

## Research and Reviews: Journal of Pharmacy and Pharmaceutical Sciences

### Ethnopharmacological Studies for Sustainable Development in Cameroon

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#### Research Article

Received:04-07-2016

Revised: 22-07-2016

Accepted:28-07-2016

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**Keywords:** Ethnopharmacological, Sustainable development, Cameroon, Drugs discovery, Medicinal plants, Diseases.

#### ABSTRACT

**Aim:** Several diseases continue to affect strongly the populations' health in Africa. Meanwhile Ethnopharmacology, a scientific interdisciplinary study of natural substances and related knowledge's or practices that cultural groups implement for therapeutic, curative, preventive or diagnostic purposes, must be developed in the continent. Therefore sustainable development, a conception of common well being developed since the end of the 20<sup>th</sup> century can be effective by developing in Africa low-priced phytodrugs for consumption and exportation. The objectives of this study were to sustainably collect and document important cultural heritage before it is lost and to investigate and evaluate agents used to promote drug discovery in Cameroon. **Materials and methods:** To achieve these objectives we have used a methodology that begun by a field work, that started by harvesting and identifying plant species with confirmation in National Herbarium and the Ethnopharmacological detailed preparation of recipes and ended by the research of previous studies on recorded plants. **Results:** Forty-three (43%) of recorded plants is been documented for the treatment of diseases and investigated for their phytochemical and activities confirming of the rationalization of their traditional uses. Some plants are documented for the first time for their medical use, for example *Massularia acuminata* for hypertension, *Pentaclethra macropylla* for infectious diseases, *Hallea stipulosa* for difficult deliverance, *Guibourtia tessmannii* for diabetes, *Piliostigma rufescens* for dysentery, *Carica papaya* for cancer and *Solanum*

*torvum* for gastric pains. **Conclusion:** The results of this study stimulate a sustainable development by providing the basis for low cost drugs discovery and by documenting biodiversity for long time exploitation.

## INTRODUCTION

Ethnopharmacology is scientific interdisciplinary study of a set of vegetal, animal or mineral materials and related knowledge's or practices that, socio cultural groups implement for modify the states of living organisms, for therapeutic, curative, preventive or diagnostic purposes. For instance several plants used generally in Africa and particularly in Cameroon have been studied in Botany, chemistry and pharmacology [1]. Searches of new active ingredients by pharmaceutical laboratories and universities have permit to confirm certain traditional uses. During the open ceremonies of Harare forum in 2000 Doctor Ebrahim M. Samba, regional Director of WHO for Africa, has declared: «It must give to traditional medicine the respect and the place that it merits». He declares that WHO was ready to bring it assistance to protect intellectual property related to indigenou knowledge on traditional medicine and to facilitate the creation of botanical gardens intended for the cultivation and the preservation of local medicinal plants. For Doctor Samba WHO is disposed to supply a technical help for the drugs discovery from medicinal plants and to insure the production for local consummation and exportation, in the respect of good practices of manufacture.

Despite the absence of legal management, necessary for the development of searches and production of phytodrugs in Africa, we assist to the creation and the production of African simple specialties from some plants used traditionally and susceptible to replace in certain cases imported medicines.

Cameroonian floral has about ten thousand species of plants [2]. Yet, less than hundred and twenty medicinal plants are recorded [3]. Synthetic drugs cannot always duplicate the curative properties of natural drugs. Today major number of pharmaceutical firms and medical research institutions are returning to their roots in the plant world. The objective of this study was to collect and document information on herbal remedies traditionally used for the treatment of diseases and susceptible to promote drug discovery in Cameroon.

## METHODOLOGY

It was begun by a field work, divided into parts: The collect and identification of plant samples with confirmation in National herbarium and the Ethnopharmacological detailed preparation of recipes including the weight of plant parts and volume of solvent used, the plant(s) or nonplant(s) associated, the modes of preparation including decoction, maceration, infusion, triturating, inhalation, scarification, washing, purge, ointment, etc, posology, duration of preparation, mode of administration and duration of treatment.

The process used to collect information has begun by a field work based on harvest and identification of plants of interest. During this step Ethnopharmacological detailed preparation of recipes were described with the aim of informants. This description focused on the mode and the time of preparation, the mode of administration, the posology, the duration of treatment, the undesirable or secondary effects, the toxic effects and the disease treated. It was followed by the chemical and pharmacological approach based on investigation of previous searches. Hence chemistry and pharmacology have also played a great role in the evaluation of natural products [4]. Confirmation of botanical identification was done in National Herbarium of Cameroon and voucher specimens are deposited in the Institute of Medical Researches and Medicinal Plants Studies.

Data were collected from 91 respondents drawn from 28 tribes using some validated questionnaires. The distribution of the respondents includes 41 traditional healers and 50 other resource persons. All the recipes were presented following diseases of different human apparatus including cardio-vascular, digestive, respiratory, nervous, female genital, male genital and urinary; bone-muscle-joints, Nose-mouth-throat-ear, eyes, skin and pediatric pathologies, symptoms and particular syndromes like anorexia; diseases and particular indications like alcoholism [5,6].

## RESULTS

### Detailed Description of Recipes

All diseases, modes of recipes' preparation, routes of administration and durations of treatment are presented in **Table 1**.

**Table 1.** Description of recipes following logical regroupings of diseases.

Human apparatus	Diseases	Plants/mineral Scientific and vernacular names (Dialect)	Ethnopharmacological preparation Quantity of water used in liter	Quantity	Duration of preparation	Route of administration Number of doses daily	Duration of treatment in days
Cardio-vascular	1. Pre-cordial pains	1. <i>Piper umbellatum</i> (Piperaceae) Nbebe 5 Yemba-Dschang)	Pounded powder	Dry stem bark		Ointment by thoracic scarifications	2
	2. Epistaxis	2. <i>Amaranthus hybridus</i> (Amaranthaceae) associated with 3. <i>Ocimum gratissimum</i> (Lamiaceae) Ndali (Bakundou), Nkuwri (Bangwa), Ose mo-se (Bakossi)	Triturating	Two leaves of each species		Instillation of 2-4 drops of juice in one orifice of nose, eyes, ears	1
	3. Hypotension	4. <i>Croton haumanianus</i> (Euphorbiaceae)	Decoction 2	Stem bark 150 g	15 min	Oral 250 ml 2	3
		5. <i>Persea americana</i> (Lauraceae) Peye (Balong), Eju Okara (Ejagham)	Decoction 6	100 leaves 150 g	1 hour	Oral 250 ml 3	3
	4. Hemorrhoid	6. <i>Alchornea cordifolia</i> (Euphorbiaceae) Sadjodjo (Bafia), Abouc (Bafut)	Decoction 1	Fresh leaves	15 min	Anal application 1-2	5
	5. Hypertension	7. <i>Catharanthus roseus</i> (Apocynaceae) 8. <i>Garcinea kola</i> (Clusiaceae) Nya (Oroko, Yemba-Menoua), Onyie (Ewondo) 9. <i>Musanga cecropioides</i> (Cecropiaceae) Oseng (Eton), Aseng (Ewondo, Boulou) 10. <i>Massularia acuminata</i> (Rubiaceae)	Decoction 2	Fresh root: 150 g	15 min	Oral 250 ml 3	7
	6. Palpitations	11. <i>Crossopteryx febrifuga</i> (Rubiaceae) 12. <i>Lannea welwitschii</i> (Anacardiaceae) 13. <i>Glyphea brevis</i> (Tiliaceae)	Decoction 2 Maceration 1	Root 300g Stem bark 150 g Leaves 30 g	15 min 15 min 1 hour	Oral 125 ml 3 Oral 50 ml 3 Oral 3	7 3
	6-Nose bleeding	See 3- <i>Ocimum gratissimum</i> (Lamiaceae) 14. <i>Sarcocephalus latifolius</i>	Triturating	Fresh leaves		Instillation 1-4 drops of juice per nostril 2	4

		(Rubiaceae) Shi Nkan She (Oku)					
Digestive	7. Constipation 8-Colic (and Hypertension, Diabetes Hemorrhoid)	See 14 <i>Sarcocephalus latifolius</i> (Rubiaceae) 15. <i>Citrus auranthifolia</i> (Rutaceae) 16. <i>Allium sativum</i> (Liliaceae) Lah (Yemba-Menou), Albacce (Fufuldé)	Decoction <b>2</b> .  Contraindication: <b>pregnancy</b> , side effect: <b>vomiting</b>	100 g fresh root,  1 Lime  50 g garlic	20 min	Oral 250 ml  <b>2</b>	1-7
	9. Gastritis	17. <i>Emilia coccinea</i> (Asteraceae)	Infusion	Leaves	1 hour	Oral 250 ml <b>3</b>	7
	10. Pathologic accumulation of gas or air in the colon	18. <i>Cola acuminata</i> (Sterculiaceae)  19. <i>Myrianthus arboreus</i> (Cecropiaceae) Ngala (Pygmies-Baka), Ekekom (Eton, Ewondo)	Decoction <b>2</b>  Decoction <b>3</b>	Stem bark 150 g  Stem bark 50 g Leaves 50 g	15 min  15 min	Oral 250 ml <b>3</b>  Oral 250 ml <b>3</b>	
	11. Dysentery	20. <i>Acanthospermum hispidus</i> (Asteraceae)	Decoction <b>3</b>	Leaves 100 g	15 min	Oral 250 ml <b>3</b>	2
		See 16 <i>Allium sativum</i> (Liliaceae)	Grind into pasta and mix with honey	Fresh bulb 50 g		Oral 10 ml <b>3</b>	2
		21. <i>Zyzygium guineense</i> (Myrtaceae)	Decoction <b>2</b>	Leaves 300 g	15 min	Oral 125 ml <b>3</b>	4
	12. Constipation	22. <i>Anchomanes difformis</i> (Araceae)	Decoction <b>2</b> side effect: <b>dizziness, irritation of throat</b>	Rhizome 100 g	15 min	Oral 75 ml <b>2</b>	3
		23. <i>Drypetes gossweileri</i> (Euphorbiaceae)	Maceration <b>2</b>	Stem bark 150 g	At least 1 hour	Washstand of a Child	2
	13. Diarrhea	24. <i>Clerodendron splendens</i> (Verbenaceae)	Decoction <b>4</b>	Leafy stem 200 g	15 min	Oral 125 ml	7
		25. <i>Streptogyna crinita</i> (Poaceae)	Maceration <b>1</b>	Leafy stem 50 g	1 hour	Oral 10 ml <b>3</b>	3
		26. <i>Tetracera alnifolia</i> (Dilleniaceae)	Decoction <b>1</b>	Leafy stem 50 g	10 min	Oral 15 ml <b>2</b>	3
		27. <i>Millettia laurentii</i> (Papilionaceae)	Decoction <b>2</b>	Stem bark 150 g	15 min	Oral 75 ml <b>2</b>	2

Female genital	14. Dysentery	See 20. <i>Acanthospermum hispidus</i> (Asteraceae)	Decoction 2	Fresh Leaften stem 50 g	10 min	Oral 250 ml 1	3	
		28. <i>Combretum racemosum</i> (Combretaceae)	Decoction 2	Root 100 g	15 min	Oral 125 ml 3 adults 10 ml 3 Child 5 ml 2 babies	7	
		29. <i>Ptilostigma rufescens</i> (Papilionaceae)	Decoction 2	Stem bark :150 g	15 min	Oral 250 ml 3	3	
	15. Dyspepsia	30. <i>Piptadeniastrum africanum</i> (Mimosaceae)	Decoction 3	Stem bark	15 min	Oral 250 ml 1	2	
		31. <i>Crinum ornatum</i> (Amaryllidaceae)	Decoction 3 side effect: diarrheas polyuria, vomiting	Stem 200 g	15 min	Oral 325 ml 3	1	
	16. Epigastral gia- gastralgia	See 22. <i>Anchomanes difformis</i> (Araceae)	Decoction 2 side effect: dizziness, irritation of throat	Rhizome 100 g	15 min	Oral 75 ml 2	3	
		32. <i>Brillantaisia patula</i> (Acanthaceae)	Decoction 1	Leaves 50 g	15 min	Oral 300 ml 2	3	
	17. Hernia	33. <i>Anthocleista vogelii</i> (Loganiaceae)	Decoction 2	Stem bark 250 g	15 min	Oral 125 ml 3	3	
	18. Nausea- vomiting	34. <i>Ficus exasperata</i> (Moraceae) Lewua (Eton)	Decoction 2	Stem bark 150 g	15 min	Oral 250 ml 3	3	
	19. Intestinal parasites	35. <i>Olax subscorpioides</i> (Olacaceae)	Maceration 2	Root bark 50 g	1 hour  15 min	Oral 20 ml 1	2	
			Decoction 2	Leaves 50 g	15 min	Oral in fasting 20 ml adult 1 10 ml child 1	Repeat the treatmen t after 2 days	
	20. Hemorroid	36. <i>Anonidium mannii</i> (Annonaceae)	Maceration 2	Leaves 500 g and Kawa 50 g	1 hour	Anal washstand with warm decoction 2	5	
		<b>Gynaecology</b>						

21. Algomenorrhoea (dysmenorrhoea)	37. <i>Lannea welwitschii</i> (Anacardiaceae)	Decoction 2	Stem 150 g and root bark 150 g	15 min	Oral 125 ml after eating 3	3
	38. <i>Securidaca longepedunculata</i> (Polygalaceae)	Decoction 2	Leaves 100 g	15 min	Oral 125 ml 1	7
22. Pelvic pains	39. <i>Hallea stipulosa</i> (Rubiaceae)	Decoction 2	Stem bark 150 g	15 min	Oral 150 ml 3	2
	40. <i>Harungana madagascariensis</i> (Hypericaceae) Endo (Eton)	Decoction 2,5	Fresh stem bark 250 g	35 min	Oral 150 ml Washstand	1
	41. <i>Isolona hexaloba</i> (Annonaceae)	Decoction 2,5	Stem bark 250 g	15 min	Oral 150 ml, 3 first and third day 150 ml second and fourth day	4
	42. <i>Tetrorchidium didymostemon</i> (Euphorbiaceae)	Decoction 2  The excess provoke slight diarrhea	Root 50 g	15 min	Oral 75 ml of warm decoction 2	5
23. Hyperpolymenorrhea	43. <i>Iringia grandiflora</i> (Irvingiaceae) Num andok (Eton) Associated to 44- <i>Staudtia stipitata</i> (Myristicaceae)	Decoction 2	Leaves 50 each	15 min	Oral 250 ml	7
	45. <i>Paspalum conjugatum</i> (Poaceae)	Decoction 2	Leaften stem 100 g	15 min	Oral 250 ml 3	4
24. Gynecologic infections	46. <i>Cylicodiscus gabunensis</i> (Mimosaceae) Adoum (Ewondo), Adun (Eton)	Decoction 2	Stem bark 100 g	15 min	Oral 250 ml 3	4
	See 40 <i>Harungana madagascariensis</i> (Hypericaceae)	Decoction 2,5	Fresh stem bark 250 g	35 min	Oral 150 ml Intimate washstand	7
25. Megacalpos	47. <i>Baillonella toxisperma</i> (Sapotaceae)	Decoction 2,5	Stem bark 250 g	35 min	Oral 150 ml Washstand	7
26. Itch of external parts of vagin	48. <i>Dacryodes edulis</i> (Burseraceae)	Decoction 2,5	Leaves 50 g Stem bark 100 g and root 100 g	30 min	Intimate Washstand	3
27. Female Sterility	49. <i>Buchholzia coriacea</i> (Capparidaceae)	Decoction 2	Leaves 100 g	15 min	Oral 150 ml 3	7

	50. <i>Ongokea gore</i> (Clusiaceae)	Decoction 2	Stem bark 100 g	15 min	Oral 125 ml 3	7	
	51. <i>Tristemma hirsutum</i> (Melastomataceae)	Decoction 2	Leaften stem 100 g	15 min	Oral 150 ml 2	7	
			<b>Obstetric and Pregnancy</b>				
28. Repeated abortion	See 42 <i>Tetrachidium didymostemon</i> (Crassulaceae), Associated to 52- <i>Kalanchoe crenata</i> (Crassulaceae) and 53. <i>Cissus aralioides</i> (Vitaceae) Ndieh gap (Bamoun)	Grind into pasta and mix in 75 ml  Undesirable effect: Vomiting	Leaves Pasta of 50 g of each plant		Ointment of thorax and abdomen until delivery	7 mo nth s	
29. Spontaneous abortion							
30. Stillborns							
31. Interruption of pregnancy	54. <i>Boeravia diffusa</i> (Nyctaginaceae)	Triturating	Leaves		Vaginal injection of juice	3	
32. Threat of abortion	55. <i>Macaranga hurifolia</i> (Euphorbiaceae)	Decoction 2 Undesirable effect:: <b>emetic</b>	Stem bark	15 min	Oral 250 ml	8 mo nth s	
	56. <i>Dichrostachys cinerea</i> (Mimosaceae)	Decoction 2 liters of Raphia wine	Leaves 100 g	15 min	Oral 150 g 2	7	
	<b>Childbirth</b>						
33. Dystocia: ocytotic (Difficult delivery)	57. <i>Hippocratea myriantha</i> (Hippocrateaceae)	Pounded powder	Dry leaves		Oral 10 ml of powder before two weeks of delivery	7	
	58. <i>Basella alba</i> (Basellaceae)	Decoction 3	Stem bark 150 g	15 min	Oral 150 ml 3	2	
	59. <i>Hyphaene thebaica</i> (Arecaceae)	Decoction 2	Apical buds 200 g	15 min	Oral 150 ml 1	1	
See 30. Stillborns	60. <i>Macaranga hurifolia</i> (Euphorbiaceae)	Decoction 2 Undesirable effect:: <b>emetic</b>	Stem bark 150 g	15 min	Oral 250 ml	8 mo nth s	
34. Childbirth preparation	61. <i>Trema orientalis</i> (Ulmaceae)	Maceration 2	Young leaves 100 g	1 hour	Oral 20 ml 2 Intimate washstand 2	7	
	<b>After delivery problems</b>						



	35. Agalactia or hypogalactia	See 48. <i>Dacryodes edulis</i> (Burseaceae)	Decoction 4 <b>Stop breastfeeding during the treatment</b>	Stem bark 500 g	30 min	Oral 325 ml <b>3</b>	7
	36. Mastrite	Animal 1-Guinea fowl Animal 2- Four-legged reptile	Scarification	Claws		Skin scarification Claw the breasts with guinea fow or four-legged reptile	1
	37. Sexual asthenia	62. <i>Paussinystalia yohimbe</i> (Rubiaceae)	Decoction <b>3</b>	Stem bark 200 g	15 min	Oral 150 ml <b>3</b>	7
Male genital and urinary		63. <i>Acridocarpus conolensis</i> (Malpiniaceae)	Consumption	Fresh Stem bark and dry grantnut		Oral <b>2</b>	7
		64. <i>Penianthus longifolius</i> (Menispermaceae)	consumption	Pieces of stem with <i>Aframomum melegueta</i> seeds		Oral <b>3</b>	7
	38. Azoospermia	See 58. <i>Basella alba</i> (Basellaceae)	Decoction <b>3</b>	Stem bark 150 g	15 min	Oral 150 ml <b>3</b>	2
	39. Urogenital infection	See 4. <i>Croton haumanianus</i> (Euphorbiaceae)	Decoction <b>2</b>	Stem bark 150 g	15min	Oral 250 ml <b>2</b>	10
		65. <i>Mitragyna inermis</i> (Rubiaceae)	Decoction <b>2</b>	Stem bark 150 g	15 min	Oral 250 ml <b>3</b>	7
	40. Male Sterility	66. <i>Ongokea gore</i> (Olacaceae)	Decoction <b>2</b>	Stem bark 125 ml	15 min	Oral 250 ml <b>2</b>	21
	41. Hypertrophy of prostate	67. <i>Prunus africana</i> (Rosaceae)	Decoction <b>3</b>	Stem bark 200 g	15 min	Oral 250ml <b>3</b>	3
Respiratory	42. Asthma	68. <i>Annona senegalensis</i> (Annonaceae) Mbagami Eton)	Decoction <b>2</b>	Root 300 g	15 min	Oral Adult 125 ml Child 25 ml <b>2</b>	3
	43. Bronchitis	69. <i>Annona muricata</i> (Annonaceae)	Decoction <b>2</b>	Leaves 50 g	15 min	Oral 250 ml <b>6</b>	5
	44. Congestion of lungs	See 42. <i>Tetrorchidium didymostemon</i>	Decoction <b>3</b>	Stem bark 200 g	15 min	Oral <b>1</b>	1
	45. Dyspnea	70. <i>Ageratum conyzoides</i> (Asteraceae)	Maceration <b>2</b>	Leafstem 100 g	1 hour	Oral 250 ml <b>3</b>	7
		71. <i>Cissus vogelii</i> (Vitaceae) Ndig (Kaka) and 72. <i>Ananas comosus</i> (Bromeliaceae) Lélan (Yemba-Menoua)	Decoction <b>1</b>	100g de liana 100 g d'anans	15 min	Oral 250 ml <b>3</b>	10



	46. Influenza	74. <i>Eleusine indica</i> (Poaceae)	Decoction 2	Leaften stem 100 g	15 min	Oral 250 ml 2	5
	47. Pneumonia	75. <i>Petersianthus africanus</i> (Lecythidaceae.) Abing (Ewondo)	Decoction 2	Stem bark 200 g	15 min	Oral 250 ml 2	7
	48. Cough	76. <i>Abrus precatorius</i> (Fabaceae)	Decoction 2	Leaves 100 g	15 min	Oral 250 ml 2	7
	49. Tuberculosis	See 22. <i>Anchomanes difformis</i> (Araliaceae)	Decoction 2	Rhizome 100 g	15 min	Oral 50 ml 2	30
Bone-muscle-joints	50. Lumbago	77. <i>Parinari excelsa</i> (Chrisobalanaceae)	Decoction 3	Fresh root 500 g	30 mn	Oral 250ml 2	7
	51. Tiredness	78. <i>Barteria fistulosa</i> (Passifloraceae)	Decoction 3	Stem bark 200 g	20 min	Oral 125 ml 2	7
		79. <i>Craterispermum sp</i> (Rubiaceae)	Decoction 3	Stem bark 200 g	15 min	Oral 125 ml 2	7
	52. Vertebral column deformation	80. <i>Dissotis rotundifolia</i> (Melastomataceae)	Decoction 3	Leaves 100 g	15 ml	Oral 125 ml 2	7
	53. Fracture	See 3. <i>Ocimum gratissimum</i> (Lamiaceae) 81. <i>Senna occidentalis</i> (Caesalpinaceae) Ngasila (Baya), Mamatasha (Fufuldé) 82. <i>Arachys hypogea</i> (Papilionaceae) 83. <i>Musa paradisiaca</i> (Musaceae) 84. <i>Monodora myristica</i> (Annonaceae) Pebe (Douala), Kessam (Anyang)	Grind into pasta 2	leaves 50 g each  Pasta    Seeds 50 g		Immobilize the fracture site and massage with the pasta of all these plants  2	8 months
	54. Myosites (Muscle pains)	85. <i>Calancoma welwitshii</i> (Flacourtiaceae) 86- <i>Bartetia fistulosa</i> (Passifloraceae) See 14. <i>Sarcocephaluslatifolius</i> (Rubiaceae)	Decoction 2	Root 100 g each	15 min	Oral 20 ml 2	7
	55. Rheumatism	87. <i>Acanthus monthanus</i> (Acanthaceae) Atondo (Eton),	Maceration 2	Fresh leaves 100 g	2 hour s	Oral 150 ml 2	7
	56. Torticolis	88. <i>Millettia sp</i> (Mimosaceae)	Maceration 2	Stem bark 100 g	2 hour	Oral 150 ml	7

					s	2	
	57. Traumatism	See 23. <i>Drypetes gossweileri</i> (Euphorbiaceae)	Pound into fine pasta  Excess use or big quantity of bark produces the skin burn	Fresh stem bark 100 g		Ointment Apply on the traumatized part	4
Nose-mouth-throat-ear	58. Toothache	See 6. <i>Alchornea cordifolia</i> (Euphorbiaceae) and 89- <i>Erigeron floribundus</i> (Asteraceae)	Decoction 1	Leaves 50 g each	15 min	Mouth bath 3	4
		90. <i>Pteridium aquilinum</i> (Dennstaedtiaceae)	Decoction 2	50 g of leaves	15 min	Mouth bath Many time daily	3
	59. Otagia	91. <i>Leea guineensis</i> (Leaceae)	Decoction 2	Young leaves 50 g	15 min	Instillation 1 drop per ear 2	2
	60. Otitis	92. <i>Gossypium barbadense</i> (Malvaceae)	Triturating	Hot leaves		Instillation 1 drop per ear 3	3
	61. Conjunctivitis	See 80. <i>Dissotis rotundifolia</i> (Melastomaceae)	Triturating	4 leaves		Instillation 1-4 drops 2	3
	62. Aphteous Stromatitis 63. Blindness	93. <i>Newbouldia laevis</i> (Bignoniaceae)	Decoction 2	Stem bark 50 g	15 min	Instillation of vapor mouth opened	2
	64. Sight lowering	94. <i>Desmodium adscendens</i> (Papilionaceae)	Maceration	Leaves 50 g	1 2 hour	Face toilet with the decoction 1	4
	65. Conjonctivity	95. <i>Celosia trigyna</i> (Amaranthaceae)	Triturating	leaves		Instillation 2 drops per eye 2	3
	66. Ocular pains	96. <i>Aframomum daniellii</i> (Zingiberaceae)	Triturating	Leaves		Instillation 2 drops per eye 2	3
	67. Abcess	97. <i>Alstonia boonei</i> (Apocynaceae) Akouk ( Eton)		Latex		Ointment Apply on the scarified abcess	3
	68. Ringworm	98. <i>Diodia scandens</i> (Rubiaceae) 99. <i>Mitracarpus scaber</i> (Rubiaceae)	Grind into pasta	Leaves 50 g each		Ointment Apply the pasta on infected sites	4
		Sulphur	Pounded powder	Powder in oil		Ointment Local application 1	7
	69. Dermatosis	100. <i>Hymenocardia acida</i> (Hymenocardiaceae) Déré (Baya), Kwo (Bamoun), Mbo (Tikar)	Decoction 2	Stem bark 50 g	15 min	Oral 50 ml 3	3
	70. Scabies	101. <i>Caloncoba welwitschii</i>	Decoction 4	Leaves 150 g	15 min	Washstand Genera l toilet	4

		(Flacourtiaceae)					
	71. Leprosy	102. <i>Chenopodium ambrosioides</i> (Chenopodiaceae)	Pounded pasta	Fresh leaften stems 100 g		Oral Juice 75 ml	4
	72. Whitlow	103. <i>Sida acuta</i> (Malvaceae) Esempeuh (Yemba- Menoua)	Grind into pasta	Fresh leaves 50 g		Ointment Apply on the affected finger and bandage	4
	77. Wounds	104. <i>Erytrophleum</i> <i>ivorensis</i> (Mimosaceae)	Grind into powder	Dry stem bark		Ointment Apply the fine powder on wound	7
	78. Reddish signs in the skin	105. <i>Senna alata</i> (Caesalpiaceae) Ngom tan (Beti)	Triturating	Young leaves		Ointment Apply the pasta on the affected part	7
Nervous system	79. Sexual aversion	See 52. <i>Kalanchoe crenata</i> (Crassulaceae) Djoudjou (Yemba- Menoua)	Triturating diluted the juice with water	leaves		Oral Juice 150 ml 1	7
	80. Epilepsy	106. <i>Cajanus cajan</i> (Fabacées) Osang éli (Fang)	Triturating	leaves		Oral Juice 150 ml 1	7
		107. <i>Oldenlandia sp</i> (Rubiaceae)	Grind into pasta and add a little water	Aerial parts 100 g		Instillation 3 drops per eye	10
	81. Frigidlity	See 62. <i>Pausinystalia yohimbe</i> (Rubiaceae) Patogué (Bassa)	Chew a piece of stem bark	Stem bark		Oral suck the juice 4	10
	82. Insomnia	108. <i>Drimaria cordata</i> (Caryophyllaceae) Lété tsinquiet (Yemba-Menoua)	Maceration 1	50 leaves	1 hour	Oral 125 ml	10
	83. Nervosity	109. <i>Amaranthus viridus</i> (Amaranthaceae) Féfah (Yemba- Menoua) See 52. <i>Kalanchoe crenata</i> (Crassulaceae) 110. <i>Asystasia gangetica</i> (Acanthaceae)	Decoction 2	Leaves 50 g each	15 min	Oral 125 ml 3 Massage the body with the rest of leaves 2	5
	<b>Nevralgia</b>						
	84. Intercostal Nevralgia	See 70. <i>Ageratum conyzoides</i> (Asteraceae)	Consumptio n Triturating	Fresh leaves		Oral 20 g 2 times Juice 25 ml 2 times	10

		111. <i>Phytolacca dodecandra</i> (Phytolaccaceae)	Maceration 150 ml	Leaves 50 g	6 hours	Oral Adults 75 ml Child 25 ml Baby 10 ml 2 times	10
	85. Lumbalگو	112. <i>Bidens pilosa</i> (Asteraceae) Fortah (Lamso), Kegis (Oku), Foseénu (Nkom)	Decoction 1	Leaves 50 g	15 min	Oral 125 ml 2	10
	86. Paralysis	See 90. <i>Erigeron floribundus</i> (Asteraceae) See 17. <i>Emilia occinea</i> (Asteraceae) See 112. <i>Bidens pilosa</i> (Asteraceae)	Pounded pasta	FreshLeaves		Massage the whole body with the pasta	10
	87. Dizziness	See 9. <i>Musanga cecropioides</i> (Cecropiaceae)	Maceration 250 ml	2-4 stipules		Oral 250 ml 1-2 times	10
Pediatric pathologies	88. Hypotrophy or Emaciation	See 107. <i>Cajanus cajan</i> (Papilionaceae)	Decoction 2	Seeds: 150g	15 min	Oral 250ml 3	10
	89. Convulsion	113. <i>Limaciopsis sp</i> (Menispermaceae)	Decoction 2	tubercle 150g	15 min	Oral 150ml 3	10
	90. Whooping cough	114. <i>Luffa aegyptiaca</i> (Cucurbitaceae)	Maceration 1	18 fresh leaves	1 hour	Oral Adult 75 ml 1 time Child 25 ml 2	10
	91. Neonatal infant death (prevention)	See 42. <i>Tetrorchidium didymostemon</i> (Euphorbiaceae) 115. <i>Bryophyllum pinnata</i> (Crassulaceae)	Pounded pasta	Leaves 50 g each		Ointment Add 75 ml of red oil Rup the woman belly and thorax	10
	92. Abdominal pains	116. <i>Impatiens irvingii</i> (Basalminaceae)	Pounded pasta	50 g Fresh leaves		Orall juice 25 ml 3 times	5
	93. Dyspnea	117. <i>Crinum natan</i> (Amaryllidaceae)	Soften on fire and extract juice  Triturating  Secondary effects: diarrhea and vomiting	Fresh leaves		Oral juice 20 ml	5
	94. Lateness to walk	118. <i>Thonningia sanguinea</i> (Balanophoraceae)	blacken by burning and pound	Whole plant powder		Skin Scarify the knees, back of feet and chest	5

	95. Retarded scholar	See 3. <i>Ocimum gratissimum</i> (Lamiaceae)	Decoction 2	Leaves 100 g	15 min	Oral 125 ml 2	10
	96. Measles	See 42. <i>Chenopodium ambrosioides</i> (Chenopodiaceae)	Maceration	50 g leaves	2 hours	Anal Washstand 2	10
	97. Chickenpox	119. <i>Manihot esculenta</i> (Malvaceae)	Pounded pasta	Leaves 50 g		Ointment Rup the whole body	3
		120. <i>Tamarindus indica</i> (Caesalpinaceae) See 121. <i>Manihot esculenta</i> (Malvaceae)	Pounded pasta	50 g of fresh leaves Each		Ointment Rup the whole body 2 times	7
Symptoms-particular syndromes	98. Anorexia	121. <i>Cleome ciliata</i> (Capparidaceae)	Decoction 2	Whole plant 100 g	15 min	Oral 150 m 2 times	3
	99. Physical asthenia	122. <i>Gardenia ternifolia</i> (Rubiaceae)	consumption	Fruits		Oral Eat crude fruit	3
		123. <i>Ficus gnaphalocarpa</i> (Moraceae)	Decoction 2	Stem bark 100 g	15 min	Oral 50 ml 2 times	3
100. Headaches	See 20. <i>Acanthospermum hispidus</i> (Asteraceae)	Triturating	Leaves 50 g			Instillation 2 drops of Juice per yes	3
	124. <i>Dictyandra arborescens</i> (Rubiaceae)	Triturating	Leaves 50 g			Inhalation Aspirate and inhalate juice 2-3 times	3
	125. <i>Helichrysum sp</i> (Asteraceae)	Decoction 2	Leaves 50 g	15 min		Oral 150ml 2	3
101. Hyperthermia	126. <i>Quassia africana</i> (Simaroubaceae)	Decoction 6	Whole plant 50 g	15 min		Take a bath Oral 25 ml 2	3
102. Spleen inflammation	127. <i>Garcinia epunctata</i> (Clusiaceae)	Decoction 1 L of water 150 ml of palm vine	Stem bark 50 g	15 min		Oral Adult 25 ml Child 15 ml 2	5
103. Anemia	128. <i>Pterocarpus soyauxii</i> (Fabaceae)	Decoction 3	Leaves: 150 g	20 min		Oral 150ml <b>3</b>	7
104. Jaundice  105. Hepatitis	129. <i>Oxyanthus speciosa</i> (Rubiaceae)	Decoction 1	Leaves 50 g	10 min		Oral Adult 150 ml Child 75 ml Baby 25 ml 2	7 mo nth s
	See 40. <i>Harungana madagascariensis</i> (Hypericaceae)	Decoction 3	Fresh leaves: 150g	20 min		Oral 150 ml <b>3</b>	8 mo nth s

Disease-specific indications				stem bark: 150 g	20 min	Oral 150 ml 3	
106. Diabetes	130. <i>Laportea ovalifolia</i> (Urticaceae) Toloti Itoil (Oroko), Sasa kola (Bassa), Sasangulu (Pygmies-Baka), Dabdy (Bagweri)	Decoction 3	Aerial parts		20 min	Oral 150 ml 3	7
	131. <i>Bosquelopsis gilletti</i> (Moraceae) associated to 132. <i>Rauvolfia obscura</i> (Apocynaceae) Sebal (Fufuldé), Aton Mbin (Yemba-Menoua)	Decoction 2	Leaves 80 g each		15 min	Oral 150 ml 3	3
		Maceration  These two recipes are taken sequentially (in 2 hours time)	Fresh root 50 g each		12 hours	Oral 10 ml in the morning 1	3
	133. <i>Entada gigas</i> (Mimosaceae)	Maceration  5	Powder of trunk 200 g		30 min  30 min	Oral 250 ml 4	3
	134. <i>Ouratea</i> sp (Ochnaceae)	Consumption	6 leaves			Oral 250 ml 2	3
107. Alcoholism  108. Tabagism	135. <i>Cogniauxia podolaena</i> (Cucurbitaceae) See 81. <i>Senna occidentalis</i> (Caesalpiniaceae) See 1. <i>Piper umbellatum</i> (Umbellaceae) 136- <i>Costus afer</i> (Costaceae) See 118. <i>Crinum natan</i> (Amaryllidaceae)	Decoction 4 Secondary effect Vomiting	Leaves 50 g each		15 min	Oral 1liter of decoction	1
109. Snack bite	137. <i>Coccinia grandis</i> (Cucurbitacées) 138. <i>Palisota hirsuta</i> (Commelinaceae) 139- <i>Pistia stratiotes</i> (Araceae)	Consumption	leaves			Oral Cut into small pieces and eat like salad 1	2
	140. <i>Solenostemon monostachyum</i>	Triturating	leaves			Ointment Apply juice on	1

		(Lamiaceae)				scarified bitten zone 1	
<b>Not intestinal parasites</b>							
<b>Filariosis</b>							
110. Loa-loa	See 20. <i>Acanthospermum hispidus</i> (Asteraceae)	Triturating	Leaves			Instillation 2 drops per eye 2 times daily	"3
111. Other Filariasis (elephantiasis)	141. <i>Garcinia epunctata</i> (Clusiaceae)	Maceration 1	Stem bark 50 g	1 hour		Oral 250 ml 6	10
	142. <i>Turraenthus africanus</i> (Meliaceae)	Decoction 6	Stem bark 200 g	15 min		Washstand Take a general bath 1	3
112. Malaria	See 40. <i>Harungana madagascariensis</i> (Hypericaceae)	Decoction	Fresh stem bark: 300 g	20 min		Oral 150 ml 3	7
113. Tripanosomiasis	143. <i>Solanum lycopersium</i> (Solanaceae) Tomato (Bafut) 144- <i>Nicotiana tabacum</i> (Solanaceae)	Triturating	Leaves 20 g each	15 min		Instillation 3 drops per eye and per nostril 2	3
<b>Total</b>	<b>113. Diseases</b>	<b>144 Plants</b>	Number of Recipes: 145  Number of times for each mode of preparation  Decoction: 83 Triturating: 17 Maceration: 19 Pounded pasta: 6  Pounded powder: 3  blacken by burning powder: 1  Grind pasta: 7 Consumption: 6 Infusion: 1 Scarify the breast by	Number of times for each Plant part used  Leaves: 68 Stem barks: 44 Roots: 10 Leafen Stem: 9 Root barks: 4 Seeds, Rhizomes, Stems, Whole plant: 3 each Bulbs, Fruits, Aerial parts and Mineral: 2 each Tubers,	Number of times for each Duration of preparation  Decoction 15 min: 75 20 min: 7 30 min: 4 10 min: 3 35 min: 3 1 hour: 1  Maceration 1 hour: 10 12 hours: 2 2 hours: 3 6 hours: 1  Infusion 1 hour: 1	Number of times for each route of administration  Oral: 118 Instillation: 15  Ointment: 13  Washstand: 10  Massage: 5  Skin scarification: 3  Mouth bath: 2  Inhalation, face toilet and vaginal injection: 1 each	Number of times for each duration of treatment  7 days: 40  3 days: 39  10 days: 18

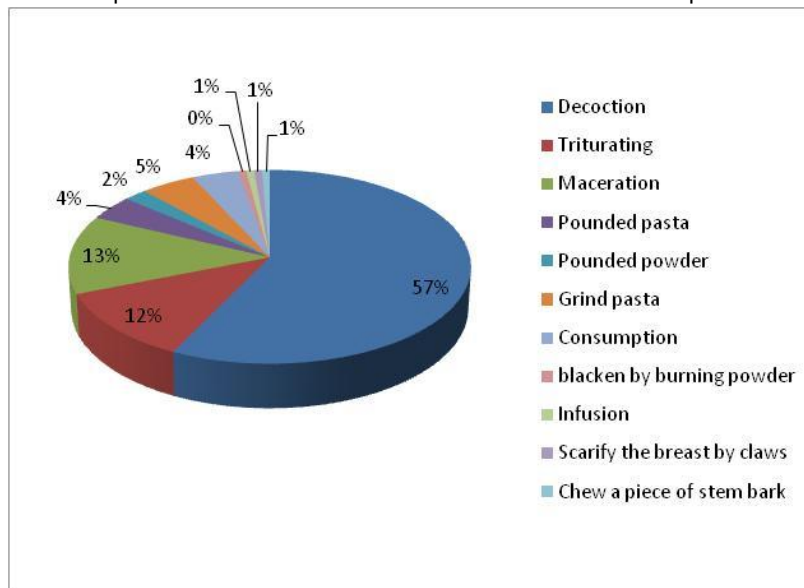


			claws : 1 Chew a piece of stem bark: 1	Liana Buds, Trunk, Latex, Stipules and Claws: 1 each			2 day s: 13  4 day s: 13  5 day s: 10  1 day : 9  1 and half mo nth s: 1 7 mo nth s, 8 mo nth s: 1 eac h
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1. Total, 145 recipes from 144 plants belonging to 120 genera and 68 families, were used for 113 diseases. Some plants are important by appearing in more than two recipes for the treatment of more than two diseases. They include *Harungana madagascariensis* for the treatment of pelvic pains, gynecologic infections, hepatitis, jaundice and malaria, *Acanthospermum hispidus* for colic, dysentery, headaches and loa-loa, *Tetrorchidium didymostemon* for pelvic pains, congestion of lungs and prevention of neonatal infant death, *Croton haumanianus* for pains before the heart, urogenital infestions and hypotension, *Anchomanes difformis* for constipation, epigastralgia and tuperculosis, *Alchornea cordifolia* for dental algia and hemorrhoid, *Piper umbellatum* for the treatment of pains before the heart and tabagism and *Pausinystalia yohimbe* for frigidity and sexual asthenia.

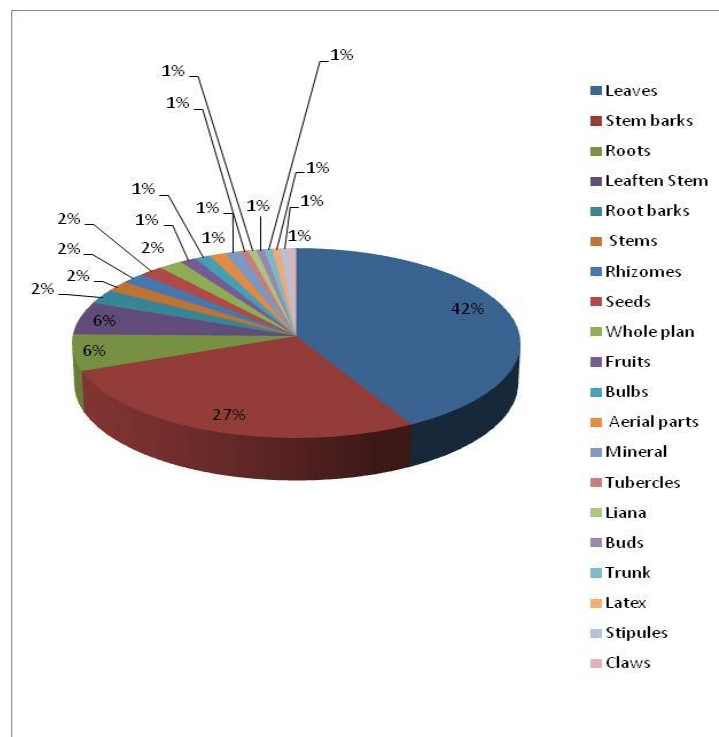
Thirteen polyspecific recipes were prepared by combining 2-5 plants. Hence *Amaranthus hybridus* and *Ocimum gratissimum* are associated to treat epistaxis; *Irvingia grandiflora* and *Staudtia stipitata* are used to treat polymenorrhea; *Tetrachidium didymostemon* associated to *Kalanchoe crenata* and *Cissus aralioides* treat repeated abortions, spontaneous abortions and stillborns; *Ocimum gratissimum*, *Senna occidentalis*, *Arachys hypogea*, *Musa paradisiaca* and *Monodora myristica* together treat fracture; *Erigeron floribundus*, *Emilia occinea* and *Bidens pilosa* are used to control paralysis; *Calancoba welwitshii*, *Barteria fistulosa* and *Sarcocephalus latifolius* release myosite or muscle pains; *Amaranthus viridus*, *Kalanchoe crenata* and *Asystasia gangetica* treat nevrosity, *Alchornea cordifolia* and *Erigeron floribundus* are used against dental algia or teedache; *Tamarindus indica* and *Manihot esculenta* treat chickenpox; *Diodia scandens* and *Mitracarpus scaber* treat ringworm; *Tetrorchidium didymostemon* and *Bryophyllum pinnata* are used in the prevention of Neonatal infantile death; *Cogniauxia podolaena*, *Senna cccidentalis*, *Piper umbellatum*, *Costus afer* and *Crinum natan* are used to stop alchoolism and tabagism. At last *Coccinia grandis*, *Pistia stratiotes* and *Palisota hirsuta* are combined to control snack bite.

The distribution of ethnopharmacological modes of recipes' preparation, natural resources' parts used distribution of administration routes of recipes and distribution of durations of treatments are presented in **Figures 1-4**.



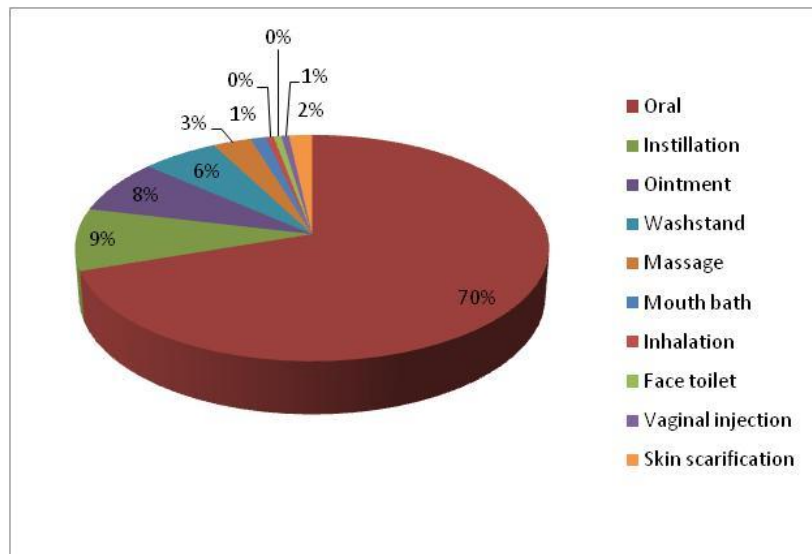
**Figure 1.** Distribution of Ethnopharmacological modes of recipes preparation.

The **Figure 1** shows that the decoction (57%) is the main mode of ethnopharmacological preparation of recipes, following by maceration (13%) and triturating (12%).



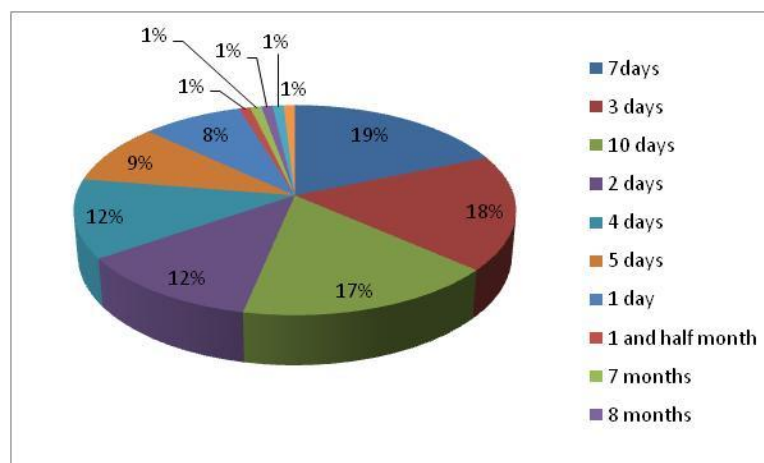
**Figure 2.** Distribution of natural resource parts used.

The **Figure 2** reveals that the leaves (42%) and the stem barks (27%) are the important plant parts used; following by roots (6%) and leafthen stems (6%).



**Figure 3.** Distribution of administration routes of recipes.

The **Figure 3** shows that oral route (70%) is widely used. It is followed by inhalation (9%), Ointment (8%) and washstand (6%).



**Figure 4.** Distribution of durations of treatments.

The **Figure 4** reveals that the most important duration of treatment are 7 days (19%), 3 days (18%) and 10 days (17%), following by 2 days (12%) and 4 days (12%). The most long treatment durations are 7-8 months for repeated abortions, hepatitis, threat of abortion and stillborn.

## DISCUSSION

Some recorded plants (43%) are investigated for their phytochemical and pharmacological properties confirming of the rationalization of their traditional uses. For examples *Pausinystalia yohimbe stem bark* contains yohimbine: an aphrodisiac alkaloid; *Catharanthus roseus* dry root constitutes a source of ajmalicine, a hypotensive of spasmolytic alpha blocker groups that is adrenolytic and increases cerebral blood flux up to 30% of carotid rate of flow. It ensures a better irrigation of the brain and presents a slight anxiolytic and anticonvulsive activity. *Acanthospermum hispidus* presents antibacterial, antiproliferative and immunomodulatory activities, antiplasmodial, antitrypanosomal and Leishmanicidal activity *in vitro*. But the plant presents a renal, hepatic and spleen toxicity after symptoms manifested by diarrhea, dyspnea and alopecia; *Allium sativum* presents antibacterial, antiviral, antifungal and anthelmintic properties. *Piper umbellatum* leaf warmed and placed on the affected area is used for body pain in Venezuela [6]. Analgesic and antiinflammatory activity has been shown for the water and water-ethanolic extract of this plant. The vasorelaxant effects of *Persea americana* leaf extract appeared to contribute significantly to the hypotensive (antihypertensive) effects. However, this activity tends to

suggest that *P. americana* leaf could be used as a natural supplementary remedy in the management, control and/or treatment of essential hypertension and certain cardiac disorders in some rural Africa communities [7]. *Tetrorchidium didymostemon* and the association of *Sarcocephalus latifolius*, *Citrus aurantifolia* and *Allium sativum* are documented for the first time for their medicinal uses. Some nontoxic recorded species are transformed into low-cost phytodrugs by private small laboratories or pharmacists (Figures 5-7). They can contribute to the improvement of people' health and reduce importation. The results of this study stimulate a sustainable development by providing the basis for drugs discovery and by documenting biodiversity for long time exploitation.



Figures 5-7. Existing phytodrugs officially authorized in Africa from recorded plants including respectively *Emilia coccinea*, *Dissotis rotundifolia* and *Pausinystalia yohimbe* [1].

## CONCLUSION

At the end of this study 113 diseases were treated by 144 plant species. Some of them have been documented for the treatment of diverse diseases. Certain active ingredients have been isolated from some of these plants and confirm their traditional use. However, several other medicinal plants need to be recorded in Cameroon. Therefore investigations must be carried out to record manifold medicinal plants and some other uses.

## ACKNOWLEDGMENTS

The authors are thankful to traditional healers and all informants who share their knowledge with us.

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