

## Medicinal Plants Sold as Anti-Haemorrhagic in the Cotonou and Abomey-Calavi Markets (Benin)

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### Abstract

Market herbalists are one of the primary uses of primary health care for people in developing countries. They contribute to the conservation of endogenous plants and knowledge. In order to identify plants with antihemorrhagic properties sold in markets in southern Benin, an ethnopharmacological survey was carried out among 34 herbalists in 17 markets in Cotonou and Abomey-Calavi. The method used is Triplet Purchase of Medicinal Recipes (ATRM). A total of 38 plant species in 24 families were identified. The most represented family is the Rubiaceae (13.16%). The most cited species are *Cissampelos mucronata* (12.96%), *Hybanthus enneaspermus* (9.26%) and *Cassytha filiformis* (8.02%). Considering the plants mentioned in single use, *C. mucronata* (37.5%), *C. filiformis* (12.5%) and *N. laevis* (10%) were the most cited species. The leafy stem (71%) is the most used part. Two methods of preparation are mainly used, maceration (45%) and decoction (55%). The extracts of these plants could be a source of Improved Traditional Medication (AHT) for the treatment of haemorrhages.

**Keywords:** antihemorrhagic plants, herbalists, market, Cotonou, Abomey-Calavi.

### 1. Introduction

The use of traditional medicine is widespread and is of growing health and economic importance in developing countries (WHO, 2002). In Africa, up to 80% of the population uses this medicine to meet their health care needs (WHO, 2009). Among the actors of this ancestral medicine market herbalists play an important role. They are accessible and their services are cheaper (Djèdo et al., 2011). Local medicinal plant markets concentrate, maintain and disseminate empirical knowledge on the use of plant genetic resources (Adomou et al., 2012). They contribute to the conservation of endogenous plants and knowledge (Albuquerque et al., 2007).

In Benin various herbal recipes are sold by market herbalists for the treatment of a variety of pathology (Adomou et al., 2012). Among the latter, there are plants with antihemorrhagic properties (Klotoé, 2016). They make it possible to respond to various pathological situations, including metrorrhagia, menorrhagia, digestive haemorrhages and obstetric haemorrhages. The latter are one of the leading causes of maternal mortality in the world (Brücker et al., 2006; USAID, Benin, 2007). Rare information on the use of these anti-haemorrhagic plants was previously reported by Adjanohoun et al. (1989) and Akoègninou et al., (2006). However, no scientific data exist on antihemorrhagic plants sold in the markets of Benin. This is what justifies the present study, which aims to identify the plants sold in the Cotonou and Abomey-Calavi markets for the treatment of haemorrhages.

### 2. Material and Method

#### 2.1 Study Framework

Ethnopharmacological surveys were conducted in October 2011, in the two communes of Benin largest demographically (Abomey and Cotonou). This zone is located between 6 ° 20' to 6 ° 43' North latitude and 2 ° 12' to 2 ° 30' East longitude. Its surface area is 61439 ha. It is characterized by an average rainfall of 1200mm per year, a daily average temperature ranging from 25 ° C to 29 ° C and a relative humidity ranging between 69% and 97%. There are several types of ecosystems, including some dense forests in the form of flaps (UNDP, Benin, 2009).

The ethnic groups present in the study area are: Aizo, the Fon, the goun, the mina, the Mahi, the tofin, Yoruba and Adja. The markets visited for the survey were those counties or district: Abomey, Akassato, Cadjèhoun, Cococodji, Cocotomey, Dantopkpa, Fifadji, Gbégamè, Gbètaagbo, Glo-Djigbé, Godomey, Hèvié, Kpanroun, Ouèdo, Togba, Vèdoco and Zinvlé (Figure 1).

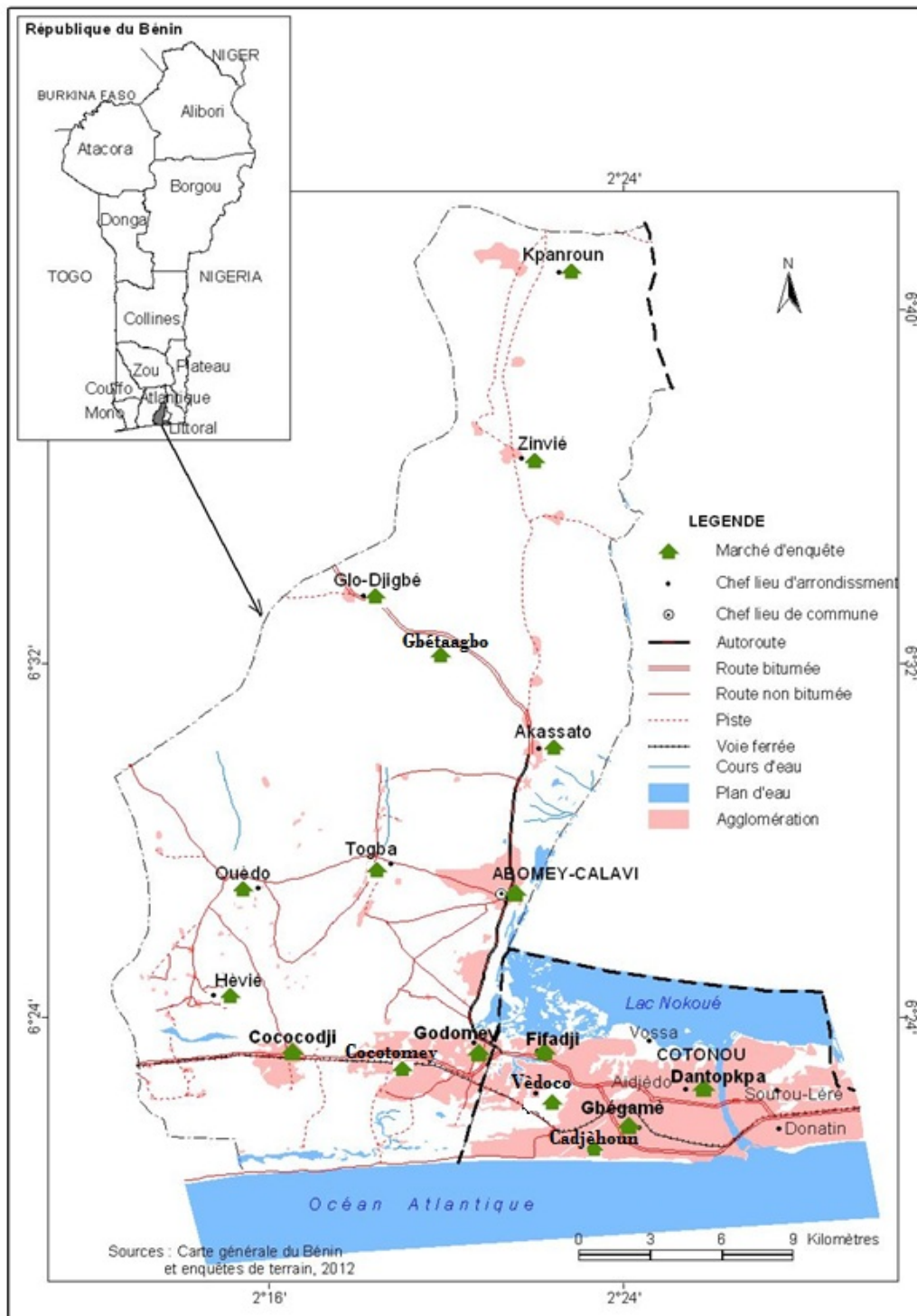


Figure 1. Map of the communes of Abomey-Calavi and Cotonou indicating the markets surveyed

## 2.2 Method of study

### 2.2.1 Collection on the Markets

This study covered 36 herbalists in 18 markets in southern Benin and was conducted using the Triplet of Medicinal Recipes (ATRM) method as described by Koudouvo (2009). This is a survey method that involves visiting the same herbalist three times in a row every week to buy three medicinal recipes to treat the same pathology. At the first visit the recipe is usually composed large number (LN) of plants. At the second visit, a reduced number (RN) of plants is requested for the same efficiency. At the third visit, a very small number (SN) is required for the same efficiency. After purchase, information on the methods of preparation and use, route of administration and duration of treatment were collected from the recipe. The names of the plants in local languages were obtained from the herbalist.

### 2.2.2 Ethnobotany Identification

The collected plants have been identified at the National Herbarium of Benin. The nomenclature used is that of the analytical Flora of Benin (Akoègninou et al., 2006). This identification has been updated to the international nomenclature. The vernacular names are obtained locally in the local language of the herbalist. The use of ethnobotanical documents on medicinal plants in Benin and neighboring countries: "Flore du Bénin" by Simone de Souza (1988), "Contribution to ethnobotanical and floristic studies in the Republic" People's Republic of Benin "by Adjanohoun et al. (1989).

## 3. Results

The 34 market herbalists surveyed are predominantly women with an average age of 54 years (from 28 years to 80 years). The interviews were conducted in local languages fon or goun. A total of 38 plant species in 24 families were identified (Table I). The most represented family is the Rubiaceae with 13.16%. The most cited species are *Cissampelos mucronata* (12.96%), *Hybanthus enneaspermus* (9.26%) and *Cassytha filiformis* (8.02%). Plants are used alone or in combination with 2 to 8 plants (Figure 2). Considering the plants used alone, *C. mucronata* (37.5%), *C. filiformis* (12.5%) and *N. laevis* (10%) were the most cited species (Table I). We obtained a high number of recipes at 1 plant on the second and third visits (Figure 2). The plant parts most used in the treatment of haemorrhage by herbalists are: leafy stems, whole plants, leaves and roots (Figure 3). Two methods of preparation are mainly used, maceration (45%) and decoction (55%). All preparations are administered per os. Some non-vegetable substances, in particular kaolin, are sometimes added to the various preparations.

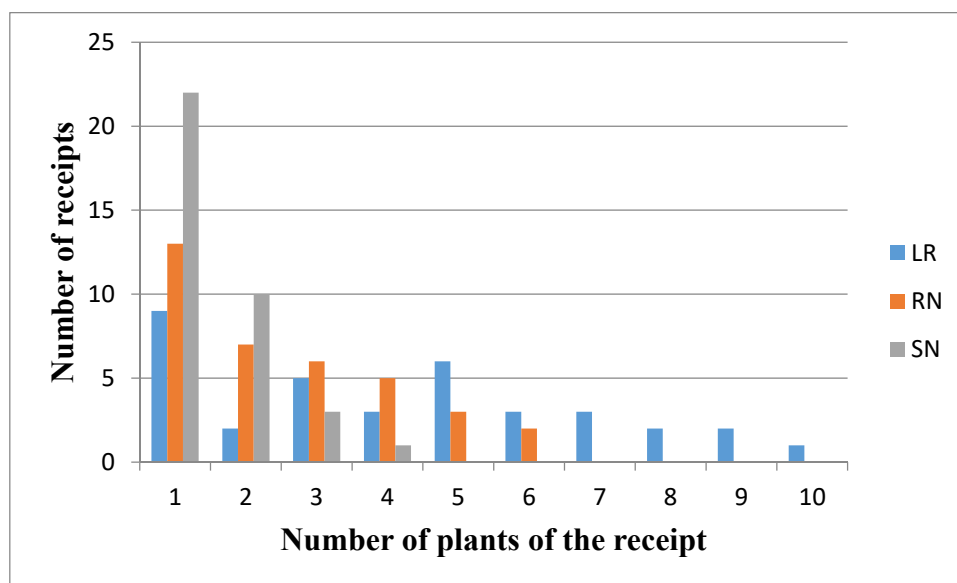


Figure 2. Repartition of the plants by receipt

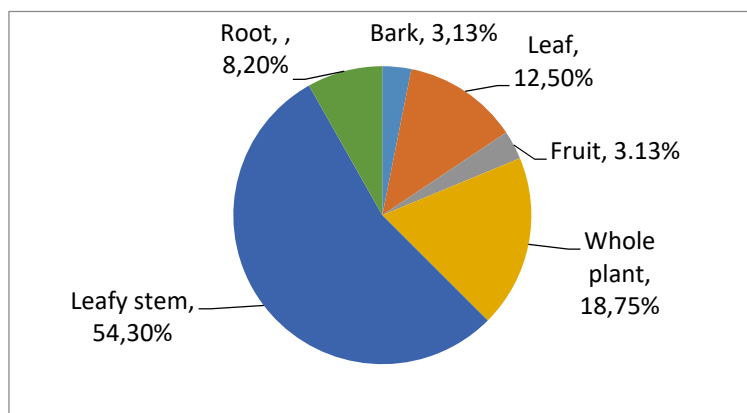


Figure 3. Repartition of plants parts used

Table antihemorrhagic plant sold in the markets of Cotonou and Calavi

Species	Family	Local name	Used part	Method of preparation	Frequency of use (%)
<i>Ampelocissus leonensis</i> (Hook.f.) Planch.	Vitaceae	Dosumadodwe	Tige feuillée	Decoc	1,23
<i>Annona senegalensis</i> pers.	Annonaceae	Nyiglwe	Feuilles	Macer+ kaolin	5,56
<i>Cassytha filiformis</i> L.	Lauraceae	Agbégbèkan	Plant entière	Macer+ kaolin	<b>8,02</b>
<i>Cissampelos mucronata</i> A. Rich	Menispermaceae	Jokojè	Tige feuillée	Macer+ kaolin	<b>12,96</b>
<i>Cnestis ferruginea</i> DC.	Connaraceae	Gboviahu	Tige feuillée	Decoc	2,47
<i>Croton gratus</i> Burch.	Euphorbiaceae		Tige feuillée	Decoc	1,23
<i>Desmodium ramosissimum</i> G.Don	Leguminosae-Papilionoideae	Zédali	Tige feuillée	Decoc	1,85
<i>Detarium microcarpum</i> Guill. & Perr.	Leguminosae caesalpinivideae	Dakpa	Ecorce	Decoc	0,62
<i>Dichapetalum madagascariense</i> Poir. X	Dichapetalaceae	Gbaglo	Tige feuillée	Decoc	1,23
<i>Diodia sarmentosa</i> Sw.	Rubiaceae		Tige feuillée	Decoc + kaolin	2,47
<i>Diodia serrulata</i> (Beauv.) G. Taylor	Rubiaceae	Irawo	Tige feuillée	Macer + kaolin	0,62
<i>Ehretia cymosa</i> Thonning	Boragniaceae	Myonma	Tige feuillée	Decoc	1,85
<i>Flabellaria paniculata</i> Cav.	Malpighiaceae	Bakara	Tige feuillée	Macer + kaolin	1,85
<i>Heterotis rotundiloba</i> (Sm.) Jacq.-Fél.	Melastomataceae	Hélé	Plante entière	Macer + kaolin	6,79
<i>Hybanthus enneaspermus</i> (Linn.) F. Muell.	Violaceae	Abiwèlè	Plante entière	Decoc + kaolin	<b>9,26</b>
<i>Hibiscus surattensis</i> L.	Malvaceae	Kpofin	Tige feuillée	Decoc	1,23
<i>Hyptis suaveolens</i> Poit.	Lamiaceae	Afio	Tige feuillée	Decoc	3,7
<i>Indigofera bracteolata</i> DC.	Leguminosae-papilionoideae	Kpanwoem	Tige feuillée	Decoc	0,62
<i>Indigofera geminata</i> Bak.	Leguminosae-papilionoideae		Tige feuillée	Decoc	0,62
<i>Jatropha curcas</i> L.	Euphorbiaceae	Gbaguidikpotin	Feuille	Macer	1,85
<i>Kigelia africana</i> (Lam.) Benth.	Bignoniaceae	Gnanbliqpo	Fruit	Decoc	0,62
<i>Lantana camara</i> L.	Verbenaceae	Hlachioyo	Tige feuillée	Decoc	4,94
<i>Lippia multiflora</i> Moldenke	Verbenaceae	Agalala	Tige feuillée	Decoc	1,85
<i>Microsorium scolopendria</i> (Burm.f.) Copel.	Polypodiaceae	Dogoman	Feuille	Decoc + kaolin	1,85
<i>Morinda lucida</i> benth.	Rubiaceae	Houinssin	Tige feuillée	Decoc	1,85
<i>Newbouldia laevis</i> P.Beauv.	Bignoniaceae	Désslégué	feuille	Macer + kaolin	4,32
<i>Ocimum canum</i> Sims.	Lamiaceae	késsoukèssou	Tige feuillée	Macer + kaolin	3,09
<i>Paullinia pinnata</i> L.	Sapindaceae	Hèdulif	Tige feuillée	Decoc	3,09
<i>Pavetta corymbosa</i> (DC.) F.N. Williams	Rubiaceae	Lokou	Tige feuillée	Decoc	0,62
<i>Pupalia lappacea</i> (L.) Juss.	Amaranthaceae	Trèdoavohou	Tige feuillée	Decoc	0,62
<i>Rourera coccinea</i> (Thonn. ex Schum.) Benth. L.	Connaraceae	Vikpomba	Tige feuillée	Macer + kaolin	6,17
<i>Rytigynia umbellulata</i> (Hiern) Robyns	Rubiaceae	Gbadéman	Tige feuillée	Decoc	0,62
<i>Schrankia leptocarpa</i> DC.	Leguminosae-minosoideae	Ahossiboassa	Tige feuillé	Decoc	0,62
<i>Schwenckia americana</i> L.	Solanaceae	Zron ou Amankuikui	Tige feuillée	Decoc	0,62
<i>Sebastiania chamaelea</i> L.	Euphorbiaceae	Ahèhèma	Tige feuillée	Decoc	0,62
<i>Secamone afzeli</i> Schult.	Aselepiadaceae	Zukudjou	Plante entière	Decoc	1,23
<i>Sida javensis</i> Cav.	Malvaceae		Plante entière	Decoc	0,62
<i>Waltheria indica</i> L.	Sterculiaceae	Adassoussou	Tige feuillé	Decoc	0,62

Macer: macération ; Decoc : decoction.

#### 4. Discussion

The present study identified 38 plant species used in Benin as haemostatic plants. Of these, twenty-four (24) medicinal plants including seven (07) unique species have never been cited in the literature for their anti-haemorrhagic properties. In Benin, no comprehensive studies have so far been conducted on anti-haemorrhagic plants sold in markets. In West Africa, the few existing data on these plants come from ethnobotanical surveys carried out in Niger, Mali, Togo, Benin and Nigeria by Adjanohoun et al. (1980, 1981, 1986, 1989, 1991, 1993). In addition, the work of Awoyemi et al. (2012) in Nigeria and Sheikhyoussef et al. (2011) in Namibia.

Data collection among market herbalists using the ATRM survey method showed a significant decrease in the number of plants per receipt between the first and third visits. The association, by market herbalists, of several plants in a recipe with several justifications. For some, this choice is guided by pecuniary reasons, the price of recipes generally being a function of our plants. For others, it is the search for great efficacy that motivates the association of several plants. Some herbalists have also confessed to systematically adding antibiotic and anti-anemic plants to their recipes. If sometimes the synergy of action can justify the large number of plants in a recipe, in most other cases there is a surplus of plants that have nothing to do with the therapeutic indication. Herbalists are often unaware of the harmful effect of surplus plants on health. The same observations were made in Togo on antimalarial receipts (Koudouvo, 2009). This author showed that the number of plants per recipe was reduced significantly from the first to the third visit.

The use of *A. senegalensis* as a hemostatic plant has previously been reported in Niger and Benin (Adjanohoun et al., 1980, 1989). *N. laevis* has been reported as haemostatic in Siéra Léone (Kargbo, 1979) and Benin (Adjanohoun et al., 1989). *P. pinnata* has been cited for its use in arresting haemorrhages in Côte d'Ivoire, Burkina Faso and Madagascar (Pernet, 1957, Kerhara and Bouquet, 1950, Tra Bi Fézan, 1997). The same is true for *C. mucronata*, whose roots are used in combination with the roots of *Waltheria indica* and *Leptadenia hastata* for the treatment of gonorrhoea (Kerharho et al., 1974). The whole aerial part of *C. mucronata*, triturate in water plus kaolin is used for the treatment of metrorrhagia and menometrorrhagia (Adjanohoun et al., 1989). However, to our knowledge, *C. filiformis* has never been cited by other authors as an anti-haemorrhagic plant.

It should be noted that some plants indicated by the trad- therapists in a previous study (Klotoé et al., 2013) are non-existent in herbalists. This is explained on the one hand by the difficulties related to the conservation of plants on the stalls by the herbalists who sell raw plant material consisting of plant organs or the whole plant. This is the case of *Jatropha multifida* L., which, due to its high water content (Shu et al., 2008), can not be preserved for long. On the other hand, traditional healers use the fresh sap of certain plants as hemostatic (the case of *Musa sapientum* L.) or transform them into more conservative herbal medicines than raw plant material.

The most common plant parts used for the haemostatic plants identified in this study were leafy stems (27.15%), leaves (26.25%), whole plants (13.88%) and trunk barks 13.56%). Aerial parts (leaves and leafy stems) have been identified in previous studies as the most important organs used (Klotoé, 2016). However, the use of the entire plant or bark (27.44%) may constitute a threat to biodiversity. Medicinal recipes, prepared mainly by decoction (44%) and maceration (40%), and administered mainly by oral (70.88%) or local application (29.12%), show similar results to those obtained in previous studies (Koua et al., 2008; Koudouvo et al., 2011).

#### 5. Conclusion

In Benin, a variety of plants are sold in markets for the treatment of haemorrhages. The most cited species are *Cissampelos mucronata*, *Hybanthus enneaspermus* and *Cassytha filiformis*. Considering single-plant recipes, *C. mucronata*, *C. filiformis* and *N. laevis* were the most cited species. These plants could be a source of Improved Traditional Medication (AHT) for the treatment of haemorrhages. Hemostatic tests should, however, be carried out on extracts of these plants in order to confirm their efficacy. Toxicological tests are also required to ensure the safety of these plants.

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