, filings solution A and B, chloroform, ethanol, aqueous HCL, ammonia solution, sulphuric acid, hexane.

Sample processing:
The local herb powders were obtained from herbs sellers at Towobowo Market, Ibarapa Central Local Government, Igboora and Bode market, Ibadan. The powders were packaged in a polythene bag for further analysis and store in deep freezer at 4°C from the selected local herb powders (*Cassia/alata*, *Theobroma/cacao* and *Aristolocha*) were taken in a test tube, distilled water was added, dissolved and shaken well. The solution was filtered; the filtrate was taken and used to determine phytochemical and physicochemical parameters of the selected samples.

Sample analysis:
Phytochemical and physio-chemicals screening of the local herb's powders was

determined using various methods described by Doughari *et al.,* (2009). The parameter determined for of the phytochemical analysis include; Alkaloids, totalphenol, flavonoids, tannins, saponin content while physio-chemical parameters determines for the local herbs powder were done using World Health Organization (WHO) guidelines (2008) to obtain total ash value, acid-insoluble, ash value, water soluble ash value, loss on drying and extractive values.

Results and discussion

Results:

Table 1: Qualitative phytochemical screening of local herbs

Parameters	Inference					
	Cassia alata leaves	*Theobroma cacao* leaves	*Aristolochia brateolata* leaves	*Cinnamon verum* (bark)	*Azadirachta indica* leaves	*Nauclealatifolia* leaves
Saponin	-ve	+ve	+ve	+ve	+ve	+ve
Tannis	-ve	+ve	+ve	+ve	-ve	-ve
Flavonoid	+ve	+ve	+ve	-ve	-ve	-ve
Steroid	-ve	+ve	+ve	+ve	+ve	+ve
Terpenoid	-ve	+ve	+ve	+ve	+ve	+ve
Coumarin	-ve	+ve	+ve	+ve	+ve	+ve
Chalcones	-ve	+ve	+ve	+ve	+ve	+ve
Quinone	+ve	+ve	+ve	+ve	+ve	+ve
Anthocyanins	+ve	+ve	+ve	+ve	+ve	+ve
Alkaloid	-ve	+ve	+ve	+ve	+ve	+ve
Cardiac Glycosides	+ve	-ve	-ve	-ve	-ve	-ve
Phenols	-ve	-ve	+ve	+ve	-ve	-ve
Di-terpenes	-ve	+ve	+ve	+ve	+ve	+ve
Proteins	-ve	+ve	+ve	+ve	+ve	+ve

Key: + = Positive, - = Negative

Table 2: Quantitative Phytochemical Screening of local herbs

Parameters	Concentrations (mg/100g)					
	Cassia alata leaves	*Theobroma cacao* leaves	*Aristolochia brateolata* leaves	*Cinnamon verum* (bark)	*Azadirachta indica* leaves	*Nacluae latifolia* leaves
Total Phenolics	Nil	20.762±0.002	9.277±0.002	6.492±0.114	Nil	Nil
Tannin	Nil	60.838±0.000	31.249±0.044	21.146±0.000	Nil	Nil
Alkaloid	Nil	3.27±0.18	4.32±0.06	3.19±0.02	3.59±0.10	3.77±0.03
Flavonoid	Nil	12.304±0.004	9.176±0.12	Nil	Nil	Nil
Saponin	Nil	2.80±0.07	3.12±0.00	3.19±0.02	5.21±0.02	5.67±0.00

Table 3: Quantitative physico-chemical screening

Parameters	Concentration (%)					
	Cassia alata leave	*Theobroma cacao* leave	*Aristolochia brateolata* leaves	*Cinnamon verum* (bark)	*Azadirachta indica* leaves	*Nauclea latifolia* leaves
pH	4.84±0.01	5.32±0.00	5.81±0.00	4.35±0.01	4.96±0.00	5.66±0.00
Moisture	4.30±0.00	3.72±0.01	6.18±0.01	7.80±0.01	6.17±0.01	6.91±0.01
Ash	20.41±0.60	21.05±0.02	7.72±0.02	8.35±0.02	7.34±0.02	8.39±0.02
Residue on Ingition	1.56±0.02	3.15±0.02	0.82±0.01	0.95±0.03	0.64±0.03	0.79±0.03
Water Soluble Ash	2.53±0.03	1.44±0.01	0.16±0.01	0.20±0.00	0.19±0.01	0.16±0.00
Extractive Hexane	0.09±0.00	0.02±0.00	0.04±0.01	0.07±0.01	0.05±0.01	0.16±0.00
Extractive Ethanol	0.96±0.03	0.21±0.02	0.14±0.01	0.17±0.01	0.33±0.02	0.11±0.01
Extractive Aqueous	1.20±0.02	1.37±0.04	1.46±0.02	1.57±0.01	12.25±0.08	1.37±0.03

Discussion

The phytochemical analysis of the selected samples confirms the presence of active metabolites in the selected plant samples. It was revealed from Table 1 that the qualitative phytochemical constituents present in the extract of local herbs powder were represented with positive sign while the parameters that was not detected was represented with –ve sign. From Table 2, it can be deduced that all tested phytochemical components were absent quantitatively in italicise, total phenols, flavonoids and tannins were absent in *A.indica* and *N.latifolia* leaves while flavonoids was absent in *C.verum* (bark). Alkaloids and saponins were present in all the local herbs powder with ranging values of 3.19±0.02 to 4.32±0.06.

For the physio-chemical analysis of the selected local herbs reported in Table 3 revealed that PH ranges from 4.35±0.01 to 5.81±0.00; moisture content ranged between 3.72±0.01 to 7.80±0.01; ash with range value of 7.34±0.02 to 21.05±0.02; % residence on ignition with range value of 0.64±0.03 to 3.15±0.02; water soluble ash with the value of 0.16±0.00 to 2.53±0.03; extractive hexane have the range value 0.02±0.00 to 0.09±0.00; extractive ethanol with the value ranging from 0.11±0.01 to 0.96±0.03 while extractive aqueous have the range value of 1.20±0.02 to 12.25±0.08 respectively.

All the herbal preparation uses in this report for anti-malaria and pile were found to contain important secondary metabolites like alkaloids and flavonoids. This is in agreement with Onifade and Maganda (2015) who reported that alkaloids are responsible for the anti malarial activity of many plant samples. He also, reported that Flavonoids increases erythrocytes oxidation level and inhibit the synthesis of protein in malaria parasites.

The presences of these physio-chemical components in the selected medicinal plants are appreciably present in normal quantities which made them viable for curing numerous diseases. This agreed with the findings of Richard (2017) who reported that the human

body needs right amount of acidic and alkaline nutrients so as to maintain a healthy PH balance.

The recommended daily intake should be 20% acidic and 80% alkaline. Hence, the findings indicated that the selected plants possess significant antimalarial active components, therefore, justify their use in ethnomedicine. Efforts on the part of herbs sellers must be made to enhance proper hygienic condition in all the preparation process starting from the collection of plant samples, processing, packaging and storage in order to reduce the incidence of pathogenic microorganisms and the spread of resistance strains.

The knowledge of traditional medicinal practices and plants are currently transmitted from generation to generation principally by word of mouth. A wide variety of plants belonging to several families have been identified through ethno-botanical and ethno-pharmacological studies of medicinal plants.

Therefore, knowledge of some active constituents of each plant species was studied to gain insight into their potentials. This study is an attempt to present a comprehensive account of selected local herbs plants used in the treatment of diseases.

Conclusion

The present study provides evidences that local herbs contained appreciable amount of bioactive metabolites like alkaloids, tannins, flavonoids, glycosides, saponins, steroids thereby justifies the claim of their therapeutic use. This study also revealed that the physicochemical and phytochemical compositions of plants are the essential analytical aspect useful for the study of identity, purity, quality, safety and efficacy of medicinal herbs for their use as potential drug candidate. Overall, medicinal her **Discussion**

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Acknowledgment

I give sincere thanks to Almighty God who has made it possible to complete this journal article.I appreciate the contributions of all the contributors for the success of this work. I equally appreciates the efforts of the Dean and H.O.D of Faculty of Science, Science Laboratory Technology Department of Oyo State College of Agriculture and Technology, Igbo-ora, Oyo State.

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