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Full Length Research Paper

Medico-botanical investigation of siam weed (*chromolaena odorata*) used among the "Ijebu" people of Ogun state, Nigeria

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Abstract

Ethno medicinal importance of Siam Weed (*Chromolaena odorata*) was exploited in five Local government areas of Ogun state, Nigeria, using questionnaire. In addition, the aqueous leaves and roots extracts of the plant were studied to ascertain the nature of phytochemicals (secondary metabolites) therein. This was with a view to provide the scientific basis for its use for the treatment of various ailments and diseases in these Local Government Areas. The study combined the use of questionnaire with laboratory study. Nine hundred and sixty five (965) respondents selected from these five local government areas participated in the study. Responses from the respondents revealed numerous ethno botanical uses of *Chromolaena odorata* in the management of many ailments and diseases. The phytochemical screening revealed the presence of flavonoids (0.067% in leaves, 0.056% in roots), phenolics (0.076% in leaves, 0.091% in roots), saponins (0.016% in leaves, 0.012% in roots), steroids (0.004% in leaves, 0.003% in roots) and tannins (0.054% in leaves and 0.039% in roots). The screening did not reveal the presence of phlobatannins, cardiac glycosides, anthraquinones, cadenolides and dienolides and triterpenes in neither the leaves nor the roots of the plant. The presence of these secondary metabolites in *Chromolaena odorata* may likely form the basis of its effectiveness as ethno pharmacological plant among the Ijebus in Ogun State, Nigeria.

Keywords: Indigenous medicine, medico-botanical, *Chromolaena odorata*, roots and leaves aqueous extracts.

INTRODUCTION

Medicinal plants are defined as the ones which contain substances that can be used for therapeutic purposes and their precursors for the synthesis of useful drugs (Akinmoladun and Akinloye, 2007). They contain nutrients that can heal the body (Trease and Evans, 1985). The use of herbal medicine has always been part of human culture, as some plants possess important therapeutic properties, which can be used to cure human and other animal diseases (Rios and Receo, 2005). Many of these indigenous medicinal plants are used as spices and food plants; they are also sometimes added to foods for medicinal purpose (Okwu 1999; 2001). The plant kingdom has proven to be the most useful in the treatment of diseases and they provide an important source of all the World's pharmaceuticals. They, in all facet of life, have served a valuable starting material for drug development (Edeoga *et al*., 2005). It has been reported that a substantial percentage (38%) of prescription contained one or more of the neutral products of plant origin as the therapeutic agent

(Farnsworth and Bringel, 1977).

Siam weed (*Chromolaena odorata*) is an herbaceous perennial that forms dense tangled bushes about 1.5-2.0 metre in height and has a characteristic aromatic smell (Phan *et al*., 2001). The plant is referred to as "Obu inenawa" by the Igbos and "Ewe Akintola" by the Ijebu tribe among the Yorubas. It originally spread from southern Mexico to Argentina and Caribbean, but has been introduced into diverse ecological areas of tropical lands (Moses, *et al*., 2010). Chromolaena odorata in Tropical Africa has acquired a reputation as a medicinal herb for a variety of ailments including malaria, dysentery, toothache, diarrhoea, diabetes, skin diseases, fever and wound dressing (Phan *et al*., 2001; Akinmoladun and Akinloye, 2007; Zachariades *et al*., 2009). *Chromolaena odorata*, an indigenous herbal plant has been one of medicinal plants commonly used for treatment of various diseases among the Ijebus in Ogun State.

Most of the populations (about 60 to 85%) in the developing countries rely on indigenous forms of medicine (Okeke *et al*., 1999; Hack, 2005). The reasons for the high patronage of herbal medicine are due to high cost of orthodox drugs and the problem of antibiotic resistance, which is very common in developing countries (Hack, 2005). However, a record of medicinal plants in earliest period of Nigeria is virtually not available because there was no documentation for their isolation, selection and preparation. This study therefore looks into the fundamental scientific basis for the use of leaves and roots of Siam weed by investigating its ethno botanical uses in five local government areas of Ogun State and determining the crude phytochemical constituents present in the plant, which may be responsible for the cure of ailments.

MATERIALS AND METHODS

Materials

The Plant

The leaves and roots of *Chromolaena odorata* were collected from five locations in Ijebu land covering five local Government Areas (Ado-odo Otta, Ifo, Ijebu-Ode, Ikenne and Sagamu) in Ogun State, Nigeria. They were air-dried at room temperature. The dried plant leaves and roots were blended with a blender and stored in a clean glassware container until needed for analysis. Five grams (5 g) of the blended leaves and roots were weighed separately and soaked in 50 ml of distilled water and then filtered to obtain the extract using Whatman. NO 42 filter paper.

Reagents

All reagents used were of analytical grade and are products of BDH Laboratory, England.

Methods

Questionnaire

Given below is a sample of the questionnaire used in the study:

Dear respondent,

I am conducting a research on medico-botanical evaluation of Siam weed (*Chromolaena odorata*) leaves and roots in this local government area of Ogun state. Kindly answer the questions below as honestly as possible. All answers supplied by you will be treated as confidential. Thanks for your cooperation.

Instructions: Please tick [√] the correct answer that suits your opinion and comment where necessary.

Name of Local Government: ……

Sex of Respondent: ……..

Age of Respondent: ……..

1. Herbs are commonly used in this local government (a) Yes[ ] (b) No [ ]
2. Do you like using herbs? (a) Yes [ ] (b) No [ ]
3. If yes in (2) above, how often? (a) regularly [ ] (b) seldom [ ] (c) on rear occasion [ ]
4. What is/are the local name(s) of this plant? ……..
5. Have you ever used this plant before (a) Yes [ ] (b) No [ ]
6. If yes in (5) above, what part(s) of the plant did you use? (a) leaves [ ] (b) root [ ] (c) stem [ ] (d) all parts [ ]
7. What purpose(s) did you use the part(s) for? .....
8. Is/are this/these part(s) used in combination with other herbs? (a) Yes [ ] (b) No [ ]
9. If yes in (8) above, mention the local name(s) of this/these other herb(s)……
10. What is/are the other traditional use(s) of this plant that you know? ……..

Extracts preparation

The preparation of aqueous extracts of *Chromolaena odorata* were carried out using the method described by Adedapo *et al*. (2007).

Phytochemical screening

Qualitative and quantitative phytochemical screenings were carried out using the methods of Odutuga and

Table 1. Ethnobotanical uses of Siam Weed (*Chromolaena odorata*) Among Ijebu people of Ogun State, Nigeria

Local Govt Area	Local Name	No. of Respondents	% of Respondents	Part(s) of plant used	Traditional usage
Ado-odo Otta	Panti Otta, Epo Agatu	200	100	Leaves and roots	Treatment of dysentery, skin diseases, fever,thunder bolt, chicken pox, measles, impotency, unblical cords of neonates, jaundice, hair, urinary tract infections, sore throat, toothache, stopping of bleeding after child birth, aiding digestion, aiding labour, improvement of libido, neutralizing venoms of any kind and used as blood purifier.
Ifo	Ewe Akintola	199	99.50	Leaves and roots	Treatment of fresh wounds, malaria, memory loss, conjunctivitis, glycoma, mumps, arthritis, bathing of heavy weight children, deworming, blood clotting, ulcer, diabetes, body pain and skin diseases
Ijebu-Ode	Epo Akintola	196	98	Leaves, roots and all other parts	Treatment of skin diseases, heart diseases, rheumatism, jaundice, syphilis, low sperm count, viral infections, anaemia, measles, fever, gonorrhea, thunder bolt, obesity, cold, catarrh, cough, vomiting, stooling, constipation, pile, high blood pressure, hypertension, blood clotting, bathing sickly babies, used as blood former and purifier. Also used for curing a disease known as “Somuroro” in Yoruba.
Ikenne	Epo Agatu, Ewe Akintola	196	98	Leaves, roots and all other parts	Treatment of skin diseases, toothache, malaria fever, bone dislocation, gonorrhea, headache, stomach disorders, rheumatism, craw-craw, stooling, fresh wounds, neutralizing poisons, blood purifier, blood clotting and analgesic.
Sagamu	Ewe Difendedi	174	87	Leaves, roots and all other parts	Treatment of skin diseases, fever, arthritis, diabetes, body pain, blood clotting, nausea, sore throat, catarrh, cough, hypertension, toothache, pile, dysentery, ringworm, anaemia, guinea worm, aiding labour during child birth.

Faremi (2010) and Bamisaye *et al*. (2013) respectively.

RESULTS

In all the five Local Government Areas of Ogun State that were covered by this research, a large percentage (96.50 %) of the populace use herbs for the treatment of one ailment or the other. Some used herbs regularly while others seldom used them. Some members of the public use *Chromolaena odorata* in combination with other herbs.

Table 1 shows the prevalence of the uses of Siam weed (*Chromolaena odorata*) plant in the five selected Local Government Areas of Ogun state, South Western part of Nigeria. The highest percentage (100%) of respondents was seen in Ado-odo Otta Local Government Area while the least (87%) was recorded in Sagamu Local Government Area. The people in Ado-odo Otta and Ifo local government areas uses leaves and roots parts of the plant for medicinal purposes. However, respondents from Ijubu-Ode, Ikenne and Sagamu Local Government Areas use all parts of *Chromolaena odorata* for the treatment of different ailments and diseases. The treatment of malaria fever, blood clotting and skin diseases with *Chromolaena odorata* is common to all the Local Government Areas that were studied (Table 1).

The qualitative phytochemical screening of leaves and roots of the plant revealed the presence of saponins, steroids, phenolics, flavonoids and tannins while anthraquinones, cardenolides, phlobatannins, triterpenes and cardiac glycosides were not detected (Table 2). The leaves of *Chromolaena odorata* contained 0.016, 0.067, 0.054, 0.076 and 0.004 percentages of saponins, flavonoids, tannins, phenolics and steroids respectively. Similarly, its roots revealed 0.012, 0.056, 0.039, 0.091 and 0.003 percentages of saponins, flavonoids, tannins, phenolics and steroids respectively (Table 3). The phytochemicals that were present in *Chromolaena odorata*, phenolics have the highest (0.076 in leaves and 0.091 in roots) while steroids have the least (0.004 in leaves and 0.003 in roots) percentage (Table 3).

Table 2. Qualitative Phytochemical Screening of Siam Weed (*Chromolaena odorata*)

Phytochemicals	Parts of Plant	
	Leaves	Roots
Anthraquinones	-	-
Cardenolides and Dienolides	-	-
Cardiac glycosides	-	-
Flavonoids	+	+
Phenolics	+	+
Phlobatannins	-	-
Saponins	+	+
Steroids	+	+
Tannins	+	+
Triterpenes	-	-

+ = Present, - = Absent

Table 3. Quantitative Phytochemical Screening of Siam Weed (*Chromolaena odorata*)

Phytochemicals	Parts of Plant	
	Leaves (%)	Roots (%)
Flavonoids	0.067	0.056
Phenolics	0.076	0.091
Saponins	0.016	0.012
Steroids	0.004	0.003
Tannins	0.054	0.039

Results are expressed as means of three determinations ± SD

DISCUSSION

The use of plant extract or chemicals derived from them to treat disease is therapeutic modality, which has stood the test of time (Anwannil and Atta, 2006). The healing properties of medicinal plants are usually linked with the presence of these chemicals otherwise called secondary metabolites and these differ from one plant to another. Our study revealed that Siam weed (*Chromolaena odorata*) contained reasonable amount of flavonoids, phenolics, saponins, steroids and tannins.

Flavonoids have been reported as antidiarrhoeal (Schnier *et al*., 2005) antibacterial (Galeotti *et al*., 2008) and antimicrobial (Cushnie and Lamb, 2008). This may be the scientific basis for the exploitation of this plant for the treatment of skin diseases, sore throat, cough, pile, dysentery, chicken pox, measles, urinary tract infections, gonorrhoea, toothache, e.t.c. in these Local Government Areas.

Saponins have also been implicated as antimicrobial and antifungal (Foerster and Hartmut, 2006). Therefore, the use of *Chromolaena odorata* for the treatment of fungi diseases like ring worm, guinea worm, skin diseases, craw-craw, e.t.c. in these local government areas are justifiable. In addition to antimicrobial and antifungal activities of saponins, it also aids digestion and enhances nutrient absorption (Foerster and Hartmut, 2006). The presence of this phytochemical suggests its effectiveness in aiding digestion in Ado-odo Otta and Ikenne local government areas of the State.

Similarly, tannins have been revealed to have antviral (Lu et al., 2004), antibacterial (Akiyama et al., 2001) and antiparasitic (Kolodziej and Kiderlen, 2005) activities. Therefore, it is not surprising that *Chromolaena odorata* is used for the treatment of skin diseases and other viral and bacterial-causing diseases in all the local government areas studied. Furthermore, tannins have been implicated to be able to accelerate blood clotting and reduce blood pressure (Buck, 2003, Cox and Cox, 2009). This may also be the basis of its efficacy as blood clotting agent and as medicinal plant for the management of hypertension in all the local government areas covered by this research work.

The importance of phenolic as analgesic, antipyretic and anti-inflammatory phytochemical had been reported by Micheal (2008). This may be the reason why the plant is effective for the treatment of body pain in Sagamu and Ikenne. In addition, some phenolic-related substances

are related to endocrine-disruptive chemicals (Micheal, 2008). This may be the basis of the use of *Chromolaena odorata* to aid labour in pregnant women during child birth in Sagamu, Ado-odo Otta Local Government Areas of Ogun State.

CONCLUSION

The presence of phytochemicals such as flavonoids, phenolics, saponins, steroids and tannins in *Chromolaena odorata* confirms the antiviral, antibacterial, antiparasitic and anti-inflammatory properties in *Chromolaena odorata*. This further revealed or provided some biochemical basis for the ethno pharmacological uses of the plant among the Ijebu people of Ogun State in South-Western part of Nigeria. Furthermore, the information provided in this research study may help to spread the ethno botanical uses of Siam Weed (*Chromolaena odorata)* to other parts of the World.

REFERENCES

Adedapo AA, Abatan MO, Olorunsogo OO (2007). Effects of some plants of the spurge family on heamatological and biochemical parameters in rats. Vet. Arhil *7;* 29-38.

Akinmoladun AC, Akinloye O (2007). Effect of *Chromolaena odorata* on hypercholesterolemia-related metabolic imbalances. Proc. Akure-Humbold Kello. 3rd SAAT Annual Conference, FUTA, Nigeria, 16-19 April, 2007: 287-290.

Akiyama H, Yamasaki O, Oono T, Iwatsuki K (2001). Antibacterial action of several tannins against *Staphylococcus aureus*. J. Antimicrob. Chemother. 48(4):487-91.

Anwannil HG, Atta R (2006). Trends in ethnopharmacology. J. Ethnopharmacol., 100: 43-49.

Bamisaye FA, Ajani EO, Minari JB (2013). **Prospects of** Ethnobotanical Uses of Pawpaw (*Carica Papaya*). J Med Plants Stud, Volume: 1, Issue: 4, 171-177.

Buck J (2003). "Medicine man". Backpacker August: 63.

Cox L, Cox J (2009). Ecobeauty: Scrubs, rubs, masks and bath bombs for you and your friends. Berkeley [Calif.]: Ten Speed Press, pg. 219.

Cushnie TP, Lamb AJ (2005). Antimicrobial activity of Flavonoids. Int J Antimicrob Agents 26 (5): 343-356.

Edeoga HO, Okwu DE, Mbaebie BO (2005). Phytochemical constituents of some Nigerian medicinal plants. Afr. J. Biotechnol., 4(7): 658-688.

Farnworth NR, Bingel AS (1977). Problems and prospect of discovering new plant drugs with pharmacological/biological activities. 1st edition. University of New Delhi, India. Pp. 220.

Forester J, Hartmut T (2006). "MetaCyc Pathway: saponin biosynthesis I". Advances in experimental medicine and biology, Vol. 405, 377-385.

Galeotti F, Barile E, Curir P, Dolci M, Lanzotti V (2008). "Flavonoids from carnation (Dianthus caryophyllus) and their antifungal activity". Phytochemistry Letters. 1: 44.

Hach SK (2006). Do not put too much value on conventional medicine. J. Ethnopharmacol., 100: 37-39.

Kolodziej H, Kiderien AF (2005). Antijeishmanial activity and immune Modulatory effects of tannins and related compounds on Leishmania Parasitised RAW 264.7 cells. Phytochemistry. 66(17): 2056 -71.

Lü L, Liu SW, Jiang SB, Wu SG (2004). "Tannin inhibits HIV-1 entry by targeting gp 41". *Acta Pharmacol. Sin.* 25 (2): 213–8.

Michael HC (2008). Western poison-oak: Taxicodendron diversilobum, Global Twitcher ed, Nicklas Stromberg.

Moses SO, Akintayo OY, Kamil L, Labunmi EV (2010). Rec. Nat. Prod. 4 (1): 72-78.

Odutuga AA, Faremi AY (2010). Introduction to Experimental Biochemistry 2010; Jubee- niyi Publisher and Printers. Pp. 54-73.

Okeke IN, Lamikanra A, Edelman (1999). Socioeconomic and behavioural factors leading to acquired bacteria resistance to antibiotics in developing countries. Emerging Infectious Diseases. 5:18-27.

Okwu DE (1999). Medicinal plants and Traditional Medicine in Nigeria. Global. J. Pure Appl. Sci. Vol. 1 (7), 455-459.

Okwu DE, (1999). Phytochemical Analysis of some plant root tubers. Research Journal of Chemical Sciences. Vol. 1(3), 19-21.

Phan TT, Lee T, Chan SY (2001). Antioxidant and astringenic property of *Chromolaena odorata*. Phytotherapy Reasearch. 27(4), 319-27.

Rios JL, Recio MC (2005). Medicinal plants and antimicrobial activity. J. Ethnopharmacol. 100: 80-84.

Schnier M, Sies H, Illek B, Fischer H (2005). Cocoa-related flavonoids inhibit CFTR- mediated chloride transport acrossT84 human colon epithelia. J. Nutri. 135(10): 2320-5.

Trease GE, Evans CW (1985). A textbook of pharmacology, 13th Edn., ELBS Bailiere Tindall, London. 378-386.

Zachariades C, Day M, Muniappan R, Reddy G, Raman A (2009). In Biological Control of Tropical Weeds Using Arthropods, Cambridge University Press, UK, 130-160.

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