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Preparation of Plant Extracts from Indigenous Medicinal Plants

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ABSTRACT

Indigenous medicinal plants have great medicinal potentials, as they have been used and are still in use for the management of several ailments and as nutritional supplements. The medicinal efficacy of medicinal plants is highly depended on the method of extraction or extract preparation. The present study evaluates the preparation of crude extracts from the root bark and stem bark of three plants with medicinal potentials – *Vernonia amygdalina, Nauclea latifolia* and *Gongronema latifolium* – using 80% ethanol as solvent and standard laboratory equipment. The result showed a high (%) yield of 13.6 and 11.96 respectively for root bark and stem bark of Vernonia amygdalina, 10.75 and 10.01 respectively for root bark and stem bark of *Gongronema latifolium* and 19.90 and 18.30 respectively for root and stem bark of *Nauclea latifolia*. These extracts were used for various analysis such as proximate and phytochemicals and the results agreed with those of the extracts of the same plants using other standard methods. Also, the extracts were used for toxicity, anti-diabetic and anti-hypertensive screening and were found to be of high efficacy.

Keywords: *Medicinal plants, extract preparation*

1. INTRODUCTION

In Africa and in most Asian countries where the use of folk medicine is in prevalence, the search for herbal cures is but a common practice. (Akpanabiatu *et al*., 2005). Traditional healers and their plant medicines provide the only health care to the majority of the people in a curative rather than a preventive approach in the developing countries for common ailments. (Gabriel *et al.,* 2007). The ready availability and economy of plants as direct therapeutic agents make plants more attractive when compared to modern medicine (Agbo and Ngogang, 2005; Agbo *et al.,* 2005a). As a result, vast literature now exist on the use of traditional medicine with Botanist reporting description of plants use for disease treatments, the Phytochemist on the chemical constituents and the Pharmacologist on the effectiveness of particular plant compound or extracts (Gabriel *et al.,* 2007). In the developing countries and in Asia in particular, several plants of folkloric medicine are used in the treatment of diseases such as malaria, obesity, anaemia opportunistic infections of the AIDS and management of diabetes (Adeyemi *et al*., 2002). According to WHO (2000), medicinal plants are plants which when administered to man or animals, exert a sort of pharmacological action on them. Herbs make up most of the plant sources for the production of useful drugs that are being utilized by people worldwide (Agbo *et al.,* 2000). Most existing plants have medicinal values, of which steps are being taken by scientific research to properly test and utilize these plants for therapeutic purposes. Herbal plants like the garden type of *Dancus carota* (carrot), have been found to inhibit cancer growth, improve sight and cure certain conditions of diabetes. *Aloe vera*, Garlic (*Allium sativum*), onions (*Allium cepa*), African mistletoe (*Loranthus benguensis*), are useful for cancer, hypertension, diabetes, etc (Farnsworth *et al.,* 1985). The efficacy of a medicinal plant depends on the preparation of the plant material for consumption and/or remedy for various diseases. Some are taking raw, cooked, roasted, applied as topical, while some have to go through a process of extract preparation before use. All the various methods and root of intake is to enhance the bioavailability and hence, the efficacy of the plant material. However, if the method of preparation and intake of the plant material is wrongly applied, the desired result may not be achieved.

2. MATERIALS AND METHODS

2.1 Collection and Processing of Plant Materials

Vernonia amygdalina Del. (African bitter leaf) and *Nauclea latifolia* (*pin cushon tree*) plants were identified and authenticated by a botanist, Department of Botany, University of Calabar. Thereafter, fresh roots of *V. amygdalina* were excavated and stems of the plant harvested from the Endocrine Research Farm of the University of Calabar. Also, fresh roots of *N. latifolia* were excavated and stem of the plant harvested from the teaching hospital premises of the university of the Calabar, while the twigs and roots of *Gongronema*

latifolium (utazy) were purchased from Ika-Ika Qua market in Calabar, Cross River State. The roots and stems were thoroughly washed to remove debris and the earth remains. From these the barks were divested and chopped into bits and allowed to dry under shade. The twig and root of *G. latifolium* were equally washed and chopped into bits and allowed to dry under shade. The dried samples were differently blended into fine powder using a Q-link electric blender Model QBL-18L40, and stored in air-tight containers.

Figure 1: Excavating the root of Nauclea latifolia

Figure 2: Laboratory processing of plant materials

2.2 Preparation of Extracts

2.2.1 Soaking

Three hundred grams (300g) of each powder was weighed using an electronic weighing balance and differently soaked in 1200mL of ethyl alcohol (80% BDH), at a ratio of 1:4 (powder/solvent). The mixture was agitated using an electric blender (to enhance proper mixing of the solvent with the powder), and then poured into air-tight plastic container. The containers, with the mixtures were then kept in the refrigerator at 4^0C for 48hours.

Figure 3: Agitation of extract during soaking

2.3 Filtration and Concentration

The mixtures were first filtered with cheese cloth, then with WhatMan No 1 filter paper (24cm). The filtrates were then separately concentrated *in vacuo* using Rotary Evaporator (Model RE52A, China) to 10% of their original volumes at 37o C - 40o C. These were concentrated to complete dryness in water bath, yielding 40.8g (13.6%) of root bark and 35.88g (11.96%) of stem bark extracts of *V. amygdalina*, 32.25g (10.75%) of root, 30.03g (10.01%) of twig extracts of *G. latifolium*, and 59.7g (19.90%) of root bark and 54.9g (18.30%) of stem extracts of *N. latifolia.* The extracts were stored in a refrigerator from where aliquots were used for the proximate, phytochemical and micronutrients analyses.

Figure 5: filtration of plant extracts

Figure 6: concentration of extracts using rotary evaporator and laboratory hot plate

Table 1: Percent extract yield from three indigenous medicinal plants

Plants/percentage yield	Root extracts	Stem extracts
Vernonia amygdalina	13.6	11.96
Gongronema latifolia	10.75	10.01
Nauclea latifolia	19.90	18.30

3. RESULTS AND DISCUSSION

The result of the laboratory preparation of extracts from three indigenous medicinal plants is presented in table 1. The method used conventional laboratory equipments, with high extract yields that met the medicinal needs for which they were prepared. The percentage yield of the extracts were 13.6% and 11.96% respectively for root and stem extracts of *V. amygdalina*, 10.75% and 10.01 respectively for root and stem extracts of *G. latifolium*, and 19.90% and 18.30% respectively for root and stem extracts of *N. latifolia*. This results agreed with other results as reported by Eyong et al, (2011), in their work on Phytochemicals and micronutrients composition of root and stem bark extracts of V*ernonia amygdalina* Del. The table showed a high yield from the root and stem bark of *N. latifolia*, compared to those of *V. amygdalina* and *G. latifolium*. This disparity in the result is due to the phytochemical constituents of the plants. Also, the yield from each plant part compared favorably with each other, with the yields from the root barks being slightly higher than those of the stem barks. The high percentage yield, with preserved integrities of the extracts is an indication of the fact that this method can be adapted as a standard method of extract preparation, using the common available equipments in our laboratories as alternatives to other standard equipment that are not readily available.

4. CONCLUSION

Medicinal plants, especially in Africa and Asia have great potentials to alleviate different array of ailments. However, these potentials are usually hampered by the ways and methods in which these plants are consumed, either directly as curative measures for ailments or as food supplements. This work evaluated an extract preparation method, that resulted in high yield and efficacy of the plants of interest.

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