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NIGERIAN FLORA AND ITS PHARMACEUTICAL POTENTIAL III

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SUMMARY: The rich plant resources of Nigeria could have a lot of potential for pharmaceutical production. Plants are used for their anti-diabetic, anti-hypertensive, and anti-fertility effects. Some of the plants provide remedies for goitre, breast tumour, headache, jaundice, liver trouble, abortion, and paralysis. Scientists should endeavour to investigate the listed plants to confirm their efficacy. Research activities on medicinal plants in Nigerian Universities and Research Institutes are enumerated. International co-operation on research into African medicinal plants is advocated.

RESUME: Les riches ressources végétales du Nigeria pourraient être un potentiel important pour la production pharmaceutique. Quelques plantes sont utilisées pour leurs effets anti-diabétiques, anti-hypertensifs et anti-fertiles; d'autres sont un remède contre le goitre, les tumeurs des seins, les maux de tête, la jaunisse, les troubles hépatiques, l'avortement et la paralysie. Les scientifiques devraient s'appliquer à examiner les plantes énumérées pour confirmer leur efficacité. Les activités de recherche sur les plantes médicinales dans les Universités et les Institutions de Recherches du Nigeria sont dénombrées. La coopération internationale dans les recherches sur les plantes médicinales africaines est recommandée.

KEY WORDS: Traditional medicinal plants, ethnomedicine, Nigeria.

A. INTRODUCTION

Nigeria is endowed with a wide variety of natural resources including potent medicinal products of plant origin. With the diminishing returns from oil, Nigerian scientists continue to recognize that natural products have a lot of potential for pharmaceutical production. A significant percentage of modern drugs used in orthodox medical practice and in traditional herbal medicine are derived from plants. It must, therefore, be recognized that medicinal herbs, like other forms of drugs, have an essential role to play in health care.

In most developing countries research on medicinal plants is easily the most popular subject in the chemical and related biological sciences. It has an immediate popular appeal among scientists and non-scientists alike. The reasons usually given for this are mainly valid. These are:

1. that in many developing countries, particularly in Africa, there is an abundance of plants, a very large number of which have not been exploited pharmaceutically. Some of these plants are used in local traditional medicine and have been reputed, through experience inherited from past generations, to be useful medicinally;

2. it is anticipated that many of these plants can provide alternatives to imported drugs; and
3. it is expected that new substances from the plants can be discovered that will be useful against diseases for which suitable care is not yet available.

Medicinal plants as sources of anti-infective, anti-cancer, anti-convulsant, anti-malarial agents, molluscicides, laxatives, flavouring and sweetening agents have been discussed (GBILE et al., 1988; KIO et al., 1986; GBILE & ADESINA, 1986). Here we will further discuss a few of the investigated plants and a few recently collected recipes.

B. MEDICINAL PLANTS AS SOURCES OF ANTI-DIABETIC AGENTS

The recognition of diabetes as a disease is probably very recent. In some communities there is no vernacular name for diabetes and the treatment is practically unknown. The few doctors that cure this disease even rely on glucosuria for the diagnosis. They can manage both juvenile and maturity onset diabetes. They have proved remarkably competent in handling insulin dependent diabetics and cases with severe ketoses. It is not surprising therefore that a hypoglycaemic peptide, designated P-insulin, has been reported from *Momordica charantia* L. (IWU, undated). Some of the other plants that have been experimentally verified include *Alstonia* R. BR., *Aristolochia* L., *Biophytum* DC., *Catharanthus* G. DON, *Citrullus* SCHRADER, *Ipomoea* L. and *Lagerstroemia* L.

X Also in traditional medicine fully developed unripe fruit of *Carica papaya* L. (pawpaw) (*Caricaceae*) is employed in the treatment of diabetes (ADENIRAN, pers. comm.). The fruit, after peeling and slicing, is boiled and filtered. A cup full is drunk thrice daily. IWU and his group have also applied extracts of pawpaw for wound healing and for chronic arthritis. They have successfully formulated a preparation, 'Petrisept', containing standardized pawpaw extracts and boric acid for post-operative wound treatment. Papain (a hydrolyzing protein-digesting enzyme) obtained from the latex of the fully developed unripe fruit of *C. papaya* has a number of uses in the pharmaceutical, cosmetic and food industries (ADESINA & GBILE, 1986). It is used in some face creams, cleansers and tooth paste, and may also be used in preparations to control oedema and inflammation associated with surgical or accidental trauma, infection and allergies. It is also used as a remedy for hay fever, yaws, tumours, kidney and bladder troubles. *Bridelia ferruginea* BENTH. (*Euphorbiaceae*) leaves were also shown to have hypoglycaemic activity in diabetic patients as well as in alloxan treated rats (IWU, 1985). Other workers have demonstrated the presence of an hypoglycaemic agent in the extract of *Dioscorea dumetorum* (KUNTH) PAX (*Dioscoreaceae*).

In ethnomedicine, a mixture of fresh leaves of *Morinda lucida* BENTH. (*Rubiaceae*), *Momordica charantia* (*Cucurbitaceae*), *Vernonia amygdalina* DEL. (*Asteraceae*), and *Dalbergiella welwitschii* (BAK.) BAK. f. (*Fabaceae*) are ground together to a fine paste before mixing with local soap for bathing the diabetic.

An infusion of dried stem bark of *Entandrophragma utile* (DAWE & SPRAGUE) SPRAGUE (*Meliaceae*) ground to fine powder and drunk like tea every morning has also been found effective. Leaf balls or small pellets prepared from the leaves of *Azadirachta indica* A. JUSS. (*Meliaceae*) chewed and eaten after being sun-dried are still popular among patients suffering from diabetis mellitus. Glucosine and diabetoline are also reported to be present in *Tecoma stans* (L.) KUNTH (*Bignoniaceae*) (LOZOYA, 1986).

C. MEDICINAL PLANTS AS SOURCES OF ANTI-HYPERTENSIVE DRUGS

In ethnomedicine, leaves of *Vernonia amygdalina* taken as vegetable are recommended as anti-hypertensive. Fresh leaves of *Persea americana* MILLER (*Lauraceae*) washed clean, ground, boiled with water and drunk daily, are also found effective. Stem bark of *Gladiolus* L. spp. (*Iridaceae*) obtained by scraping off the outer bark, ground together with fresh roots of *Sansevieria senegambica* BAK. (*Agavaceae*) and soaked in the juice of *Citrus aurantiifolia* (CHRISTM.) SWINGLE (*Rutaceae*), is a recommended drink for hypertension (SODIPO, 1986). A tablespoon of the powdered leaf of *Ocimum gratissimum* L. (*Lamiaceae*) taken in water thrice daily has an anti-hypertensive effect. *Ficus exasperata* VAHL (*Moraceae*) prepared and used similarly may have the same effect.

Also a decoction of the barks of *Ficus platyphylla* DEL. (*Moraceae*), *Parkia biglobosa* (JACQ.) BENTH. (*Mimosaceae*) and *Butyrospermum paradoxum* (GAERTN. f.) HEPPER (syn. *Vitellaria paradoxa* GAERTN. f.) (*Sapotaceae*) is a good anti-hypertensive.

D. ANTI-FERTILITY AGENTS

The fruit of *Citrullus colocynthus* (L.) SCHRADER (*Cucurbitaceae*) (without the seeds) cut into pieces, with the root of *Anthocleista* AFZEL. ex R. BR. spec. (*Loganiaceae*), plus salt, cooked together and drunk every morning, has been found effective as an anti-fertility agent (ADEYEMO, pers. comm.). The fruit of *Spondias mombin* L. (*Anacardiaceae*) and the fruit of *Aframomum meligueta* (ROSCOE) SCHUMANN (*Zingiberaceae*), powdered and used with cold pap, are also used in ethnomedicine as anti-fertility agents.

The fruit of *Adenopus breviflorus* BENTH. [syn. *Lagenaria breviflora* (BENTH.) ROBERTY] (*Cucurbitaceae*), used in ethnomedicine in Nigeria, was investigated by ELUJOBA et al. (1985). Their studies showed that *A. breviflorus* has a significant anti-implantation action.

E. OTHER PLANTS OF MEDICINAL IMPORTANCE

Most of the plants and recipes discussed in this paper, were collected by the authors from Kaduna State (Zaria and environs) and Ogun State (Ijebu-Ode, Ago-Iwoye and environs) in northern and southern Nigeria respectively.

Ageratum conyzoides L. (*Asteraceae*): leaves chewed with a cotyledon of *Cola acuminata* (P. BEAUV.) SCHOTT & ENDL. has anti-poison effects. *A. conyzoides* ground with local soap and used regularly for bathing, is believed to enable a patient to live his normal life span (GBILE, 1988).

Anogeissus leiocarpus (DC.) GUILLEMIN & PERROTTET (*Combretaceae*): a decoction of leaves of *A. leiocarpus* and a bunch of fruitlets of *Xylopia aethiopica* (DUNAL) A. RICH. (*Annonaceae*) is a good remedy for malaria fever. The efficacy of this was confirmed by an Egyptian friend who had frequent attacks before he came for advice. Since he started to drink the decoction, he has not experienced a fresh attack of malaria.

Bryophyllum pinnatum (LAM.) OKEN [syn. *Kalanchoe pinnata* (LAM.) PERS.] (*Crassulaceae*) is a treatment for headache. Leaves are heated to get the liquid to easily squeeze out. The extract thus obtained is applied on the affected part of the head.

Calotropis procera (AITON) AITON f. (*Asclepiadaceae*): the use of *C. procera* to induce breast milk is widely known in ethnomedicine. The leaves are ground with local soap and used to wash the breasts thrice daily. The roots and

leaves are also used as remedies for convulsion, as bitter tonics, analgestics, anti-catarrhics and anti-asthmatics. The chemistry of *C. procera* has been exhaustively discussed (CHANDLER et al., 1968; HASSALL & ROYLE, 1959; GROUT et al., 1963).

Cissampelos owariensis P. BEAUV. (*Menispermaceae*) is used to prevent abortion in woman.

Cyanastrum cordifolia OLIV. (*Cyanastraceae*): the plant is known in Yoruba as 'ewe kan, egbo kan', which literally means 'one leaf, one root'. *C. cordifolia* and *Capsicum* L. spec. are made into stew and taken regularly for the treatment of goitre.

Elaeis guineensis JACQ. (*Arecaceae*): to stop serious catarrh and serious sneezing, red palm oil extracted from the seed is applied into the two nostrils. The authors have found it very efficacious.

Garcinia kola HECKEL (*Clusiaceae*): *G. kola* seeds, stem, and roots have been found to possess remarkable anti-hepatotoxic and hepatropic properties. The extract checked liver damage caused by tetrachloride, ethronine, ethyl alcohol and phathoidine. The petroleum ether extract and the top layer of the acetone extract demonstrated significant anti-microbial activity. Phytochemical studies on the plant resulted in the isolation and characterization of several flavonoids, benzophenones, triterpenes and biflavonoids (IWU & IGBOKO, 1982; IWU, 1982).

Chassalia kolly (SCHUMACH.) HEPPER (*Rubiaceae*): for the diagnosis of early pregnancy, *C. kolly* leaves are squeezed in water for bathing the woman. After bathing, the body of the subject will itch if she is pregnant. If no itching, delay in menstrual flow could be attributed to other factors. To stop the itching (which is positive for the pregnancy test), palm oil is used to rub the body. The efficacy of *C. kolly* in the diagnosis of early pregnancy has been confirmed in the Ijebu-Ode area of Ogun State, Nigeria.

Momordica charantia (*Curcubitaceae*) is used for the treatment of piles. The leaves are dried and ground. A tablespoon in water (adult dosage) is taken once a day.

Nauclea latifolia SM. (*Rubiaceae*): the roots are washed, soaked in water until yellow liquid is produced, and the liquid drunk as a curative for stomachache.

Nicotiana tabacum L. (*Solanaceae*) is used to stop frequent yawning. Water, in which fresh leaves of tobacco are soaked, is drunk. *N. tabacum* is transiently excitatory, antipyretic, sedative and is a nervine depressant. It is an excellent remedy for convulsions, giddiness and other nervous diseases and is usually formulated into many Nigerian anti-convulsant remedies (GBILE & ADESINA, 1986). The main alkaloids of tobacco are nicotine, nornicotine, and anabasine, while the main coumarins are scopoletin, esculetin, their glycosides, and scoparone (WATT & BREYER-BRANDWIJK, 1962). Apart from its economic importance as an article of trade, *N. tabacum* has a potential use as a nervine depressant and as an anti-convulsant because of its high coumarin content.

Parquetina nigrescens (AFZEL.) BULLOCK (*Periplocaceae*): leaves squeezed in water is used to bath the head of the patient ill with headache.

Peperomia pellucida (L.) KUNTH (*Piperaceae*):

1. for the treatment of headache, liquid is extracted from the leaves and applied on the affected part;
2. leaves are used for stew, - it could be cooked with *Crossandra* SALISB. spp. (*Acanthaceae*) -, and it is taken orally for the treatment of small pox and measles;
3. for breast abscess and early stages of breast tumour, fresh leaves are ground, mixed with shea butter (oil produced from the seeds of *Butyrospermum paradoxum*), and applied on the affected part.

Solenostemon monostachyus (P. BEAUV.) BRIQ. (*Lamiaceae*): the liquid extracted from leaves after warming is used for rinsing the mouth and is a good remedy for mouth infection.

Stachytarpheta indica (L.) VAHL (*Verbenaceae*): liquid from the inflorescence is extracted by grinding and is used for whooping cough and similar coughs in children. The co-author (F.A. ADEYEMI) has tried it for his children and found it very effective.

Swartzia madagascariensis DESV. (*Caesalpiniaceae*): the roots soaked in gin is used for the treatment of yellow fever. In northern Nigeria, women who have just 'put to bed' are bathed with the leaves in hot water for quick restoration of health.

Zea mays L. (*Poaceae*): leaves extracted in palm-wine (drink obtained from *Elaeis guineensis*), produces a drink that is found effective in the treatment of paralysis.

F. CONCLUSIONS

Most of the plants discussed under 'other plants of medicinal importance' are yet to be investigated. Plant requests from interested scientists are always welcome. There are truly excellent prospects for scientists to discover not only new drugs from medicinal plants but also local plants that could provide the basis for a genuine local pharmaceutical industry, provided the proper approach to medicinal plant research is adopted.

In Nigerian universities and research institutes, there are ongoing projects in relation to medicinal plants. Work is currently being done as follows: on pesticides at the University of Ibadan (Agronomy Department), Kano, Ahmadu Bello University (ABU), Agronomy Department, and at the University of Benin; on spasmolytics at the University of Nigeria, Nsukka; on anti-microbials at Obafemi Awolowo University (OAU), Ile-Ife, ABU and the University of Ibadan (Botany Department) and Calabar; on anti-malarials at the University of Port-Harcourt (Microbiology Department), and the University of Lagos, OAU; on cardiovascular agents (anti-hypertensives) at ABU, the University of Maiduguri and Benin; on anti-arthritis agents at Nsukka, Calabar and Ibadan; on anti-venoms at Nsukka; and on ethnobotany, with emphasis on ethnomedicine, at the Forestry Research Institute of Nigeria, Ibadan.

Since a good number of synthetic drugs that are used today are directly from or precursors extracted from medicinal plants, it is imperative, in order to improve the health condition of the world in general, that there should be international co-operation among scientists in the investigation of African medicinal plants.

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