International Organization for Chemical Sciences in Development

Working Group on Plant Chemistry

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African traditional healer and *Harpagophytum procumbens* (Pedaliaceae)

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14. Production of traditional medicine: preparations accepted as medicines in Mali

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Introduction

Mali is a West African country without a coastline. Its sanitary situation is characterized by the predominance of parasitic illnesses, infections and nutritional diseases together with an insufficiency of qualified health workers, medicines and equipment.

Due to this situation, 80% of the population use traditional medicine. In the Bandiagara District a study has shown that only 19.4% of current diseases have been cured by conventional medicine. Generally traditional medicine has been through 4 stages :

- the only means of therapy;
- the clandestine practice;
- the tolerance period;
- the creation of a research institute to promote traditional medicine.

In Mali, the government created, in 1968, an Institute named " *Institute of Phytotherapy*" which, in 1973, became the *National Institute of Pharmacopoeia and Traditional Medicine*. Now, this institute is called *Department of Traditional Medicine* (DMT). It is a part of the *National Institute of Research in Public Health*. The main objectives of this Department are to promote traditional medicine, the organization of the traditional system of health care and the production of medicines from local resources.

Methodology

In order to attain the objectives the methodology employed by the DMT includes: bibliographic researches, ethnobotanic surveys, phytochemical and pharmacological studies, formulation of improved traditional medicines, clinical tests (in

collaboration with " conventional doctors") and evaluation of the results by a scientific and technical committee.

Results

Since its creation, the Department of Traditional Medicine has been working mainly to bring traditional healers and herborists into associations. In addition, it started the study of the medicinal plants of Mali, through the creation of herbaria and ethnobotanic surveys. Phytochemical, pharmacological and clinical tests were also performed with some of these plants. The Institute has been working on more than 12 different traditional medicines claimed to be effective in the treatment of different diseases, such as malaria, dysentery, diarrhea, jaundice (icterus), ulcers, gastritis, constipation, asthma, cough, diabetes, hypertension, stomatitis and skin diseases. Since 1990, four Improved Traditional Medicines "Médicaments Traditionnels Améliorés" (M.T.A.) have been accepted as medicine in Mali. They are sold in pharmacies like conventional medicines. Those medicines are: Hepatisane®, Laxa cassia®, Dysenteral® and Balembo®.

This paper shows traditional uses and results of phytochemical, pharmacological and clinical studies which have been done on these four different medicines.

Hepatisane®

Hepatisane® is a finished product, in tea-bags containing 10 g of powdered dry leaves of *Combretum micranthum* G. Don. (Combretaceae). This medicine is used against digestive disturbances associated with liver diseases and jaundice (constipation, fat intolerance, sickness, loss of appetite).

The traditional indications of *C. micranthum* in Mali are fever, constipation, indigestion, stomachache, weakness, hypertension, anorexia, headache and stomatitis.

The phytochemical studies done in our laboratory showed that the leaves of *C. micranthum* contain coumarins, carotenoids, flavonoids, catechic and gallic tannins, sterols, terpenes and alkaloids. Other studies have shown the presence of the alkaloids hydroxy-stachydrine, betain and choline (Paris and Moyse-Michon 1956; Bassene *et al.* 1986), of the heterosides of flavones vitexin and orientin (Jentsch *et al.* 1962; Bassene *et al.* 1987), of inositol, sorbitol and mannitol (Bassene *et al.* 1985), and of organic acids: gallic, tartric, malic, citric and oxalic acids (Kerharo and Adams 1974).

The cholagogue effect of the leaves has been studied in our laboratory. In addition the plant has also been classified as tissular and hepatorenal diuretic (Paris and Moyse-Michon 1956; Balansard and Delphaut 1946).

Decoction of Hepatisane® (2 bags/day) has been administrated to voluntary persons suffering from jaundice during many years, at the clinic of the Department of Traditional Medicine. These persons were followed by seric control of bilirubine

and transaminases which became normal within 2 and 3 weeks after beginning of treatment. It has to be noticed that Hepatisane® should not be used in cases of obstruction of the choledoc canal or when serious hepatic cellular insufficiency is associated.

Laxa cassia®

Laxa cassia® is a finished product presented in boxes of 4 tea-bags each containing 5 g of the powdered dry leaves of *Cassia italica* Mill. (Caesalpinaceae). This medicine is used against constipation.

The traditional indication of *C. italica* in Mali is constipation through a concept of "cleaning of the stomach". In some cases, intoxication have been described after self-overdosage of this traditionally used plant.

The phytochemical studies done in our laboratory showed that the leaves contained: mucilages, anthracenic derivatives, sterol, carotenoids and coumarins. Sennosides have been identified as the active principle of this drug. In pharmacological studies, cholagogue, laxative and/or purgative effects were established.

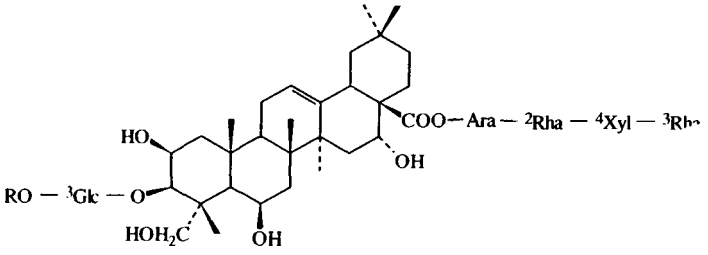
Laxa cassia® is used in decoctions of one bag per day. Excess of automedication represents some risk, and a long term use can provoke "laxative disease" characterized by diarrhea with abdominal pain and disorder of electrolytic equilibrium (hypokaliemia, hyponatremia, etc.). For this reason, Laxa cassia® should not be used by pregnant and breast feeding women.

Balembo®

Balembo® is the local name of the plant which is used for its preparation. It is a finished product, presented in syrup children and adults forms, in bottle of 100 ml. is used against cough and prepared with the fruits of *Crossopteryx febrifuga* Benth. (Rubiaceae).

Crossopteryx febrifuga is traditionally used in Mali in the treatment of cough, pneumonia, chest pain, fever, edema, diarrhea and sickness.

The phytochemical studies done at the Department of Traditional Medicine showed that the fruits contain tannins, carotenoids, coumarins, mucilages, sterols, triterpenes, leucoanthocyans and saponins. Of these, two glycosides of oleanolic acid, the crossoptines A and B were easily extracted from the roots of *C. febrifuga* by polar solvents. They exhibit light toxicity but possess antiinflammatory, analgesic and mucolytic proprieties (Pousset 1992). Their structures have been elucidated (Gariboldi *et al.* 1990) and a patent is deposited in Italy.



R = H Crossoptine A
R = Apiose Crossoptine B

The pharmacological studies done in Mali on Balembo® syrup, showed analgesic, antiinflammatory and expectorant effects. From a toxicological point of view, no evidence has been found that the aqueous extract of *C. febrifuga* was toxic for rabbits after *per os* administration. However, in intraperitoneal injection, it provokes an acceleration of breathing movements, loss of motor coordination and of balance in mice. The animals finally die as a result of respiratory stop. According to Tomas-Barberan and Hostettmann (1988), the dichloromethane extract of trunk bark contain triterpenic derivatives such as betulic acid, that have been shown to be active on colon carcinoma cell-lines.

Clinical studies done in Mali at D.M.T and *"Dispensaire anti-tuberculeux (D.A.T)"* have established the sedative effect of Balembo® syrup. For this reason, this syrup should not be used by children under six months of age. Its normal dosage consists of 1 teaspoon 3 times a day.

Dysenteral®

Amoebic dysentery and diarrhea are dominant child diseases in Mali. Although they often use oral rehydration salts, mothers continue to use medicinal plants like *Euphorbia hirta* L. (Euphorbiaceae). Dysenteral® is a tisane presented in tea bags containing 10 g of the powdered dry entire plant of *E. hirta* and its only indication is dysentery.

The traditional indications of *Euphorbia hirta* in Mali are diarrhea, dysentery and curiously asthma.

The phytochemical studies done at the DMT showed that the plant contains tannins, mucilages, leucoanthocyans, flavonoids, sterols, triterpenes and coumarins. According to Kerharo, previous studies have shown sugars, volatile substances, fatty acids, essential oils and alkaloids (Kerharo and Adams 1974). However the presence of phorbol-ester derivatives in some Euphorbiaceae recognized to be irritant and cocarcinogenetic are detrimental its use. Phenyl acetate-13-deoxy-12 hydroxy-4-phorbol has been isolated from the latex of *E. hirta* (Ayensu 1979; Sofowora 1984). However, it seems that the co-carcigenic

effect disappears with drying as is the case with *Euphorbia lathyris* (Bissel *et al.* 1981).

We have mainly run clinical tests because Ndir and Pousset have shown that extracts of *E. hirta* inhibited the proliferation of amoebae (Ndir and Pousset 1982). In the regional center of traditional medicine of Bandiagara in Mali, clinical comparison between metronidazole and Dysenteral® have been performed. After two days administration of Dysenteral® no vegetative forms of dysenteric amoebae were found. An important clinical study undertaken by Ridet and Chartol on 53 patients has shown the efficiency of an extract from *Euphorbia hirta* for stopping an epidemic amoebic dysentery (Ridet and Chartol 1964). In Dakar, Dalil has healed ten cases of amoebic dysentery with 3 times ten grams of lyophilized extract of the plant (Dalil 1984). Dysenteral® is presented in packet of 9 tea bags, and is used as a decoction (1 bag 3 times a day).

Production of M.T.A. (improved traditional medicines)

In a program of research and commercialization our department has a service of M.T.A. production. The objectives of this program are to measure how the population accepts M.T.A.; the identification of the possibility to make a large production and the incitation of the public-pharmacists to sell M.T.A. and of medical doctors to prescribe such medicines . Table 14.1. shows the production of M.T.A. from 1992 to the first half of 1995.

Table 14.1. Production of M.T.A. 1992 - 1995

M.T.A.	Presentation	Quantities/Period 1992	1993	1994	1995	Price per unit (CFA*) DMT	Public
Balembo®	child.	6'000	12'000	19'000	1'0000	415	630
	adult.	4'000	8'000	11'000	7'000	490	690
Hepatisane®	Packet	6'494	129'870	194'805	129'870	588	825
Laxa Cassia®	Packet	2'250	11'000	15'000	8'000	144	200
Dysenteral®	Packet	444	600	100	200	324	450

*100 CFA = 1 FF = *ca* 3.5 US$

We find an increase in the production of improved traditional medicines in the period 1992 to 1995. The only exception here is Dysenteral® which is not very often sold by pharmacists. This exemption can be explained by the common use of *Euphorbia hirta* which can be obtained easily by people in traditional markets. We are presently doing a in-depth toxicological research to evaluate the cocarcinogenetic effect of this plant.

Conclusion

Medicinal plants are an important element of our cultural inheritage, and their use is still expanding. The reasons for their increasing interest are the devaluation of the local currency (CFA), which has made conventional medicines more expensive, the improve infrastructure of the herborists in Bamako markets and of course the production of improved traditional medicines (M.T.A.).

Hepatisane®, Laxa cassia®, Dysenteral® and Balembo® have been retained as essential drugs in Mali. Since 1994, a law has been taken by the Malian government about the practice of private traditional medicine. M.T.A can now be produced in private industries. Each M.T.A has a technical dossier which can be obtained at the D.M.T.

New M.T.A have been proposed for sale, *i.e.* Malarial N°5® against malaria, Gastrosedal® to cure gastritis and gastroduodenal ulcers; Psorospermine® against some skin diseases. We have to continue research to identify active substances and produce pharmaceutical forms, improving quality control and securing sources of supply of plants.

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