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. Their standardization is important for the production of new drugs. This study sought to assess the Phytochemical and Physicochemical parameters of indigenous herbs obtained from two distinct markets, namely Towobowo and Oja-Ibode, located in Igbo-ora, Ibarapa Central Local Government Area (LGA), Oyo State. Different extracting solvents were used for the samples, such as water, ethanol and N-hexane. Spectrophotometric methods of analysis were used to analyse selected phytochemical and physicochemical parameters. The results revealed that all selected phytochemicals were qualitatively. Total phenols range from 6.492±0.114 to 20.762±0.002. Tannins with range value of 21.146±0.000 to 60.838±0.000, Alkaloids ranged between 3.19±0.02 and 4.32±0.06, Flavonoids had the range value of 9.176±0.12 to 12.304±0.004 while Saponins value ranged from 2.80±0.07 to 5.67±0.00 respectively. For the physicochemical analysis, pH ranges from 4.35±0.01 to 5.81±0.00, Moisture content ranged between 3.72±0.01 and 7.80±0.01, Ash with range value of 7.34±0.02 to 21.05±0.02, 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 to 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 conclusion, these medicinal plants could be a source of phytochemicals that can be used as raw materials in drug production. It was recommended that; further work should be done to know the anti-microbial effect of the plant as raw materials in pharmaceutical industry.*

**Keywords:** Medicinal plants, phytochemical, physicochemical, Pharmaceutical industry.

**Introduction**

Plants are the major components of traditional medicines (WHO, 2003). From time immemorial, mankind has been developing traditional medicinal system, based on the knowledge of medicinal plants throughout the world (Petrovska, 2012). 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 makes use of the ethnobotany to search for the pharmacologically active natural substances, and has in this manner discovered hundreds of beneficial compounds. These encompass well-known pharmaceutical agents such as aspirin, opium, and quinine, as highlighted by Shermah and Hash in their research conducted in 2001. (Shermah and Hash, 2001).

Plant synthesizes hundreds of chemical and biochemical compounds for function including defence against insects, herbivorous mammals, fungi and diseases (Stepp, 2004). Medicinal plants are faced with both specific threat of over collection to meet the demand and the general threat, such as habitat destruction and climate change (Ahn, 2017). The non-nutrient chemical or bioactive components are referred to as phytochemicals and are responsible for the plants therapeutic effect such as anti-oxidant, antimicrobial, anti-inflammatory and antimalarial activities (Negi et al., 2011).

Plant medicines raise safety concerns and cause adverse effects and even death in extreme cases, whether by the side-effect of their active compounds’ substances, overdose, inappropriate prescription or adulteration, contamination (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 antibiotics, resistances are increasing worldwide. This have created such a situation that are common and less expensive 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 effective treatments of microbes. Researchers therefore take much attention in folks medicine in search of better drugs against microbial infections (Srinivasanet al., 2001).

The continuous spread of disease resistance organism to drugs poses a serious threat to disease control programs. 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, they are still undergoing clinical examinations and trials. Development of novel drugs now becomes urgent as a result of increasing number of drug resistant parasites. Thus, the high cost of diseases treatment has made the poor masses of Nigeria heavily reliant on traditional practitioners and medicinal plants for the treatment of diseases and ailments. On a global scale, traditional healers employ diverse medicinal plants in the treatment of illnesses. Nevertheless, it's noteworthy that this practice lacks full recognition within the realm of modern medicine, as underscored by (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.

**Methodology**

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 hydrochloric acid (HCl), ammonia solution, sulphuric acid, and hexane. The local herb powders were obtained from herbs sellers at Towobowo Market, Ibarapa Central Local Government, Igboora and Bode market, Ibadan. The powder was packaged in a polythene bags. The selected local herb powders (Cassiaalata, Theobromacacao, 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 for further phytochemical and physicochemical parameters analysis to determine its effectiveness.

Screening for phytochemical and physicochemical properties in the powdered form of local herbs, as outlined by Doughari et al. in 2009. The components of the phytochemical analysis included; Alkaloids, totalphenol, flavonoids, tannins, saponin content while physio-chemical parameters characterization of the local herbs powder were done as per World Health Organization (WHO) guidelines (2008) on total ash value, acid-insoluble, ash value, water soluble ash value, loss on drying and extractive values.

**Results and discussion**

**Results:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Phytochemicals parameters | Inference | | | | | |
| *Cassiaalata* leaves | *Theobromacacao*leaves | *Aristolochiabrateolata* leaves | *Cinnamonverum* (bark) | *Azadirachtaindica* leaves | *Nauclealatifolia* leaves |
| Saponin  Tannis  Flavonoid  Steroid  Terpenoid  Coumarin  Chalcones  Quinone  Anthocyanins  Alkaloid  Cardiac Glycosides  Phenols  Di-terpenes  Proteins | -ve  -ve  +ve  -ve  -ve  -ve  -ve  +ve  +ve  -ve  +ve  -ve  -ve  -ve | +ve  +ve  +ve  +ve  +ve  +ve  +ve  +ve  +ve  +ve  -ve  -ve  +ve  +ve | +ve  +ve  +ve  +ve  +ve  +ve  +ve  +ve  +ve  +ve  -ve  +ve  +ve  +ve | +ve  +ve  -ve  +ve  +ve  +ve  +ve  +ve  +ve  +ve  -ve  +ve  +ve  +ve | +ve  -ve  -ve  +ve  +ve  +ve  +ve  +ve  +ve  +ve  -ve  -ve  +ve  +ve | +ve  -ve  -ve  +ve  +ve  +ve  +ve  +ve  +ve  +ve  -ve  -ve  +ve  +ve |

Table 1:Qualitative phytochemical screening of local herbs

Key: + = Positive, - = Negative

Table 2: Quantitative Phytochemical Screening of local herbs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Phytochemical Parameters | Concentrations | | | | | |
| *Cassiaalata* leaves | *Theobromacacao* leaves | *Aristolochiabrateolata* leaves | *Cinnamonverum* (bark) | *Azadirachtaindica* leaves | *Nacluaelatifolia* 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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Physico-chemical Parameters | Concentration | | | | | |
| *Cassiaalata* leaves | *Theobromacacao* leaves | *Aristolochiabrateolata* leaves | *Cinnamonverum* (bark) | *Azadirachtaindica* leaves | *Nauclealatifolia* 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 present study confirms the presence of active metabolites in the selected plant samples. It was revealed from table 1 that the qualitative phytochemical constituents were present in the extract of local herbs powder and these were represented with positive sign while the parameters that were absent with negative sign. From table 2, it could be deduced that all tested phytochemical components were absent quantitatively in Cassia alata, total phenol, flavonoid and tannin were absent in *Azadirachta Indica* (*A.indica)* and *Nyssa latifolia* (*N.latifolia)* leaves while flavonoid was absent in *C.verum* (bark). Alkaloid and saponin 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, 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 the most important secondary metabolite such as alkaloid and flavonoids. This is in agreement with Onifade and Maganda (2015) who reported that alkaloids have been studied to contribute to the antimalarial activity of many plant samples. Also, they studied that flavonoid increases erythrocytes oxidation level and inhibit the synthesis of protein in malaria parasites.

The presences of these physio-chemical components in the medicinal plants selected are appreciably normal in quantities which made them viable for curing several 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. Thus, the findings indicated that the selected plants possess significant antimalarial active components, and hence, 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.

**Conclusion**

The present study provides evidences that local herbs contained appreciable amount of bioactive metabolites like alkaloids, tannins, flavonoids, glycosides, saponins, steroids thereby justify the claim of their therapeutic use. It revealed that the physicochemical and phytochemical compositions of plants are the essential analytical aspect for the study of identity, purity, quality, safety and efficacy of medicinal herbs for their use as potential drug candidate. Overall, medicinal herbs are rich sources of phytochemicals which are important for health preservation and disease prevention. The findings indicated that these plants possess significant antimalarial active phytochemical constituents, therefore justifying their use in ethnomedicine. In conclusion, findings from this investigation suggest that the physicochemical and phytochemical properties of local herb obtained from several locations in Oyo State fulfilled the requirements as raw material for herbal drugs.

**Implications of the Findings**

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.

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