Article

Medicinal Plants Used for Neuropsychiatric Disorders Treatment in the Hauts Bassins Region of Burkina Faso

Prosper T. Kinda 1, Patrice Zerbo 2, Samson Guenné 1, Moussa Compaoré 1, Alin Ciobica 3 and Martin Kiendrebeogo 1,*

1 Laboratoire de Biochimie et Chimie Appliquées, Université Ouaga I-Pr Joseph Ki-ZERBO, 03 PB 7021 Ouagadougou 03, Burkina Faso; pros.kinda@hotmail.fr (P.T.K.); guesams@gmail.com (S.G.); mcompaore_3@yahoo.fr (M.C.)

2 Laboratoire de Biologie et écologie végétale, Université Ouaga I-Pr Joseph Ki-ZERBO, 03 BP 7021 Ouagadougou 03, Burkina Faso; patzerbo@yahoo.fr

3 “Alexandru Ioan Cuza” University of Iasi, Faculty of Biology, Department of Research, Carol I Avenue, No. 20A, Iasi 700505, Romania; alin.ciobica@uaic.ro

* Correspondence: martinkiendrebeogo@yahoo.co.uk; Tel.: +226-7060-8590

Academic Editor: James D. Adams
Received: 16 December 2016; Accepted: 15 May 2017; Published: 19 May 2017

Abstract: Background: In Burkina Faso, phytotherapy is the main medical alternative used by populations to manage various diseases that affect the nervous system. The aim of the present study was to report medicinal plants with psychoactive properties used to treat neuropsychiatric disorders in the Hauts Bassins region, in the western zone of Burkina Faso. Methods: Through an ethnobotanical survey using structured questionnaire, 53 traditional healers (TH) were interviewed about neuropsychiatric disorders, medicinal plants and medical practices used to treat them. The survey was carried out over a period of three months. Results: The results report 66 plant species used to treat neuropsychiatric pathologies. Roots (36.2%) and leaves (29%) were the main plant parts used. Alone or associated, these parts were used to prepare drugs using mainly the decoction and the trituration methods. Remedies were administered via drink, fumigation and external applications. Conclusions: It appears from this study a real knowledge of neuropsychiatric disorders in the traditional medicine of Hauts Bassins area. The therapeutic remedies suggested in this work are a real interest in the fight against psychiatric and neurological diseases. In the future, identified plants could be used for searching antipsychotic or neuroprotective compounds.

Keywords: Neuropsychiatry; phytotherapy; traditional healers; Burkina Faso

1. Introduction

 Nowadays, medicinal plant use in traditional therapy is increasing and diversifying. These plants were a precious patrimony for the humanity in general and particularly very important for developing countries people’s healthcare and their subsistence [1]. They are invaluable resources for the great majority of rural populations in Africa, where more than 80% use them to ensure their primary healthcare [2]. According to the World Health Organization (WHO), neuropsychiatric disorders are a whole of “mental health problems”, which are characterized by anomalies of the thought, emotions, behavior and relationship with others. These pathologies handicap the person concerned and assign people of its circle. Factors causing these disorders are essentially genetic, social, environmental and psychotropic drugs. Mental and neurological disorders represent 13% of the burden of total morbidity in the world [3]. Thirteen per cent to 49% of the world’s populations develop neuropsychiatric disorders at some point in their life [4]. These pathologies affect all categories of person, race, sex and...
Epilepsy is one of the most common neurological disorders. It affects more than 50 million persons in the world including 80% in developing countries [6]. High prevalence was observed in Africa where about 75% of patients do not receive adequate treatment [7]. The prejudices that surround neuropsychiatric diseases are causes of stigmatization of unwell persons who are often marginalized [3,8]. In Burkina Faso, 175% of the cases of disability are caused by neuropsychiatric disorders [6].

Many natural or synthetic psychoactive molecules such as neuroleptics, antidepressants, anxiolytics are used in modern medicine to treat these pathologies, particularly epilepsy, schizophrenia and the others psychotic disorders [8–10]. However, these modern treatments are expensive, complex and inaccessible for African populations in rural area [8,11]. Many of these psychoactive molecules have plant origins [12,13], which could justify plants use in the African traditional medicine to treat neuropsychiatric diseases [14,15]. In Burkina Faso, medicinal plants are widely used by peoples. Disapproved a long time after independences period for allopathic drugs [16], the government allowed in 1994 the traditional medicine practice. Since this time, it appeared a craze more and more growing for phytotherapy within the population, already predisposed to be directed there [17]. Moreover, many studies were undertaken to document plant species used in this therapy practice [18–22]. However, little research has approached the specific case of plants used to treat nervous system disorders in Burkina Faso. In the Hauts Bassins region, these pathologies were frequently denoted in psychiatric consultation [23,24]. Except Millogo’s group works on “epilepsy and traditional medicine in Bobo-Dioulasso” [25], the traditional therapy of these pathologies is quoted only in other parallel studies. The present study aims to provide information about medicinal plants used to treat neuropsychiatric disorders in the Hauts Bassins region of Burkina Faso. It was necessary to report psychic and neurological disorders treated by traditional healers, medicinal plants and medical practices used for these treatments.

2. Materials and Methods

2.1. Study Area

The study was carried out in the Hauts Bassins region, located in western part of Burkina Faso (Figure 1). This area is known for its high phytogenetical and cultural diversity. Located at the West of Burkina Faso, between 9°21′N latitude and 2°27′W longitude, the Hauts Bassins region belongs to the phytogeographical sector of south-soudanien, characterized by average annual precipitations higher than 900 millimeters and average temperatures oscillating between 25°C and 30°C [26]. This sector is dominated by vegetable formations of savannas type timbered, arboreous or shrubby [27]. Several ethnics groups live in this area with a great diversity of cultural practices. The main spoken languages are Mooré (29.5%), Dioula (27.1%) and Bobo (18.8%) [28]. This region is characterized by a high number of traditional healers (TH) resulting from various ethnic groups. In addition to plant diversity and neuropsychiatric diseases frequency [24], the area was chosen because of the presence of various TH.
2.2. Ethnobotanical Data Collection

The ethnobotanical survey was carried out during a three month period from October to December 2015. Data were collected using a structured interview with traditional healers (TH) who are organized in association. Through the association, a preliminary phone call was had with TH to inform them about objectives of the study. After that, an appointment were fixed with each one for individual interview. The approach was based on a dialogue using one of the three languages (Mooré, Dioula or French) to the TH choice. Pre-established questionnaires were used and a local person acting as a guide was necessary. Data were collected and transcribed on survey card-guides. It concerned medicinal plants used to treat the main psychiatric and neurological diseases such as epilepsy, mental disorders or madness, evils related to charm or witchcraft, hallucination or consciousness loss. These pathologies were reported to be more frequent in this area of Burkina Faso [24]. We gathered some of them because of their names in the local languages. Other collected information related to local names (in Mooré and/or Dioula) of plants, organs used of plants and medical practices such as drugs preparation and administration methods. Fifty-three TH including 35 men and 18 women, old from 31 to 82 years and having experience of plants use in traditional medicine were interviewed. Plants mentioned in the interview were collected in order to make the herbal constitution.

2.3. Data Analysis

Samples of plants collected were identified by botanists of the Ecology Department of University of Ouaga 1-Pr Joseph Ki Zerbo (Burkina Faso). Then, voucher specimens were deposited in the herbarium of this University. The adopted nomenclature is that of “the tropical flora of Western Africa” [29], “medicinal plants and traditional medical practices in Burkina Faso” [30], “the catalogue of vascular plants of Burkina Faso” [31] and some enumerations of tropical Africa plants [32–34]. Plant parts used and medical practices were listed. Data were analyzed using SPSS software version 17.0 for window (SPSS Inc., Chicago, USA), and graphs were made on Excel of Office 2013.
3. Results

3.1. Plants Species Used

Sixty-six plant species including 51 woody and 15 herbaceous used to treat psychiatric and neurological diseases were identified. They belonged to 56 genera and 32 families (Table 1). Acacia and Ficus Genera were the most represented with 4 species each. The most represented families were Mimosaceae (8 species), Fabaceae (5 species) and Rubiaceae (5 species). Among these plants, the most used were showed on Table 2. A high use of Securidaca longepedunculata (45.3%), Calotropis procera (20.75%), Khaya senegalensis (20.75%), Allium sativum (20.75%), Daniellia oliveri (19%) and Annona senegalensis (17%) was observed by the majority of traditional healers (TH). Datura innoxia and Zanthoxylum zanthoxyloides were used by the oldest TH (more than 60 year old). Six species: S. longepedunculata, C. procera, K. senegalensis, A. senegalensis, Diospyros mespiliformis and Guiera Senegalensis were used to treat the main diseases targeted. Most of the plants were used alone and in association with other plants.

3.2. Plant Parts Used and Medical Practices

Various plant parts were used to prepare remedies (Figure 2a). Roots were mainly used (36.2%), followed by leaves (29%), mistletoes (9.3%) and stem barks (9%). Drugs preparation modes were the decoction (46.7%), the triturati0on (31%), the calcination (11.6%) and the aqueous maceration (10.7%) (Figure 2b). The drink (40.8%), the bath (33.8%), the fumigation (14.8%) and the massage (8.4%) are the main modes of administration (Figure 2c).

3.3. Neuropsychiatric Pathologies Treated

Diseases or regrouping diseases treated by traditional healers were registered in Table 3. From these results, hallucination or consciousness loss were most treated, followed by epilepsy, mental disorders and witchcraft or evils related to charm. In addition to these target pathologies, other cases such as insomnia and nerves diseases are also treated. Several plant species intervene in the treatment of each listed disorders. Thus, 37 plants were used to treat hallucination or consciousness loss, 32 to treat mental disorders, 31 to fight against epilepsy and 25 against diseases related to charm or witchcraft.
| Scientific Name (Genera and Specie) | Family          | Local Name (Moore) | Local Name (Dioula) | Parts Used | Mode of Preparation | Mode of Administration | Pathologies Treated |
|-----------------------------------|----------------|-------------------|---------------------|------------|---------------------|------------------------|---------------------|
| Abrus precatorius L.              | Fabaceae       | Ngorog-nini       | Noronha             | Fr         | Cal                 | Mas                    | MA-MD              |
| Acacia ataxacantha DC.            | Mimosaceae     | Kangui pêêliga    | Bangana             | Ro, Ba     | Dec                 | Bat, Dri               | EP                 |
| Acacia nilotica (L.) Willd. Ex Del.| Mimosaceae     | Kangui pêêliga    | Ro                  | Dec        |                     | Bat, Dri               | MA-MD              |
| Acacia penna (L.) Willd           | Mimosaceae     | Kangui pêêliga    | Ro                  | Dec        |                     | Bat, Dri               | EP                 |
| Acacia sieberiana DC.             | Mimosaceae     | Gore-porsego      | Wénékassango        | Le, Ro, Ba | Mac, Dec, Tri      | Bat, Dri, Fum, Mas     | MA-MD, HA-CL       |
| Adansonia digitata L.             | Bombaceae      | Toêêga            | Sira-yiri           | Le, Ro     | Dec, Cal            | Bat, Dri, Fum          | MA-MD, HA-CL       |
| Alzizia africana Smith ex Pers.   | Caesalpiniaeae | Kangkalga         | Lingué, Lingué yiri | Le, Ro, Ba, Mi | Dec, Cal, Tri | Bat, Dri, Fum, Mas | MA-MD, HA-CL       |
| Allium cepa L.                    | Liliaceae      | Zéyon             | Djaba               | Bu         | Tri                 | Fum                    | EP                 |
| Allium sativum L.                 | Liliaceae      | Layi              | Bu                  | Dec, Cal, Tri |                     | Bat, Dri, Fum, Pur, Mas | MA-MD, HA-CL      |
| Annona senegalensis Pers.         | Annonaceae     | Barkudga          | Mandé sunsun, Barkandé | Wp, Le, Ro, Ba | Dec, Cal, Tri | Bat, Dri, Fum | EP, MA-MD, CH-WI, HA-CL |
| Anogeissus leiocarpus (DC) Guill. & Perr. | Combretaceae | Siiga             | Zègwenè             | Ba         | Mac                 | Bat, Dri               | HA-CL              |
| Balanites acyrtica L.             | Balanitaceae   | Kyeuguelga        | Bere                | Le, Ro     | Dec                 | Bat, Dri               | MA-MD, CH-WI       |
| Boscia senegalensis (Pers) Lam. ex Poir. | Capparidaceae | Lambwetga         | Bere                | Le, Ro     | Dec                 | Bat, Dri               | EP                 |
| Boswellia dalzielli Hutch         | Burseraceae    | Gondrengneogo, Kondrangneogo | Ro, Ba | Mac, Dec, Tri | Bat, Dri, Fum | HA-CL                   |
| Calotropis procera (Ait) Ait. F.  | Asclepiadaceae | Putrepuuga        | Fogofogo            | Wp, Le, Ro, Mi, La | Mac, Dec, Tri | Bat, Dri, Fum, Ing | EP, MA-MD, CH-WI, HA-CL |
| Ceiba pentandra (L.) Gaertn       | Bombaceae      | Gounga            | Bana-yiri           | Ro         | Cal                 | Dri                    | EP                 |
| Cissus quadrangularis L.          | Vitaceae       | Wòb-Zanré         | Oulouyoroko         | St         | Cal                 | Dri                    | EP                 |
| Citrus aurantifolia (Christm.) Swingl. | Rutaceae  | Lembur-tiiga      | Laimbourou         | Fr, Mi     | Mac, Dec, Cal | Bat, Dri, Mas | MA-MD, CH-WI, HA-CL |
| Crateva adansonii DC.             | Capparidaceae  | Kalgoum-tôôgâa    | Tiékala             | Le         | Dec                 | Dri                    | CH-WI              |
| Cymbopogon giganteus Chiov.       | Poaceae        | Kuwaré            | Tiékala             | Le, Ro     | Dec                 | Bat, Dri               | MA-MD, HA-CL       |
| Cymbopogon proximus (Hoehst ex A. Rich) Stafp | Poaceae  | Soompiiga         | Tiékala             | Le, Ro     | Dec                 | Dri                    | CH-WI              |
| Dalbergia melanoxylon Guill. & Perr. | Fabaceae      | Guiridandégâa     | Ro                  | Mac        |                     | Fum                    | MA-MD, HA-CL       |
| Daniellia oliveri (Rolfe) Hutch et Dalz | Caesalpiniaeae | Aoga, Anwga       | sana, sana yiri    | Le, Ro, Ba, Mi | Mac, Dec, Cal, Tri | Bat, Dri, Fum | MA-MD, CH-WI, HA-CL |
| Datura inoxia Mill.               | Solanaceae     | Barassé, Zëëbla  | Alomoukaikai        | Le, Fr     | Cal                 | Dri, Mas               | MA-MD, CH-WI, HA-CL |
| Detarium microcarpum Guill. & Perr. | Caesalpiniaeae | Kagadéga          | Tamakouna           | Le, Ro     | Dec                 | Bat, Dri               | EP, CH-WI, HA-CL   |
| Diospyros mespiliformis Hochst ex A. DC | Ebenaceae   | Gaaka, Gaanka     | Sounsoun, Sounsounf | Le, Ro, Mac, Dec |                     | Bat, Dri, Fum | MA-MD, CH-WI, HA-CL |
| Entada africana Guill. & Perr.    | Mimosaceae     | Séonego           | Ro                  | Dec        |                     | Bat, Dri               | EP                 |
| Faidherbia albida (Del.) A. Chev.  | Mimosaceae     | Zaanga            | Balanzan, Balazâa   | Le, Ro     | Dec                 | Bat, Dri               | CH-WI              |
| Scientific Name (Genera and Specie) | Family | Local Name (Moore) | Local Name (Dioula) | Parts Used | Mode of Preparation | Mode of Administration | Pathologies Treated |
|------------------------------------|--------|-------------------|---------------------|------------|---------------------|------------------------|---------------------|
| *Ficus ingens* (Miq.) Miq.        | Moraceae | Kunkwiga          | Djetiguia faaga     | Ro         | Dec                 | Dri                    | EP                  |
| *Ficus tetraphylla* Miq.           | Moraceae | Kunkwi-peelga     | Le, Ro, Ba          | Mac, Dec   | Bat, Dri            | EP, MA-MD, HA-CL      |
| *Ficus sycomorus* L.               | Moraceae | Kankanga          | Toro, Toro yiri    | Le, Ro, Mi | Dec, Tri            | Bat, Dri              | EP, HA-CL           |
| *Ficus vallis-cloudae* Delile      | Moraceae | Kankanga          | Torossaba, Toroba   | Le         | Dec                 | Bat, Dri              | EP                  |
| *Flueggea vinosas* (Roxb ex. Willd) Voigt. | Moraceae | Sugdin-daaga     | Bure, Bure yiri    | Wp, Le, St, Ro | Dec, Cal         | Bat, Dri              | EP, CH-WI, HA-CL    |
| *Gardenia sp.*                     | Rubiaceae | Subudga           | Lambrerzanga       | Wp, Le, Ro, Mi | Dec, Cal, Tri   | Bat, Dri              | EP, MA-MD, CH-WI, HA-CL |
| *Guiera senegalensis* J.F. Gmel   | Combretaceae | Wilin-wiiga       | Kounougou           | Wp, Le, Ro, Mi | Dec, Cal, Tri | Bat, Dri              | EP, MA-MD, CH-WI, HA-CL |
| *Hygrophila senegalensis* (Nees) T. Anderson | Acanthaceae | Rung-rungui      | Timitiminí        | Wp         | Dec                 | Bat, Dri              | EP                  |
| *Hypotis spicigera* Lam.           | Lamiaceae | Garga             | Le                  | Tri        | Pur                 | HA-CL                     |
| *Indigofera tinctoria* L.          | Fabaceae | Kuka              | Dia, Dia           | Le, Ba, Mi | Mac, Dec, Cal, Tri | Bat, Dri, Fum        | EP, MA-MD, CH-WI, HA-CL |
| *Khaya senegalensis* (Desr) A. Juss | Combretaceae | Lahtulga         | Le, Ro, Ba         | Dec, Tri   | Bat, Dri            | EP, HA-CL              |
| *Leptadenia hastata* (Pers.) Decne | Asclepiadaceae | Lelongo          | Kosafla            | Wp, Le, St, Ro | Dec               | Bat, Dri, Fum        | MA-MD, HA-CL       |
| *Mitragyna inermis* (Willd) O. Ktze | Rubiaceae | Yodi-peelga      | Wp                  | Tri        | Fum                 | MA-MD                  |
| *Moringa oleifera* Lam.            | Moringaceae | Arzan-tiiga      | Masa yiri          | Wp         | Dec                 | Bat, Dri, Fum        | MA-MD              |
| *Nicotiana rustica* L.             | Solanaceae | Kinkirs taba, Waam-tabre | Flavourou        | Le         | Tri                 | Fum                    | HA-CL              |
| *Nicotina tabacum* L.              | Solanaceae | Taba             | Kotaba             | Le         | Cal                 | Dri, Mas              | CH-WI              |
| *Ocimum americanum* L.             | Lamiaceae | Yulin-gru-raaga  | Sukuola            | Le         | Dec, Tri            | Bat, Fum              | EP, HA-CL           |
| *Ocimum basilicum* L.              | Lamiaceae | Yulin-grnagra    | Sukuola-sina       | Le         | Tri                 | Fum                    | HA-CL              |
| *Parkia biglobosa* (Jacq.) R. BR. ex G. Don. F | Mimosaceae | Rosaga           | Nèere              | Le, Ro, Mi | Mac, Dec           | Bat, Dri              | EP, MA-MD, CH-WI    |
| *Pennisetum americanum* Stapf      | Poaceae | Kauzi            | Sagnon             | Fr         | Tri                 | Pur                    | EP, CH-WI           |
| *Pericopsis laxiflora* (BentH ex Bak.) V. Meeawen | Fabaceae | Taankoniliga, Kolo-kolo, Koloko yiri | Wp, Le, Ro, Mi | Dec, Tri | Bat, Dri, Fum | MA-MD, HA-CL       |
| *Prosopis africana* (Guill. Perr. & Rich) Taub. | Mimosaceae | Duanduanga, yamagui | Goulé, Goulé | Ro, Fr | Dec, Cal | Bat, Dri | CH-WI |
| *Pseudocedrela kotschyi* (Schweinf.) Harms | Meliaceae | Sigueudré       | Le                   | Dec        | Bat, Dri            | MA-MD, HA-CL    |
| *Saba senegalensis* (A. DC) Pichon | Apocynaceae | wedga            | Zaban yiri         | Le, Ba     | Dec                 | Bat                    | HA-CL              |
| *Sclerocarya birrea* (A. Rich) Hochst | Anacardiaceae | noabga         | Ro                   | Dec        | Bat                 | EP                    |
| *Scoparia dulcis* L.               | Scrophulariaceae | Kafremaandé   | Wp                   | Tri        | Fum                 | MA-MD, HA-CL        |
### Table 1. Cont.

| Scientific Name (Genera and Specie) | Family            | Local Name (Moore) | Local Name (Dioula) | Parts Used | Mode of Preparation | Mode of Administration | Pathologies Treated |
|------------------------------------|-------------------|-------------------|---------------------|------------|--------------------|------------------------|---------------------|
| Securidaca longepedunculata Fresen  | Polygalaceae       | Pelga             | Djoro, Diouro       | Le, Ro, Ba | Mac, Dec, Cal, Tri | Bat, Dri, Fum, Pur, Mas | EP, MA-MD, CH-WI, HA-CL |
| Sterculia setigera Del.            | Sterculiaceae      | Ponsensemporgo, Ptermuka | Congo-sera, Kongossira | Ro, Mi     | Dec                | Bat, Dri               | EP                  |
| Strychnos spinosa Lam.             | Loganiaceae        | Katrepoaga, Katerpoagh | Kogobaranie, Foufle barani | Fr          | Tri                | Ing                    | CH-WI               |
| Stylosanthes erecta P. Beauv.      | Fabaceae           | Sakwisabelga      | Wp                  | Cal        | Mas                | Bat, Dri, Fum           | CH-WI               |
| Tamarindus indica L.               | Caesalpiniaeae     | Pusga             | Nitomi, Toni        | Le, Ro, Fr, Mi | Mac, Dec, Tri  | Bat, Dri, Fum           | EP, MA-MD, HA-CL, MA-MD, CH-WI, HA-CL |
| Vitellaria paradoxa C.F. Gaertn    | Sapotaceae         | Taanga            | Schi yiri, Si yiri  | Le, Ro, Mi | Dec, Tri          | Bat, Dri               | MA-MD               |
| Vitex doniana Sweet                | Verbenaceae        | Aadga             | Koto                | Le, Ro     | Dec                | Bat, Dri               | MA-MD               |
| Ximenia americana L.               | Olaceae            | Leenga            | Le, Ro              | Le, Ro     | Dec                | Bat, Dri               | MA-MD, CH-WI, HA-CL  |
| Zanthoxylum zanthoxyloides Lam.    | Rubiaceae          | Rapeoka           | Wo                  | Ro, Ba     | Tri                | Dri, Fum, Mas          | EP, MA-MD, HA-CL, IN, EP, HA-CL |
| *Zizyphus mauritiana* Lam.         | Rhamnaceae         | Mugunuga          | Tomonon             | Le, Ro, Mi | Dec, Tri          | Bat, Dri               | EP                  |

**Part used:** Whole plants (Wp); Leaves (Le); Stems (St); Roots (Ro); Barks (Ba); Flowers (Fl); Fruits (Fr); Mistletoes (Mi); Bulbs (Bu); Latex (La). **Mode of preparation:** Maceration (Mac); Decoction (Dec); Calcination (Cal); Trituration (Tri). **Mode of administration:** Bath (Bat); Drink (Dri); Fumigation (Fum); Purging (Pur); Massage (Mas); Ingestion (Ing). **Pathologies:** Epilepsy (EP); Madness or Mental Disorders (MA-MD); Charm or Witchcraft (CH-WI); Hallucination or Consciousness Loss (HA-CL); Insomnia (IN); Nerves diseases (ND).
Table 2. Main plants used, rate and age of TH user, rate of treated diseases and type of use.

| Plants                                      | User TH Rate (%) | Average Age of TH | Treated Diseases Rate (%) | Use Alone or Associated |
|---------------------------------------------|------------------|-------------------|---------------------------|-------------------------|
| Acacia sieberiana DC.                       | 7.5              | 45                | 75                        | alone                   |
| Afzelia africana Smith ex Pers.             | 11.3             | 42                | 75                        | alone, associated       |
| Allium sativum L.                           | 20.75            | 57.5              | 50                        | associated              |
| Annona senegalensis Pers.                   | 17               | 55.5              | 100                       | alone, associated       |
| Calotropis procera (Ait) Ait. F.            | 20.75            | 57                | 100                       | alone, associated       |
| Citrus aurantifolia (Christm.) Swingle      | 7.5              | 51                | 75                        | associated              |
| Daniellia oliveri (Rolfe) Hutch. et Dalz.  | 19               | 45.5              | 75                        | alone, associated       |
| Datura innoxia Mill.                        | 13.2             | 60.5              | 75                        | alone, associated       |
| Detarium microcarpum Guill. et Perr.        | 5.7              | 39                | 75                        | associated              |
| Diospyros mespiliformis Hochst ex A. DC.   | 13.2             | 39                | 100                       | alone, associated       |
| Ficus iteophylla Mgq.                       | 7.5              | 39                | 75                        | alone, associated       |
| Guiera senegalensis J.F. Gmel.              | 13.2             | 50                | 100                       | alone, associated       |
| Khaya senegalensis (Desr) A. Juss           | 20.75            | 47                | 100                       | alone, associated       |
| Mitragyna inermis (Willd) O. Ktze           | 7.5              | 35.5              | 75                        | alone, associated       |
| Parkia biglobosa (Jacq.) R. BR. ex G. Don.F.| 7.5              | 48                | 75                        | alone                   |
| Securidaca longipesculata Fresen             | 45.3             | 48                | 100                       | alone, associated       |
| Tammarindus indica L.                       | 11.3             | 46                | 75                        | associated              |
| Ximenia americana L.                        | 5.7              | 46                | 75                        | alone, associated       |
| Zanthoxylum zanthoxyloides Lam. Zep & Timl  | 7.5              | 60                | 75                        | alone, associated       |
| Zizyphus mauritiana Lam.                    | 5.7              | 47                | 75                        | alone, associated       |
Figure 2. Plant parts used, modes of preparation and administration of remedies.

Table 3. Pathologies treated, traditional healers (TH) rate and medicinal plants used.

| English Name                  | Pathologies Treating TH Rate (%) | Number of Plants Used |
|------------------------------|----------------------------------|-----------------------|
| Epilepsy                     | Kisinkindou                      | 49                    | 31                     |
| Hallucination or Consciousness loss | Ningyilinga, sobgré             | 79.2                  | 37                     |
| Insomnia                     | Gueim Baansé                     | 3.8                   | 2                      |
| Mental disorders or Madness  | Guimdo, joukolgo                 | 47.2                  | 32                     |
| Nerves diseases              | Guin Bamsé                       | 3.8                   | 1                      |
| Witchcraft or Charm diseases | Rabigo, Soondo                   | 35.8                  | 25                     |
4. Discussion

Traditional medicine practice in Hauts Bassins area is rich and diversified. The most often treated neuropsychiatric disorders are hallucination, epilepsy and mental disorders, respectively treated by 79.2%, 49% and 47.2% of traditional healers (TH). These data correspond to those of other works [7,25,35], which revealed that these pathologies are well-known and treated in the traditional medicine of many African countries.

Sixty-six (66) plant species belonging to various families used in the treatment of neuropsychiatric disorders were listed. This result testifies TH knowledge about plants diversity of this area and their therapeutic virtues. Similar results were observed by previous studies [19,21] which showed that local populations of Burkina Faso were known to profit from the best part of biodiversity in traditional medicine. More than 77% of plants identified are ligneous. This rate could be justified by the relative abundance of these species in the phytogeographical sector of this area, and their availability during all the year. These results were in the same order with those of Traoré’s group in the province of Comé [36], Olivier’s group on “Dozo” traditional healers [21] and Zerbo’s group in western area [22], which indicates a prevalence of ligneous use in the pharmacopeia of this zone of Burkina Faso. *S. longepedunculata*, *C. procera*, *K. senegalensis*, *A. sativum*, *D. oliveri*, *A. senegalensis* were identified as the main species used and *D. innoxia*, *Z. zanthoxyloïdes* were only used by older TH. They were cited like plant species intervening in the treatment of neuropsychiatric disorders in others African countries [8,35,37]. According to many authors, all these plants have phytochemical components with effects on the nervous system [38,39]. They contain alkaloids, terpenoids, steroids, flavonoids, tannins, saponins and cardiac glycosides (Table 4). These chemical constituents were considered as the main bioactive compounds of medicinal plants [30,40,41]. *C. procera* root bark used in the treatment of anxiety, epilepsy, and madness contain alkaloids such as α-amyrin, β-amyrin, while its leaf and its latex possess cardenolides such as calactin, calotoxin, calotropin and uscharin [42,43].

These chemical contents could be responsible of the traditional use of this plant. Besides, *C. procera* extracts were reported to possess significant anticonvulsant and analgesic properties [42,44]. Tropanic alkaloids as scopolamin, atropin, hyoscinian isolated in *D. innoxia* are known for their anticholinergic effects. They act as acetylcholin antagonists [15]. Scopolamine is an antimuscarinic agent used as analgesic and relaxant [45]. Anticholinergic and antimuscarinic effect of these compounds could explain in part Datura use in mental diseases treatment. Securidine, an alkaloid isolated from *S. longepedunculata* root, has a stimulating effect on the spinal cord. Used in a non-toxic dose, it influenced the function of the autonomic nervous system [46]. Some flavonoids were reported to possess anxiolytic effects and neuroprotective activities; they are capable of binding to GABAA receptors with significant affinity [47]. As examples, 6-methylapigenin is a benzodiazepine binding site ligand and 2S(-)-hesperidin has sedative and sleep-enhancing properties [48]. Quercetin significantly decreased the brain ischemic lesion [49]. Hesperidin was identified in *C. aurantifolia* and *Z. zanthoxyloïdes*, while apigenin was isolated from *S. longepedunculata* and Quercetin in most of plants listed in this study (Table 4).

These bioactive compounds could explain plants efficacy in the treatment of neuropsychiatric diseases [50,51]. Mechanisms through which these compounds act on the central nervous system are various including regulation of neurotransmitters activity [52–54]. However, beneficial activities of these plants do not occult their toxic effects. Indeed, they have also cytotoxic and cardiotoxic effects [42]. Securinine in the range 5–30 g/kg act like strychnine, causing spasms and death by respiratory arrest [46]. Tropanic alkaloids are potential neurotoxic agents [15]. Therefore, a controlled use of these plants should be promoted.
Table 4. Phytochemical constituents and pharmacological properties of main plants used.

| Plants                        | Pharmacological Properties                                      | Phytochemical Constituents                                                                 | Chemical Compounds Identified                                                                 |
|-------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| *Acacia sieberiana* DC.       | Inhibition of acetylcholinesterase, anti-inflammatory [55].      | Alkaloids, cyanogenic glucoside, tannins, terpenoids, Saponins, Flavonoids, essential oils, Caridic glycosides, steroid, resins [56–58]. | Dihydroacacipetalin; acacipetalin [56]. Manganese; calcium; magnesium; cupper; iron; zinc; nickel [57]. |
| *Afzelia africana* Smith ex Pers. | Alkaloids, tannins, saponins, fiber, flavonoids, cyanides, beta-carotenes, cyanogenic glycosides, terpenoids, steroids, anthocyanins [59–61]. | Sodium; potassium; calcium; magnesium; phosphorus; iron; zinc; vitamins A, C, E, B1, B2, B6, B12 [59,62]. |                                                                                               |
| *Allium sativum* L.           | Stimulant, antioxydant, anti-inflammatory, antimicrobial, fungicidal, antibacterial, anticancerous, chemopreventive, anti-tumoral, antidiabetic [63–65]. | Alkaloids, phenolics, flavonoids, essential oils [64,66,67] | Trisulphide-di-2-propenyl; artumerone; tetrazolo [1,5-b] pyridazine; 2-hydroxyethyl ethyl disulfide; cyclic octa-atomic sulphur [66]. Alliin; allicin [63]. Diallyl trisulfide; diallyl disulfide; methyl allyl trisulfide [65]. Diallyl monosulfide; trisulfide methyl-2-propenyl; dimethyl tétrasulfide [68]. |
| *Annona senegalensis* Pers.   | Anticonvulsant, anxiolytic, sedative, antibacterial, anti-inflammatory, cytotoxic, antioxydant, anti-nociceptive, antivenenous [15,69]. | Alkaloids, flavonoids, saponins, sterols, flavonols, triterpenes, diterpenoids phenols, antraquinones, anthocyanes, coumairnes [15,70]. | 1,2-benzenediol; butylate hydroxytoluene; methylcarbamate; n-hexadecanoïque acid; hexadecane; acide oleique; etracosane; 9-octylethapetadé; heneicosane; 13-octadécadien-1-ol; octadécanoïque acid; 9,17-octadécadienial; pentadécane; tettratriacontane; squalène [71]. Kaurenoïc acid [69] |
| *Calotropis procera* (Ait) Ait. F | Anticonvulsant, analgesic, anti-inflammatory, antitumor, hepatoprotective, antioxidant, spasmylotic, cytotoxic, cardiotonique, lipase inhibitory, anti-apoptotic [42,72–74]. | Alkaloids, cardenolides, triterpenes, flavonoids, sterols, saponins, diterpenes, resines, tannins, steroids [43,75]. | Calactin; calotropagenin; calotropin; calotoxin; uscharin; syriogenin, afrogenin [42,43]. Flavonoid 5-hydroxy-3,7-dimethoxylavone-4′-O-β-glucopyranoside; 3-O-rutinosides of quercetin; kaempferol; isohermnetin [75]. Cholin; uscharin; uscharidin; voruscharidin; α-amyrine; β-amyrine [30,76]. |
| *Citrus aurantifolia* (Christm.) Swingle | Antioxidant, anti-inflammatory, fungicidal, antibactéal [77–79]. | Essential oils, glucosides, carotenoids, flavonoids [67,77]. | α-pinene; camphene; sabine; β-pinene; myrcene; A3-carene; limonene; (Z)-β-ocimene; α-terpinene; γ-terpinene; terpinolene; linalool; citronnelal; isocamphene; borneol; terpinen-4-ol; myrténal; δ-cadinene; Caryophyllen oxide; α-eudesmol; myrcene; P-cymene; benzoic acid; α-cedrene; α-bisabolene; α-bisabolol [77–79]. Hespéridine, vitamine C [69]. |
| *Daniellia oliveri* (Rolfe) Hutch. et Dalz. | Analgéic, antihistaminic, relaxant, anti-inflammatory, antimicrobial, antidiabetic, antispasmodic, antipyretic, antidiarrheal [80–82]. | Alkaloids, saponosides, flavonoids, glycosides, diterpenoids, sitosterol, coumarines, antracenosides, tanins, hétéroïdes cardiotoniques, trierpênes, Sterols [8,81,82]. | Rutin; quercétin-3′-O-méthyl-3′-O-a-hamnopyranosyl-(→)β-D-glucopyranoside (Narcissin); quercitrin; quercimeritrin [80,81]. |
Table 4. Cont.

| Plants                                | Pharmacological Properties                                      | Phytochemical Constituents                                                                 | Chemical Compounds Identified                                                                 |
|---------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| *Datura innoxia* Mill.                | Hallucinogen, analgesic, hypnotic, narcotic, anti-cholinergic, anti-parkinsoniense, sedative, cytotoxic, aphrodisiac, antispasmodic, anti-emetica, anti-inflammator, anti-dizziness, antitumor [83–85] | Alkaloids tropanics [83,86]. Hyoscyamine; scopalamine; tropine; tropine; pseudotropine; scopoline; scopine; 3-acetyltropine; 3-acetoxytropine; cuscohygrine; aposecalopamine; 3(α'),6-ditigloyloxytropine; 3(β'),6-ditigloyloxytropine; 3(α'),3-ditigloyloxytropine; 3(α'),6-ditigloyloxytropine; 7-hydroxyhyoscyamine; 6-hydroxyhyoscyamine; 3-tritolonoxylglyoxytropine; 6-tigloyloxytropine; luteoline [83,85,86]. |                                                                                             |
| *Detarium microcarpum* Guill. et Perr. | Alkaloid, fibers, tannins, saponins, flavonoids, cyanides, beta carotenes, cyanogenic glycosides, terpenoids, steroids, anthocyanines [59,61]. | Calcium; phosphorus; iron; zinc; vitamins A, E [59].                                      |                                                                                             |
| *Diospyros mespiliformis* Hochst ex A. DC. | Antioxidant, astringent, spasmodic, antibacterial, homeostatic [87]. | Alkaloids, polyphenols, flavonoids, anthraquinones, tannins, triterpenes, saponins, saponosides, anthocyanes, anthracenosides, steroids [87,88]. |                                                                                             |
| *Ficus iteophylla* Miq.               | Analgesic, anti-inflammatory, antibacterial [89]                   | Steroids, furanocoumarines, flavonoids glycosides [80,89]                              | 3β-cholest-5-ene-3, 23diol; 24 ethyl cholest-5-ene- 3β-ol [89].                             |
| *Guiera senegalensis* J.F. Gmel.      | Psychoactive, detoxicant, anti-plasmodial, antimicrobial, antifungal, antioxidant, anticancerous, anti-viral, [90,91]. | Alkaloids, flavonoids, triterpenes, tannins, cardenolides, anthracene, coumarines, sterols, saponosides [91,92]. |                                                                                             |
| *Khaya senegalensis* (Desr) A. Juss   | Anticonvulsant, Anxiolytic, sedative, antioxygen, anti-tumoral, chemopreventive, anti-inflammatory [15,93–95]. | Alkaloids, saponins, tannins, triterpenes, flavonoids, glucosides, carbohydrate, phylates, oxalates, triterpenoids [15,94,95]. | Gedunin; methyl-angolensate; methyl-6-hydroxyangolensate [96]. Catechin; rutin; quercetin rhamnoside; procyandins [97]. Fisinolide; 2,6-dihydroxyfisinolide; methyl 3β-acetoxy-6-hydroxy-1-oxomelic-14-enoate [98]. Magnesium, calcium, potassium, sodium, iron, manganese, lead, chromium [94]. |
| *Mitragyna inermis* (Willd) O. Ktze  | Anticonvulsant, cardiovascular affects, antibacterial, antiplasmodial, anti-diabetic [99–101]. | Alkaloids, polyphenols, sterols, polypeptenes, quinones, tannins, saponins, flavonoids, saponosides [99,100,102]. | Rhynchophylline; isorhynchophylline; corynosome; isorhynchophylline; ciliaphylline; rhynchocline; isospcionoxeine; 9-methoxy-3-epi-α-yohimbine [103]. 27-nor-terpenoid glucoside [104,105]. |
| *Parkia biglobosa* (Jacq.) R. BR. ex G. Don. F | Antibacterial, antifungal, antioxidant, antihyperlipidemic, cardioprotective [106–108]. | Alkaloids, cardiac glycosides, tannins, steroids, tannins, alkaloids, flavonoids, saponins, terpenes, glycosides [106,109]. |                                                                                             |
Table 4. Cont.

| Plants | Pharmacological Properties | Phytochemical Constituents | Chemical Compounds Identified |
|--------|----------------------------|---------------------------|-------------------------------|
| *Securidaca longepedunculata* Fresen | Anticonvulsant; antidepressant, anti-inflammatory, antioxidant, anti-inflammatory, cytotoxic, antivenomous, antibacterial, aphrodisiac, sedative, [110–112] | Alkaloids, saponosides, flavonoids, phenols, xanthones, anthraquinones, essential oils [113–115]. | Gallic acid; quercetin; cafeic acid; chlorogenic acid; epicatechin; p-coumaric acid; cinnamic acid; rutin; apigenin [82]; Phelandrene; pinene; z-sabinol; limonene; p-cymene [110]; Securinin [116,117]; Muchimangine E, muchimangine F [118]. |
| *Tamarindus indica* L. | Analgesic, anti-inflammatory, anti-inflammatory, antivenin, hepatoprotective, anti-inflammatory, anti-inflammatory, anti-inflammatory, antioxidative, antibacterial [119–121]. | Alkaloids, saponins, glycosides, tannins, terpenoids, flavonoids, coumarins, naphthoquinones, anthraquinones, xanthones [121–124]. | C-glycosides: orientin, vitexin, isoorientin, isovitexin, tartaric acid; malic acid [120]. Limonene; methyl salicylate; pyrazine; alkylthiazole; calcium; iron; zinc; vitamins B and C [125]. |
| *Ximenia americana* L. | Anti-plasmodial, antioxidant, anticancer, antineoplastic, antityrososomal, antirheumatic, antioxidant, analgesic, antipyretic [90,126,127]. | Alkaloids, anthraquinones, cardiac glycosides, flavonoids, pylobatannins, saponins, tannins, terpenoids, isoprenoids, triterpenes, sesquiterpenes, quinones [126–128]. | Norisoprenoid isophorane; ximenynic acid; methyl-14,14-dimethyl-18-hydroxyheptatracont-27,35-diene-12-ynoic acid, tariric acid; β-sitosterol; oleane palmitates [127,129,130]. |
| *Zanthoxylum zanthoxyloides* Lam. Zep & Timl | Anti-plasmodial, vasorelaxant, antifungal, antibacterial, inhibition of acetylcholinesterase, antiradical, [131–133]. | Alkaloids, tannins [132,134]. | Myrcene; germacrene D; limonene, β-caryophyllene; decanal [135]. Acide 3,4-Divanilloylquinique, acide 3,5-O-divanilleyquinique, acide 4,5-O-divanilloyquinique, acide 4,5-O-divanilloyquinique [136],fagaramide; (+)-séamine; lupéol; hespéridine; Dihydrochélerythrine; N,N-diméthyllincarpine; Chélerythrine; Norchélerythrine; 6-(2-oxybutyl) dihydroychélerythrine; 6-hydroxy-dihydroychélerythrine; avicine; arnottianamide [131]. |
| *Zizyphus mauritiana* Lam. | Antitumor, antibacterial, antioxidant, antimicrobial, anticancer [137,138]. | Alkaloids, flavonoids, triterpenoids, tannins, glycoside, phenol, lignin, saponins [137,139]. | 2H-1-benzopyran-2-one, 9, stigmasterol; stigmastane-3,6-dione [137]. 3-methyl piperidine; o-methyl delta-tochopherol; octacosane; cyclobarbital; squalene; 2,4-dimethyl; thymol TMS; benzoquinol; γ-sitosterol; hydroprogesterone [138]. |
Roots (36.2%) and leaves (29%) were the most used organs for the preparation of remedies. These data are in agreement with those observed by Olivier’s group [21] and Kantati’s group [35]. That would be explained by the availability of these plant parts at all periods in this region, but their effectiveness would be related to the significant accumulation of chemical compounds in these organs [113,140]. However, roots use should lead to some species disappearance. Thus, conservation measures of those are necessary.

Methods of remedies preparation are similar to those observed in other works. The decoction (46.7%) was the most used, followed by the trituration, calcination and aqueous maceration. These results are comparable to those of Zerbo’s group works in Sanan’s region and Western area of Burkina Faso [16,22], Adetutu’s group in the South-western of Nigeria [141] and Kantati’s group in Togo [35]. They noted that these methods were the main ones used by traditional healers in these different areas. In phytochemistry, the decoction is considered to be a method allowing complete extraction of bioactive chemical compounds of plants [142]. The aqueous maceration was quoted as being a good method of alkaloids and polyphenols extraction [142,143]. Likewise, the trituration and the calcination methods allow reducing vegetable material to powder or paste, while preserving bioactive molecules. These data could justify the main use of these modes of preparation.

The majority of drugs are administrated orally (drink, 40.8%), the preferential mode of administration in the traditional medicine [67]. However, some are preferentially used by external ways. That would be related to risks that oral use presents for some plants, because of their toxicity or the specificity of the disease [21]. The nasal way is the third most used mode of administration. It has the advantage of allowing a fast access of the active substances in the brain and their best absorption [144].

Results of the ethnobotanical survey corroborate with previous phytochemical studies about traditional uses of plants listed [7,35] and their psychoactive compounds content [69,91]. Indeed, alkaloids are the most known of molecules possessing psychoactive properties [67,145]. Likewise, some flavonoids, steroids and terpenoids were quoted to have psychoactive effect [47,53,146]. These chemical constituents intervene to disturb neurotransmitters activities. They stimulate, inhibit or block liberation, reception or elimination of neurotransmitters [147,148]. Pharmacological results show that the main plants used possess anticonvulsant, anxiolytic, antispasmodic, antinociceptive, analgesic or sedative properties [44,85,111]. This result could confirm the presence of psychoactive compounds in these plants.

5. Conclusions

This study made it possible to report 66 plant species belonging to 51 genera and 32 families used for the treatment of neuropsychiatric diseases. Roots and leaves were the most organs used, the decoction and the trituration were the principal modes of drug preparation. The administration of remedies was done mainly by oral way. Plants identified were quoted to possess psychoactive properties and some chemical contents which could justify that.

Traditional remedies suggested in this study are a real interest in the fight against neuropsychiatric disorders. Then, further researches will be necessary to identify psychoactive compounds from these plants and their acting mechanisms for neuropsychiatric diseases treatment.

Acknowledgments: The authors wish to thank Sidonie Yabré and traditional healers of “Hauts Bassins” region from Burkina Faso for their availability and assistance during survey.

Author Contributions: M.K. and P.Z. conceived and designed the survey; P.T.K. realized the survey; P.T.K. and M.C. analyzed the data; P.T.K. wrote the paper; P.Z. identified the plant specimen; S.G., M.K. and A.C. corrected the manuscript.

Conflicts of Interest: The authors declare no conflict of interest.
References

1. Hele, B.; Metowogo, K.; Mouzou, A.P.; Tossou, R.; Ahounou, J.; Eklou-Gadegbeku, K.; Dansou, P.; Aklikokou, A.K. Enquête ethnobotanique sur les plantes utilisées dans le traitement traditionnel des contusions musculaires au Togo. Rev. Ivoir. Sci. Technol. 2014, 24, 112–130. (In French).

2. Organisation Mondiale de la Santé (OMS). Rapport de l’atelier Interrégional de l’OMS sur l’utilisation de la Médecine Traditionnelle dans les soins de santé Primaires; OMS: Genève, Suisse, 2009. (In French)

3. Organisation Mondiale de la Santé (OMS). Projet Zéro de Plan D’action Mondial Sur la Santé Mentale 2013–2020; OMS: Genève, Suisse, 2012. (In French)

4. Yasamy, M.T.; Maulik, P.K.; Tomlinson, M.; Lund, C.; Van Ommeren, M.; Saxena, S. Responsible Governance for Mental Health Research in Low Resource Countries. PLoS Med. 2011, 8, 1–6. [CrossRef] [PubMed]

5. Fusar-Poli, P.; Deste, G.; Smieskova, R.; Barlati, S.; Yung, A.R.; Howes, O.; Stieglitz, R.-D.; Vita, A.; McGuire, P.; Borgwardt, S. Cognitive Functioning in Prodromal Psychosis: A meta-analysis. Arch. Gen. Psychiatry 2012, 69, 562–571. [CrossRef] [PubMed]

6. World Health Organization (WHO). Mental Health Gap Action Programme: Scaling up Care for Mental, Neurological, and Substance Use Disorders; WHO: Geneva, Switzerland, 2008.

7. Moshi, M.J.; Kagashe, G.A.B.; Mbwambo, Z.H. Plants used to treat epilepsy by Tanzanian traditional healers. J. Ethnopharmacal. 2005, 97, 327–336. [CrossRef] [PubMed]

8. Diaby, M.A. Etude de la chimie et des activités biologiques de Daniellia oliveri (Rolfe, Hutch et Dalz), une plante utilisée dans la prise en charge de l’épilepsie au Mali. Thèse d’Etat, USST-B, Bamako, Mali, 2014.

9. Starling, J.; Feijo, I. Schizophrenie et autres troubles psychotiques à début précoce. IACAPAP E-textb. Child Adolesc. Ment. Health 2012, 1–24. (In French).

10. Rey-bellet, P. Quoi de neuf dans le traitement des psychoses. Curr. Opin. Psychiatry 2015, 1–26.

11. World Health Organization (WHO). Regional Strategy for Mental Health 2000–2010; WHO: Geneva, Switzerland, 2000.

12. Comité Français d’Education pour la Santé (CFES) et MILDT. Médicaments Psychoactifs; EURO RSCG: Puteaux, France, 2000. (In French). Available online: http://perso.mediaserv.net/ganja/sarah/sarah/106_fin.pdf (accessed on 8 October 2016).

13. Fouchev, M. Etat des lieux sur l’industrie du médicament. Rev. Neuropsychol. 2010, 1–8. (In French). Available online: http://psychologie-m-fouchey.psyblogs.net/ (accessed on 8 October 2016).

14. Sobiecki, J.F. A preliminary inventory of plants used for psychoactive purposes in southern African healing traditions. Trans. R. Soc. S. Afr. 2002, 57, 1–24. [CrossRef]

15. Taire, G.S.; Kuete, V. Neurotoxicity and Neuroprotective Effects of African Medicinal Plants. In Toxicological Survey of African Medicinal Plants; Elsevier: London, UK, 2014; pp. 423–444.

16. Zerbo, P.; Millogo-rosalodimby, J.; Nacoulma-ouedraogo, O.G.; Van Damme, P. Plantes médicinales et pratiques médicales au Burkina Faso: Cas des Sanan. Bois Forêt des Tropiques 2011, 307, 41–53. (In French).

17. Millogo, A.; Kaboré, J.; Preux, P.-M.; Dumas, M. Traitement des adultes épileptiques en milieu hospitalier à Bobo-Dioulasso (Burkina-Faso). Epilepsies 2003, 15, 37–40. (In French)
24. Traoré, M. Etude du profil et de la prise en charge des cas d’abus de drogues dans la ville de Bobo-Bioulasso (Burkina Baso). Ph.D. Thesis, Université de Ouagadougou, Ouagadougou, Burkina Baso, 2012.
25. Millogo, A.; Ratsimbazafy, V.; Nubukpo, P.; Barro, S.; Zongo, I.; Preux, P. Epilepsy and traditional medicine in Bobo-Dioulasso (Burkina Faso). Acta Neurol. Scand. 2004, 109, 250–254. [CrossRef] [PubMed]
26. Ministère de l’Économie et du Développement (MED). Profil des Régions du Burkina Faso: La région des Hauts Bassins; MED: Ouagadougou, Burkina Faso, 2005. (In French)
27. Fontès, J.; Guinko, S. CARTE de la Végétation et de l’Occupation du Sol du Burkina Faso: Notice Explicative; Université de Toulouse III: Toulouse, France, 1995. (In French)
28. Institut National de la Statistique et de la Démographie (INSD). Etat et structure de la population; INSD: Ouagadougou, Burkina Faso, 2009. (In French)
29. Hutchinson, J.; Dalziel, J.M. Flora of West Tropical Africa; The Whitefriars Press: London/Tonbridge, UK, 1963.
30. Nacoulma-Ouedraogo, O.G. Plantes médicinales et pratiques médicinales traditionnelles au Burkina Faso: Cas du plateau central. Thèse d’Etat, Université de Ouagadougou, Ouagadougou, Burkina Faso, 1996.
31. Thiombiano, A.; Schmidt, M.; Dressler, S.; Ouédraogo, A.; Hahn, K.; Zizka, G. Catalogue Des Plantes Vasculaires Du Burkina Faso. Conservatoire et jardin botaniques de la ville de genève. 2012. Available online: http://www.worldcat.org/title/ (accessed on 8 October 2016).
32. Kerharo, J.; Bouquet, A. Plantes Médicinales Et Toxiques De La Côte-d’Ivoire-Haute-Volta. Mission D’étude De La Pharmacoçée Indigène En A.O.F; Editions Vigot Frères: Paris, France, 1950. (In French)
33. Pageard, R. Plantes à brûler chez les Bambara. J. Soc. Afr. 1967, 37, 87–130. [CrossRef]
34. Moreau, R. Quelques Plantes de Haute-volta: Leurs noms Vernaculaires en Langue Mossi, dioula, bobo-oulé, Dagari et Peul-wassolo; Publications des scientifiques de l’IRD: Haute-Volta, French, 1970. (In French)
35. Kantati, Y.T.; Kodjo, K.M.; Dogbeavou, K.S.; Vaudry, D.; Leprince, J.; Gbeassor, M. Ethnopharmacological survey of plant species used in folk medicine against central nervous system disorders in Togo. J. Ethnopharmacol. 2016, 181, 214–220. [CrossRef] [PubMed]
36. Traoré, A.; Derme, A. I.; Sanon, S.; Gansane, A.; Ouattara, Y.; Nebié, I.; Sirima, S.B. Connaissances ethnobotaniques et pratiques phytothérapeutiques des traditionnaires de santé de la Comoé pour le traitement du paludisme: Processus d’une recherche scientifique de nouveaux antipaludiques au Burkina Faso. Ethnopharmacologia 2009, 43, 35–46. (In French).
37. Sobiecki, J.F. A review of plants used in divination in southern Africa and their psychoactive effects. S. Afr. Humit. 2008, 20, 333–351.
38. Perveen, T.; Haider, S.; Zubairi, N.A.; Ahmed, W.; Batool, Z.; Begum, S. Effect of herbal combination on biochemical and behavioral responses in rats. Pak. J. Biochem. Mol. Biol. 2012, 45, 20–22.
39. Sucher, N.J.; Carles, M.C. A pharmacological basis of herbal medicines for epilepsy. Epilepsy Behav. 2015, 52, 308–318. [CrossRef] [PubMed]
40. Bruneton, J. Pharmacognosie, Phytochimie, Plantes Médicinales, 2eme ed.; Tec. et Doc.: Lavoisier, Paris, 1993.
41. Sereme, A.; Millogo-Rasolodimby, J.; Guinko, S.; Nacro, M. Propriétés Therapeutiques Des Plantes a Tanins du Burkina Faso. Pharmacoçée Méd. Tradit. Afr. 2008, 15, 41–49. (In French).
42. Al-snafi, A.E. The constituents and pharmacological properties of Calotropis procera-an overview. Int. J. Pharm. Res. Rev. 2015, 5, 259–275.
43. Mohamed, N.H.; Liu, M.; Abdel-mageed, W.M.; Alwahibi, L.H.; Dai, H.; Ahmed, M.; Badr, G.; Quinn, R.J.; Liu, X.; Zhang, L.; et al. Cytotoxic cardenolides from the latex of Calotropis procera. Bioorg. Med. Chem. Lett. 2015, 25, 4615–4620. [CrossRef] [PubMed]
44. Lima, R.C.D.S.; Silva, M.C.C.; Aguiar, C.C.T.; Chaves, E.M.C.; Dias, K.C.F.; Macêdo, D.S.; Sousa, F.C.F.; Carvalho, K.M.; Ramos, M.V.; Mendes, V.M. Anticonvulsant action of Calotropis procera latex proteins. Epilepsy Behav. 2012, 23, 123–126. [CrossRef] [PubMed]
45. Steenkamp, P.A.; Harding, N.M.; Von Heerden, F.R.; Van Wyk, B.E. Fatal Datura poisoning: Identification of atropine and scopolamine by high performance liquid chromatography/photodiode array/mass spectrometry. Forensic Sci. Int. 2004, 145, 31–39. [CrossRef] [PubMed]
46. Maiga, A.; Diallo, D.; Fane, S.; Sanogo, R.; Paulsen, B.S.; Cisse, B. A survey of toxic plants on the market in the district of Bamako, Mali: Traditional knowledge compared with a literature search of modern pharmacology and toxicology. J. Ethnopharmacol. 2005, 96, 183–193. [CrossRef] [PubMed]
47. Zhang, Z. Therapeutic effects of herbal extracts and constituents in animal models of psychiatric disorders. Life Sci. 2004, 75, 1659–1699. [CrossRef] [PubMed]
48. Marder, M.; Wasowski, C.; Medina, J.H.; Paladini, A.C. 6-Methyldapigenin and hesperidin: New valeriana flavonoids with activity on the CNS. *Pharmacol. Biochem. Behav.* 2003, 75, 537–545. [CrossRef]

49. Dajas, F.; Rivera, F.; Blasina, F.; Arredondo, F.; Lafon, L.; Morquio, A.; Heizen, H. Cell culture protection and in vivo Neuroprotective Capacity of Flavonoids. *Neurotox. Res.* 2003, 5, 425–432. [CrossRef] [PubMed]

50. Lake, J. Natural product-derived treatments of neuropsychiatric disorders: Review of progress and recommendations. *Stud. Nat. Prod. Chem.* 2000, 24, 1093–1137.

51. Guenne, S.; Balmus, I.M.; Hilou, A.; Ouattara, N.; Kiendrebéogo, M.; Ciobica, A.; Timothe, D. The relevance of Asteraceae family plants in most of the neuropsychiatric disorders treatment. *Int. J. Phyt.* 2016, 8, 176–182.

52. Gurib-Fakim, A. Medicinal plants: Traditions of yesterday and drugs of tomorrow. *Mol. Asp. Med.* 2006, 27, 1–93. [CrossRef] [PubMed]

53. Becaud-Boyer, A.-S. *Salvia divinorum*, hallucinogène d’hier aujourd’hui, outil thérapeutique de demain? Thèse d’Etat, Université Joseph FOURIER, Grenoble, France, 2011.

54. Charlene, B. La soumission chimique. Thèse d’Etat, Université Toulouse III, Toulouse, France, 2013.

55. Eldeen, S.; Mohamed, I. Pharmacological investigation of some trees used in South African traditional medicine. Ph.D. Thesis, University of KwaZulu–Natal, Pietermaritzburg, South Africa, 2005.

56. Seigler, D.S.; Butterfield, C.S.; Dunn, J.E.; Conn, E.E. Dihydroacacipetalin–a new cyanogenic glucoside from *Acacia sieberiana* var. Woodii. *Phytochemistry* 1975, 14, 1419–1420. [CrossRef]

57. Salisu, A.; Ogbadu, G.H.; Onyenekwe, P.C.; Olorode, O.; Ndana, R.W.; Segun, O. Evaluating the Nutritional Potential of *Acacia Sieberiana* Seeds (Dc) Growing in North West of Nigeria. *J. Biol. Life Sci.* 2014, 10, 25–36.

58. Zeuko’o, M.E.; Jurbe, G.G.; Ntim, P.S.; Ajayi, T.A.; Chuwkuka, J.U.; Conn, E.E. Phytochemical Screening and Antidiarrheal Evaluation of Acetone Extract of *A cacia sieberiana* var woodii (Fabaceae) stem bark in wistar rats. *Acad. J. Pharm. Pharmacol.* 2015, 3, 1–6.

59. Uchenna, A.; Nkiruka, V.; Eze, P. Phytochemical and Pharmaceutical Composition of Formulated Diabetic Snacks Made from Two Nigerian Foods *Afzelia africana* and *Detarium microcarpium* Seed Flour. *Pak. J. Nutr.* 2013, 12, 108–113. [CrossRef]

60. Olajide, O.B.; Fadimu, O.Y.; Osaguona, P.O.; Saliman, M. Botanical and phytochemical studies of some selected species of leguminoseae of northern nigeria: A study of borgu local government area, niger state. Nigeria. *Analysis* 2013, 4, 546–551.

61. Igwenyi, I.O.; Azor, B.N. Proximate and Phytochemical Compositions of Four Indigenous Seeds Used As Soup Thickeners in Ebonyi State Nigeria. *Int. Res. J. Pharm.* 2014, 5, 41–47.

62. Gebreyohannes, G.; Gebreyohannes, M. Medicinal values of garlic: A review. *Int. J. Med. Méd. Sci.* 2013, 5, 401–408.

63. Bhandari, S.; Yoon, M.K.; Kwak, J. Contents of Phytochemical Constituents and Antioxidant Activity of 19 Garlic (*Allium sativum* L.) Parental Lines and Cultivars. *Hort. Environ. Biotechnol.* 2014, 35, 138–147. [CrossRef]

64. Mallet, A.C.T.; Cardoso, M.G.; Souza, P.E.; Machado, S.M.F.; Andrade, M.A.; Nelson, D.L.; Piccoli, R.H. Chemical characterization of the *Allium sativum* and Origanum vulgare essential oils and their inhibition effect on the growth of some food pathogens. *Rev. Bras. Plant. Med.* 2014, 16, 804–811. [CrossRef]

65. Johnson, O.O.; Ayoola, G.A.; Adenipekun, T. Antimicrobial Activity and the Chemical Composition of the Volatile Oil Blend from *Allium sativum* (Garlic Clove) and *Citrus reticulata* (Tangerine Fruit). *Int. J. Pharm. Sci. Drug Res.* 2013, 5, 187–193.

66. Yinyang, J.; Mpondo, M.E.; Tchatat, M.; Ndjib, R.C.; Mvogo-Ottou, P.B.; Dibong, S.D. Les plantes à alcaloïdes utilisées par les populations de la ville de Douala (Cameroun). *J. Appl. Biosci.* 2014, 78, 6600–6619. [CrossRef]

67. Rainy, G.; Amita, S.; Preeti, M. Study of chemical composition of garlic oil and chemical analysis of co-trimoxazole in response to in vitro antibacterial activity. *Int. Res. J. Pharm.* 2014, 5, 1–5.

68. Mustapha, A.A. *Annona senegalensis* Persoon: A Multipurpose shrub, its Phytotherapic, Phytopharmacological and Phytomedicinal Uses. *Int. J. Sci. Technol.* 2013, 2, 862–865.
70. Konate, A.; Sawadogo, W.R.; Dubruc, F.; Caillard, O.; Ouédraogo, M. Phytochemical and Anticonvulsant Properties of Annona senegalensis Pers. (Annonaceae), Plant Used in Burkina Folk Medicine to Treat Epilepsy and Convulsions. Br. J. Pharmacol. Toxicol. 2012, 3, 245–250.

71. Awa, E.P.; Ibrahim, S.; Ameh, D.A. GC/MS Analysis and antimicrobial activity of Diethyl ether fraction of Methanolic extract from the stem bark of Annona senegalensis pers. Int. J. Pharm. Sci. Res. 2012, 3, 4213–4218.

72. Ibrahim, S.R.M.; Mohamed, G.A.; Shaala, L.A.; Moreno, L.; Banuls, Y.; Van Goetsenoven, G.; Kiss, R.; Youssef, D.T.A. New ursane-type triterpenes from the root bark of Calotropis procera. Phytochem. Lett. 2012, 5, 490–495. [CrossRef]

73. Patil, S.G.; Patil, M.P. Maheshwari, V.L.; Patil, R.H. In vitro lipase inhibitory effect and kinetic properties of di-terpenoid fraction from Calotropis procera (Aiton). Bio Catal. Agric. Biotechnol. 2015, 4, 579–585. [CrossRef]

74. Sayed, A.E.H.; Mohamed, N.H.; Ismail, M.A.; Abdel-mageed, W.M.; Shoreit, A.A.M. Antioxidant and antiapoptotic activities of Calotropis procera latex on Catfish (Clarias gariepinus) exposed to toxic 4-nonylphenol. Ecotoxicol. Environ. Saf. 2016, 128, 189–194. [CrossRef] [PubMed]

75. Nenaah, G.E. Potential of using flavonoids, latex and extracts from Calotropis procera (Ait.) as grain protectants against two coleopteran pests of stored rice. Ind. Crop. Prod. 2013, 45, 327–334. [CrossRef]

76. Kerharo, J.; Adam, J.G. La Pharmacopée sénégalaise traditionnelle. Plantes médicinales et toxiques. J. d’agriculture Trop. Bot. Appl. 1974, 21, 76–77.

77. Jeong-Hyun, L.; Jae-Sug, L. Chemical Composition and Antifungal Activity of Plant Essential Oils against Malassezia furfur. Kor. J. Microbiol. Biotechnol. 2010, 38, 315–321.

78. Dongmo, P.M.J.; Tchournoboung, F.; Boyom, E.F.; Sonwa, E.T.; Zollo, P.H.A.; Menut, C. Antiradical, antioxidant activities and anti-inflammatory potential of the essential oils of the varieties of citrus limon and citrus aurantifolia growing in Cameroon. J. Asian Sci. Res. 2013, 3, 1046–1057.

79. Ouedhiri, W.; Bouhdid, S.; Balouiri, M.; Lalami, A.E.O.; Moja, S.; Chahti, F.O.; Greche, H. Chemical composition of Citrus aurantium L. leaves and zest essential oils, their antioxidant, antibacterial single and combined effects. J. Chem. Pharm. Res. 2015, 7, 78–84.

80. Ahmadu, A.; Haruna, A.K.; Garba, M.; Ehinmidu, J.O.; Sarkar, S.D. Phytochemical and antimicrobial activities of the Daniellia oliveri leaves. Fitoterapia 2004, 75, 729–732. [CrossRef] [PubMed]

81. Kaboré, A. Activité anthelmintique de deux plantes tropicales testée in vitro et in vivo sur les strongles gastro-intestinaux des ovis de race mouton d’Aquitaine. La Pharmacopée Galaise Traditionnelle, ou journal d’herboristerie et médecine popularisée des pays d’Afrique, 2004, 17, 1026–1032.

82. Ibrahim, S.R.M.; Mohamed, G.A.; Shaala, L.A.; Moreno, L.; Banuls, Y.; Van Goetsenoven, G.; Kiss, R.; Youssef, D.T.A. New ursane-type triterpenes from the root bark of Calotropis procera. Phytochem. Lett. 2012, 5, 490–495. [CrossRef]

83. Konate, A.; Sawadogo, W.R.; Dubruc, F.; Caillard, O.; Ouédraogo, M. Phytochemical and Anticonvulsant Properties of Annona senegalensis Pers. (Annonaceae), Plant Used in Burkina Folk Medicine to Treat Epilepsy and Convulsions. Br. J. Pharmacol. Toxicol. 2012, 3, 245–250.

84. Abdulmalik, I.A.; Sule, M.I.; Musa, A.M.; Yaro, A.H.; Abdullahi, M.I.; Abdulkadir, M.F.; Yusuf, H. Isolation of Steroids from Acetone Extract of Ficus iteophylla. Br. J. Pharmacol. Toxicol. 2011, 2, 270–272.

85. Ibrahim, S.R.M.; Mohamed, G.A.; Shaala, L.A.; Moreno, L.; Banuls, Y.; Van Goetsenoven, G.; Kiss, R.; Youssef, D.T.A. New ursane-type triterpenes from the root bark of Calotropis procera. Phytochem. Lett. 2012, 5, 490–495. [CrossRef]

86. Kebo, S.; Zayed, R. Comparison of Tropane Alkaloid Spectra Between Datura innoxia Grown in Egypt and Bulgaria. Z. Naturforsch. C 2004, 59, 184–186. [CrossRef] [PubMed]

87. Ibrahim, S.R.M.; Mohamed, G.A.; Shaala, L.A.; Moreno, L.; Banuls, Y.; Van Goetsenoven, G.; Kiss, R.; Youssef, D.T.A. New ursane-type triterpenes from the root bark of Calotropis procera. Phytochem. Lett. 2012, 5, 490–495. [CrossRef]

88. Ibrahim, S.R.M.; Mohamed, G.A.; Shaala, L.A.; Moreno, L.; Banuls, Y.; Van Goetsenoven, G.; Kiss, R.; Youssef, D.T.A. New ursane-type triterpenes from the root bark of Calotropis procera. Phytochem. Lett. 2012, 5, 490–495. [CrossRef]

89. Abdulmalik, I.A.; Sule, M.I.; Musa, A.M.; Yaro, A.H.; Abdullahi, M.I.; Abdulkadir, M.F.; Yusuf, H. Isolation of Steroids from Acetone Extract of Ficus iteophylla. Br. J. Pharmacol. Toxicol. 2011, 2, 270–272.

90. Soha, P.M.; Benoit-Vical, F. Are West African plants a source of future antimalarial drugs? J. Ethnopharmacol. 2007, 114, 130–140. [CrossRef] [PubMed]
111. Adeyemi, O.O.; Akindele, A.J.; Yemitan, O.K.; Aigbe, F.R.; Fagbo, F.I. Anticonvulsant, anxiolytic and sedative properties of total alkaloids extract from Mitragyna inermis (Willd) O. Kuntze, a West African traditional medicinal plant. J. Ethnopharmacol. 2013, 150, 7750–7771. [CrossRef] [PubMed]

110. Adebiyi, R.A.; Elsa, A.T.; Agaie, B.M.; Etuk, E.U. Antinociceptive and antidepressant like effects of Securidaca longepedunculata root extract in mice. J. Ethnopharmacol. 2006, 107, 234–239. [CrossRef] [PubMed]

99. Zongo, C.; Akomo, E.-F.O.; Sawadogo, A.; Obame, L.C.; Koudou, J.; Traore, A.S. In vitro antibacterial properties of Total alkaloids extract from Mitragyna inermis (Willd) O ktze (Rubiaceae), anti-diabetic plant. Phytomedicine 2015, 20, 7750–7771. [CrossRef] [PubMed]

98. Khalid, S.A.; Friedrichsen, G.M.; Kharazmi, A.; Theander, T.G.; Olsen, C.E.; Christensen, S.B. Limonoids properties of total alkaloids extract from Mitragyna inermis (Willd) O. Kuntze, a West African traditional medicinal plant. Asian J. Plant Sci. 2009, 8, 172–177. [CrossRef]

97. Alowanou, G.G.; Olounlade, A.P.; Azando, E.V.; Daga, F.D.; Hounzangbeadote, S.M. Anticancer Res. 2013, 33, 8003–8014. [CrossRef]

96. Nwodo, N.J.; Ibezim, A.; Ntie-Kang, F.; Adikwu, M.U.; Mbah, C.J. Anti-Trypanosomal Activity of Nigerian Medicines. J. Med. Plants Res. 2012, 6, 191–195. [CrossRef] [PubMed]

95. Wakirwa, J.H.; Idris, S.; Madu, S.J.; Dibal, M.; Malgwi, T. Assessment of the In-vitro antimicrobial potential of Khaya senegalensis Bark Extract on Human Colorectal Cancer. Anticancer Res. 2006, 26, 2397–2406. [PubMed]

94. Khalid, S.A.; Friedrichsen, G.M.; Kharazmi, A.; Theander, T.G.; Olsen, C.E.; Christensen, S.B. Limonoids properties of total alkaloids extract from Mitragyna inermis (Willd) O. Kuntze, a West African traditional medicinal plant. Asian J. Plant Sci. 2009, 8, 172–177. [CrossRef]

93. Androulakis, X.M.; Muga, S.J.; Chen, F.; Koita, Y.; Toure, B.; Michael Wargovich, J. Chemopreventive Effects of 9-methoxyyohimbine-type indole alkaloid from Mitragyna inermis. J. Med. Plants Res. 2010, 4, 74–79. [CrossRef] [PubMed]

92. Ouédraogo, F. Etude in vitro de l’activité antiplasmodiale d’extrait de feuilles, de fleurs et de galles de Guiera senegalensis J. F. Gmel (combretaceae). Thèse Doctorat, Université de Ouagadougou, Ouagadougou, Burkina Faso, 2011.

91. Somboro, A.A.; Patel, K.; Diallo, D.; Sidibe, L.; Chalchat, J.C.; Figueredo, G.; Ducki, S.; Troin, Y.; Chalard, P. An ethnobotanical and phytochemical study of the African medicinal plant Guiera senegalensis J. F. Gmel. J. Med. Plants Res. 2011, 5, 1639–1651.

90. Ezekwe, C.I.; Ada, A.C.; Okechukwu, P.C.U. Effects of Methanol Extract of Parkia biglobosa Stem Bark on the Liver and Kidney Functions of Albino Rats. Glob. J. Biotechnol. Biochem. 2013, 8, 40–50.

89. Alowanou, G.G.; Olounlade, A.P.; Azando, E.V.; Daga, F.D.; Hounzangbeadote, S.M. Anticancer Res. 2013, 33, 8003–8014. [CrossRef] [PubMed]

88. Konkon, N.G.; Adjoungoua, A.L.; Manda, P.; Simaga, D.; N’Guessan, K.E.; Kone, B.D. Toxicological and phytochemical screening study of Mitragyna Inermis (willd) O Kuntze, a West African traditional medicinal plant. J. Ethnopharmacol. 2013, 149, 149–169. [CrossRef] [PubMed]

87. Karou, S.D.; Tchacondo, T.; Ilboudo, D.P.; Simpore, J. Sub-saharan Rubiaceae : A review of their traditional uses, phytochemistry and biological activities. Int. J. Appl. Res. Nat. Prod. 2013, 6, 40–50.

86. Ajaiyeoba, E.O. Phytochemical antibacterial properties of parkia biglobosa and parkia bicolor leaf extracts. J. Appl. Biochem. 2004, 359–361. [CrossRef] [PubMed]
112. Okomolo, C.M.; Mbafor, J.T.; Bum, E.N.; Kouemou, N.; Kandeda, A.K.; Tall, E.; Dimo, T.; Kakoutirira, A.; Rakotominirina, S.V. Evaluation of the sedative and anticonvulsant properties of three Cameroonian plant. Afr. J. Tradit. Complement. Altern. Med. 2011, 8, 181–190. [PubMed]

113. Nébié, R.H.C.; Yaméogo, R.T.; Belanger, A.; Sib, F.S. Salicylate de méthyle, constituant unique de l’huile essentielle de l’écorce des racines de Securida longepedunculata du Burkina Faso. C. R. Chim. 2004, 7, 1003–1006. (In French). [CrossRef]

114. Sow, P.G. Enquête Ethnobotanique et Ethnopharmacologique des Plantes Médicinales de la pharmacopée Sénégalaise Dans le Traitement des Morsures de Serpents. Le Pharmacien Hospitalier et Clinicien 2012, 47, 37–41. [CrossRef]

115. Octane, M.; Chaudhary, S.; Rahman, K.; Hamiduddin; Zaman, R.; Shaikh, L. Tamarindus indica: An overview. Afr. J. Biotechnol. 2010, 9, 7744–7746. [CrossRef] [PubMed]

116. Tariq, M.; Chaudhary, S.; Rahman, K.; Hamiduddin; Zaman, R.; Shaikh, L. Tamarindus indica: An overview. J. Biol. Sci. Opin. 2013, 1, 128–131. [CrossRef]

117. Dibwe, D.F.; Awale, S.; Kadota, S.; Morita, H.; Tezuka, Y. Heptaoxygenated xanthones as anti-austerity agents from Securida longepedunculata. Bioorg. Med. Chem. 2013, 21, 7663–7668. [CrossRef] [PubMed]

118. Bhadoriya, S.S.; Mishra, V.; Raut, S.; Ganeshpurkar, A.; Jain, S.K. Anti-Inflammatory and Antinociceptive Activities of a Hydroethanolic Extract of Tamarindus indica Leaves. Sci. Pharm. 2012, 80, 685–700. [CrossRef] [PubMed]

119. Tariq, M.; Chaudhary, S.; Rahman, K.; Hamiduddin; Zaman, R.; Shaikh, L. Tamarindus indica: An overview. Afr. J. Biotechnol. 2010, 9, 7744–7746. [CrossRef] [PubMed]

120. Yusha’u, M.; Gabari, D.A.; Dabo, N.T.; Hassan, A.; Dahiru, M. Biological activity and phytochemical constituents of Tamarindus indica stem bark extracts. Sky J. Microbiol. Res. 2014, 2, 67–71.

121. Dougari, J.H. Antimicrobial Activity of Tamarindus indica Linn. Trop. J. Pharm. Res. 2006, 5, 597–603. [CrossRef]

122. Capur, M.A.; John, S.A. Antimicrobial Activity of Ethanolic Bark Extract of Tamarindus indica against some Pathogenic Microorganisms. Int. J. Curr. Microbiol. Appl. Sci. 2014, 3, 589–593.

123. Ahmed, A.O.E.E.; Ayoub, S.M.H. Chemical composition and antimalarial activity of extracts of Sudanese Tamarindus indica L. (Fabaceae). Pharma Innov. J. 2015, 4, 90–93.

124. Isho, D.; Milind, P. IMLII: A Craze Lovely. Int. Res. J. Pharm. 2012, 3, 110–115.

125. Maikai, V.A.; Kobo, P.I.; Maikai, B.V.O. Antioxidant properties of Ximenia americana. Afr. J. Biotechnol. 2010, 9, 7744–7746.

126. Monte, F.J.Q.; de Lemos, T.L.G.; de Araújo, M.R.S.; Gomes, E.S. Ximenia americana: Chemistry, Pharmacology and Biological Properties, a Review. 2012. Available online: www.intechopen.com (accessed on 12 December 2016).

127. Araújo, M.R.S.; Assunção, J.C.C.; Dantas, I.N.F.; Costa-Lotufo, L.V.; Monte, F.J.Q. Chemical Constituents of Ximenia americana. Nat. Prod. Commun. 2008, 3, 857–860.

128. Fatope, M.O.; Adoun, O.A.; Takeda, Y. C18 Acetylenic Fatty Acids of Ximenia americana with Potential Pesticidal Activity. J. Agric. Food Chem. 2000, 4, 1872–1874. [CrossRef]

129. Saeed, A.E.M.; Bashier, R.S.M. Physico-chemical analysis of Ximenia americana L. oil and structure elucidation of some chemical constituents of its seed oil and fruit pulp. J. Pharmacogn. Phytother. 2010, 2, 49–55.

130. Kouri, F.C. Investigation phytochimique d’une brosse à dents africaine Zanthoxylum zanthoxyloides (Lam.) Zepernick et Timler (Sym. Fagara zanthoxyloides L.) (Rutaceae). These, Université de Lausanne, Lausanne, Suisse, 2004.

131. Ouedraogo, S.; Traore, A.; Lombo, M.; Some, N.; Sana, B.; Guissou, I.P. Vasodilator effect of Zanthoxylum zanthoxyloides, Calotropsis procera and FACa, a mixture of these two plants. Int. J. Biol. Chem. Sci. 2011, 5, 1351–1357. [CrossRef]
134. Olounladé, P.A.; Hounzangbé-Adoté, M.S.; Azando, E.V.B.; TAmha, T.B.; Brunet, S.; Moulis, C.; Fabre, N.; Fournste, I.; Hoste, H.; Valentin, A. Etude in vitro de l’effet des tanins de Newbouldia laevis et de Zanthoxylum zanthoxyloides sur la migration des larves infestantes de Haemonchus contortus. *Int. J. Biol. Chem. Sci.* 2011, 5, 1414–1422.

135. Affouet, K.M.; Tonzibo, Z.F.; Attioua, B.K.; Chalchat, J.C. Chemical Investigations of Volatile Oils from Aromatic Plants Growing in Côte d’ivoire: *Harissa abyssinica* Oliv., *Canarium schwerfurthii* Engl. *Zanthoxylum gilletii* (De wild) Waterm. And *Zanthoxylum zanthoxyloides* Lam. *Anal. Chem. Lett.* 2012, 2, 367–372.

136. Ouattara, B.; Angenot, L.; Guissou, P.; Fondu, P.; Dubois, J.; Frédéérich, M.; Jansen, O.; Van Heugen, J.C.; Wauters, J.N.; Tits, M. I.C/MS/NMR analysis of isomeric divanilloylquinic acids from the root bark of Fagara zanthoxyloides Lam. *Phytochemistry* 2004, 65, 1145–1151. [CrossRef] [PubMed]

137. Sameera, N.S.; Mandakini, B.P. Investigations into the antibacterial activity of *Ziziphus mauritiana* Lam. and *Ziziphus xylopyra* (Retz.) Willld. *Int. Food Res. J.* 2015, 22, 849–853.

138. Ashraf, A.; Sarfraz, R.A.; Anwar, F.; Shahid, S.A.; Alkharfy, K.M. Chemical composition and biological activities of leaves of *Ziziphus mauritiana* l. Native to Pakistan. *Pak. J. Bot.* 2015, 47, 367–376.

139. Parmar, P.; Bhatt, S.; Dhyaní, D.S.; Jain, A. Phytochemical studies of the secondary metabolites of *Ziziphus mauritiana* Lam. Leaves. *Int. J. Curr. Pharm. Res.* 2012, 4, 153–155.

140. Springer, T.L.; McGraw, R.L.; Aiken, G.E.; Michx, L. Variation of Condensed Tannins in Roundhead Lespedeza Germplasm. *Crop Sci.* 2002, 42, 2157–2160. [CrossRef]

141. Adetutu, A.; Morgan, W.A.; Corcoran, O. Ethnopharmacological study and in vitro evaluation of wound-healing plants used in South-western Nigeria. *J. Ethnopharmacol.* 2011, 137, 50–56. [CrossRef] [PubMed]

142. Kalla, A. Etude et valorisation des principes actifs de quelques plantes du sud algérien: *Pituranthos scoparius*, *Rantherium adpressum* et *Traganum nudatum*. Ph.D. Thesis, Université Mentouri-Constantine, Constantine, Algérie, 2012.

143. Feknous, S.; Saidi, F.; Said, R.M. Extraction, caractérisation et identification de quelques métabolites secondaires actifs de la mélisse (*Melissa officinalis* L.). *Nat. Technol.* 2014, 11, 7–13.

144. Mohagheghzadeh, A.; Faridi, P.; Shams-ardakani, M.; Ghasemi, Y. Medicinal smokes. *J. Ethnopharmacol.* 2006, 108, 161–184. [CrossRef] [PubMed]

145. Ujvary, I. Psychoactive natural products: Overview of recent developments. *Ann Ist Super Sanità* 2014, 50, 12–27. [PubMed]

146. Amar, B.M. *La Polyconsommation de Psychotropes et les Principales Interactions Pharmacologiques Associées*; Centre québécois de lutte aux dépendances: Québec, QC, Canada, 2007.

147. Organisation Mondiale de la Santé (OMS). *Neurosciences: Usage de Substances Psychoactives et Dépendance*; OMS: Genève, Suisse, 2004.

148. Stafford, G.I.; Jäger, A.K.; Van Staden, J. African Psychoactive Plants. *Challenges* 2009, 1021, 323–346.