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RESEARCH ARTICLE

MEDICINAL ROLE OF PLANTS FROM COFFEE AGROSYSTEMS OF MAN RURAL AREA IN COTE D'IVOIRE

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ABSTRACT

In Côte d'Ivoire, the development of agricultural activities has come at the expense of the Ivorian forest cover. To address this situation, agroforestry is now encouraged, making plantations veritable reservoirs of biodiversity. This study highlights the therapeutic benefits of these plants associated with cultivation. A floristic inventory and an ethnomedicinal survey were conducted to achieve this objective. These investigations allowed us to identify 72 plant species, divided into 56 genera and 26 families, with Fabaceae and Moraceae dominating. The majority of these plants (59.72%) have therapeutic properties. These medicinal plants are used in the treatment of 32 conditions, the most common of which are malaria, stomach ulcers, asthma, diabetes, and hypertension. Regarding the plant organs used in medicinal recipes, leaves are the majority (59%). The most common preparation technique for medicinal recipes is decoction (70%). Phytomedicines are most commonly administered as drink (44%). *Cola gigantea* and *Morinda lucida* are the most commonly used plants as phytomedicines, while Alchornea cordifolia is the most frequently cited species. Coffee agrosystems in rural Man must be promoted because they are veritable reservoirs of plant biodiversity that contribute significantly to the good health of the local population.

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INTRODUCTION

In Côte d'Ivoire, agricultural activities are carried out to the detriment of the Ivorian forest cover, which has declined significantly over the past several decades. To address this situation, agroforestry is an ecological and dynamic practice of natural resource management and sustainable land use (Torquebiau, 2007; Koné *et al*., 2008) with the aim of planting other plant species in crops. The practice of agroforestry is common in the Man department, a major coffee production area. This is also the region of the "Café des montagnes de Man" brand, recognized by the African Intellectual Property Office (OAPI) in 2024.

According to FAO (2019), the Man region plays a key role in Côte d'Ivoire and Africa in coffee growing. These coffee plantations are reservoirs of biodiversity, creating agrosystems, often diverse, consisting of several species, especially fruit trees, thus contributing to improving the financial income of local populations (Akinmoladun *et al*., 2021). Furthermore, this biodiversity is not limited solely to ecological and economic aspects, but also has significant therapeutic potential. Indeed, in rural areas of Man, local communities use a large number of medicinal plants from these agroecosystems to treat various ailments, such as gastrointestinal diseases, parasitic infections, and respiratory disorders (Kouadio *et al*., 2010).

This traditional use of medicinal plants is all the more relevant as several of them have shown promising pharmacological properties in recent studies (Kouadio *et al*., 2014). However, despite the highlighting of the medicinal properties of some plants by the authors cited above, there is still a lack of scientific documentation relating to the specific diversity and therapeutic properties of plant species from coffee agrosystems in the Man region. This study is in line with this perspective. It presents their therapeutic properties to encourage the conservation of these plants associated with coffee plantations.

MATERIAL AND METHODS

Study area: The study was conducted on three coffee plantations in the rural area of Man. The city of Man is located in the Tonpki region, approximately 600 km from Abidjan, the country's economic capital. It is located between longitudes 07°25' and 07°55' West and latitudes 07°00' and 07°40' North (Figure 1).

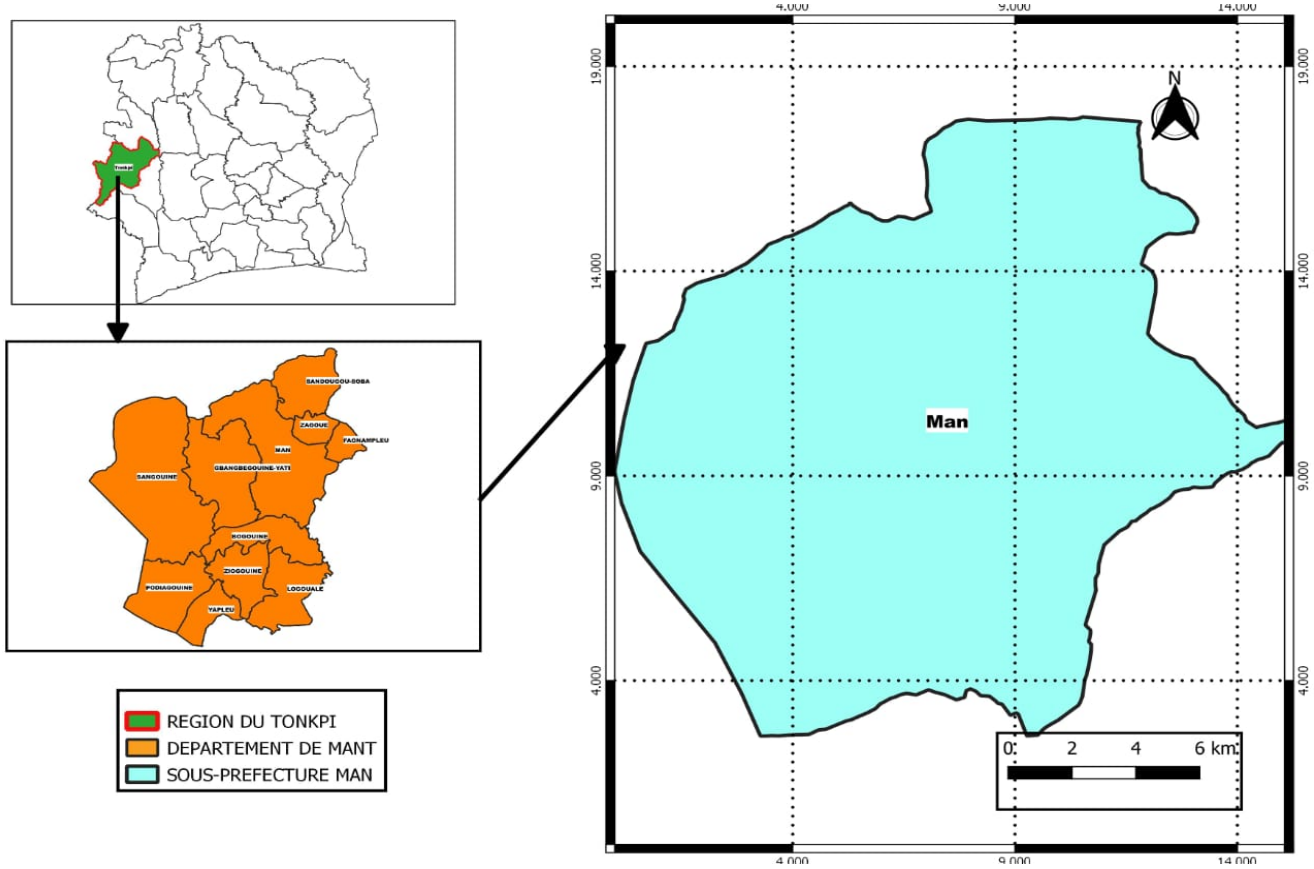

Figure 1. Map showing the location of the town of Man in the Tonpki region of Côte d'Ivoire

Study Materials: The plant material consisted of all the plant species identified during the ethnomedicinal survey from coffee agrosystems (Figure 2). The survey required technical equipment consisting of a survey sheet, pruning shears, a GPS, a digital camera, and a laptop.

Figure 2. An overview of a coffee agrosystem in the rural area of Man

Floristic Inventory: The floristic inventories were conducted using a combination of surface and mobile survey methods. In this study, the surface survey consisted of establishing rectangular plots (200 m long and 100 m wide) separated by 50 m. In each plot, woody and tree species were recorded. The mobile survey involved covering the entire distance (50 m) between two plots in a north-south and west-east direction to record and collect as many plant species as possible.

Ethnobotanical Survey: The ethnobotanical survey was conducted using the "Show and Tell" method, already used in various previous studies (Ta, 2013). The herbarium samples were presented to interviewees, who provided information on medicinal uses. This survey targeted both the plantation owners and anyone over the age of 18 residing in the village. The investigations were guided by a survey form.

Identification of Inventoried Plant Species: The identification of the inventoried plant species was carried out at the University of Man, referring to the morphological characteristics of Hawthorne (1996). The names given were in accordance with APG IV (2016).

Species Citation Frequency (FCe): Species citation frequency (FCe) is the ratio between the number of times a species was cited and the total number of citations of all species during ethnobotanical investigations (Fah *et al*., 2013).

$$FC = 100\left(\frac{\text{Number of people who mentioned the item(n)}}{\text{Number of people surveyed (N)}}\right)$$

The Relative Exploitation Level (NER): It is obtained by calculating the ratio between the number of conditions addressed by a species and the total number of conditions addressed by all conditions (N'Guessan *et al*., 2015). It is expressed as follows:

$$NER = 100\left(\frac{\text{Number of conditions treated by a species}}{\text{Total number of conditions treated by all species}}\right)$$

The NER values obtained were used to qualify the exploitation level of the different species. The species are divided into the following categories:

- very well-exploited species if NER is between 75% and 100%;
- well-exploited species if NER is between 50% and 75%;
- moderately exploited species if NER is between 25% and 50%;
- little-exploited species if NER is between 1% and 25%;
- unexploited species if NER = 0%.

Statistical Data Processing: FCe values were analyzed using SPSS 20.0 software, which allowed for hierarchical classification using a dendrogram. Correlations were sought between ethnobotanical indices (FCe and NER) using R software. Excel 2016 software was used to generate graphs.

RESULTS

Floristic Richness: Floristic inventories in the Man coffee agrosystems identified 72 species distributed among 56 genera and 26 families. The most represented families were Fabaceae with 16 species and Moraceae with 10 species (Figure 3).

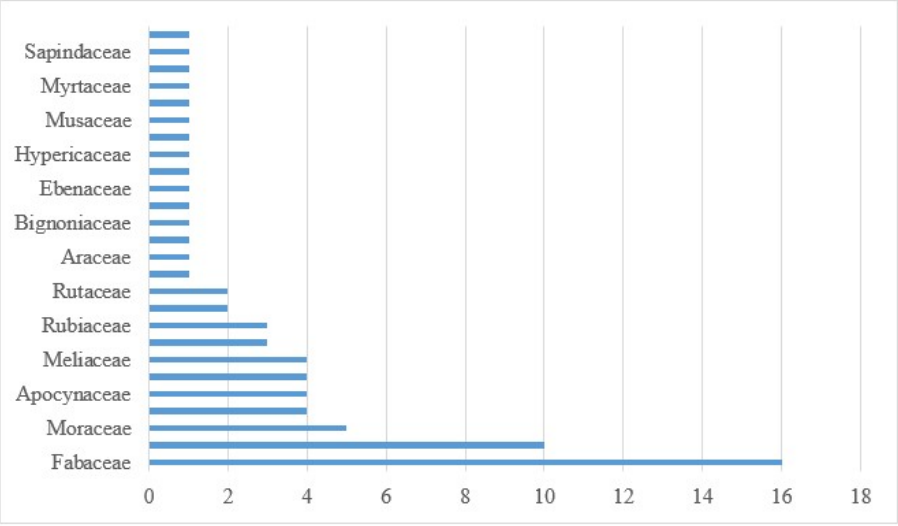

Figure 3. Distribution of listed plants according to botanical families

Among these listed plants, 43 species are used in the treatment of common pathologies by local populations representing 59.72%.

Evaluated ethnobotanical indices: The calculated FCe allowed for a hierarchical classification using a dendrogram (Figure 4). The figure shows three groups of plants with a Cluster Distance of 3. The first group includes a single species, the most cited plant: Alchornea cordifolia (FCe = 8.2). The second group included 14 moderately cited plants with FCe ranging from 5.5 to 3. These are *Griffonia simplicifolia, Antiaris toxicaria, Psidium guajava, Ficus exasperata, Tamarindus indica, Cola nitida, Lindackeria dentata, Combretum indicum, Manguifera indica, Baphia nitida, Cola caricifolia, Jatropha curcas, Sterculia apetala* and *Cola gigantea*. All other plants constituting the third group were composed of the least cited plants with FCe between 2.6 and 0.1.

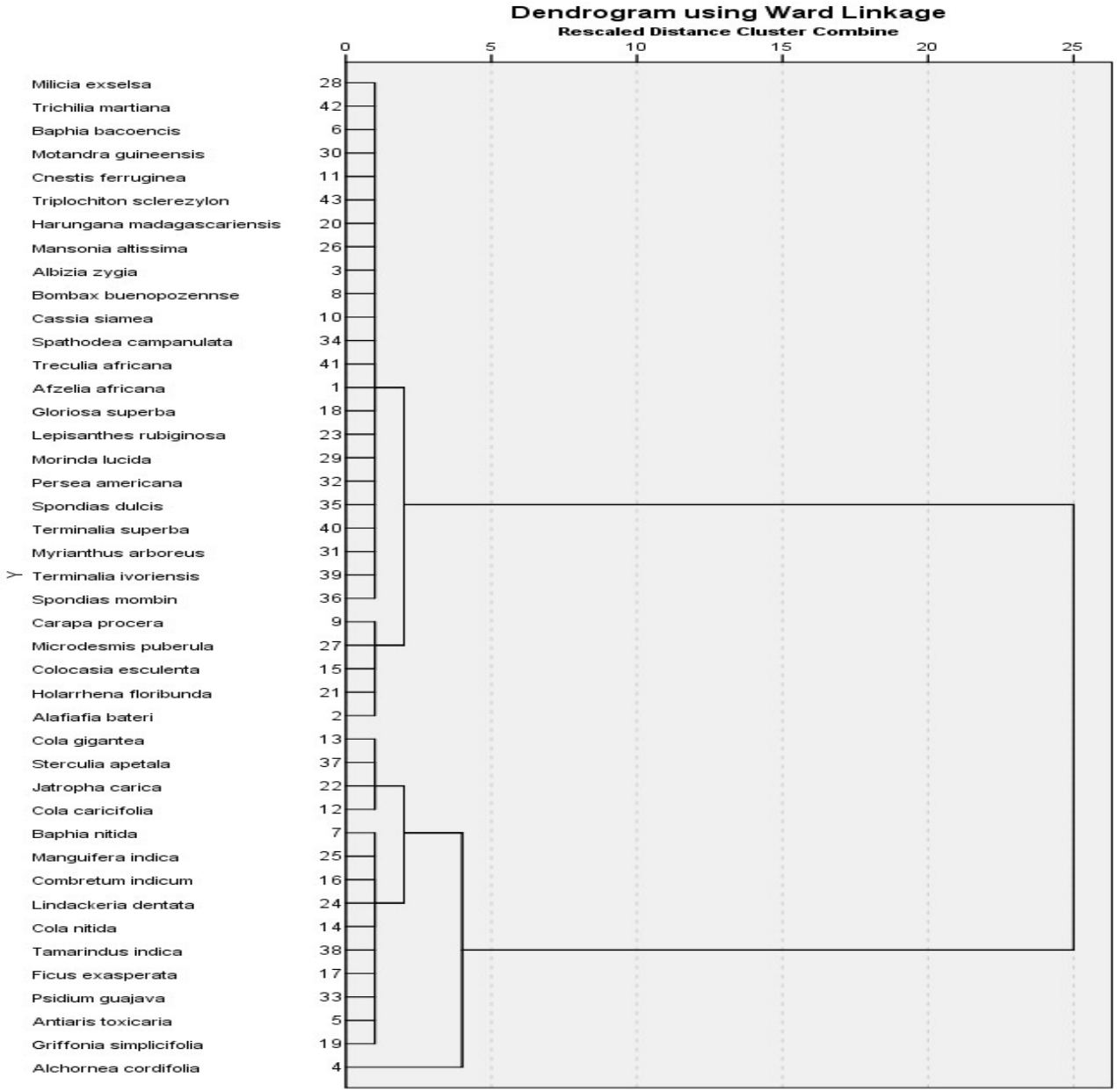

Figure 4. Dendrogram of hierarchical classification of plants based on FCe

Concerning the NER values divided the plants into two groups. The moderately exploited plants had the same NER value of 28.12%. These were: *Cola gigantea* and *Morinda lucida*. The bark of these plants was frequently used in medicinal recipes. The other species had NER values between 1 and 25%: they are rarely used as phytomedicines.

Correlations between ethnomedicinal indices: The relationship between FCe and NER was analyzed using Figure 5. The Pearson correlation test showed a weakly negative correlation between the two ethnobotanical parameters (r = -0.029; P = 0.8542). The relationship between them was linear.

Plant Parts Used and Conditions Treated: There were 4 techniques of preparation: leaves, bark, fruit, and sap. The medicinal plants encountered in our study were used for 32 ailments, the most common of which were malaria, stomach ulcers, asthma, diabetes, and hypertension.

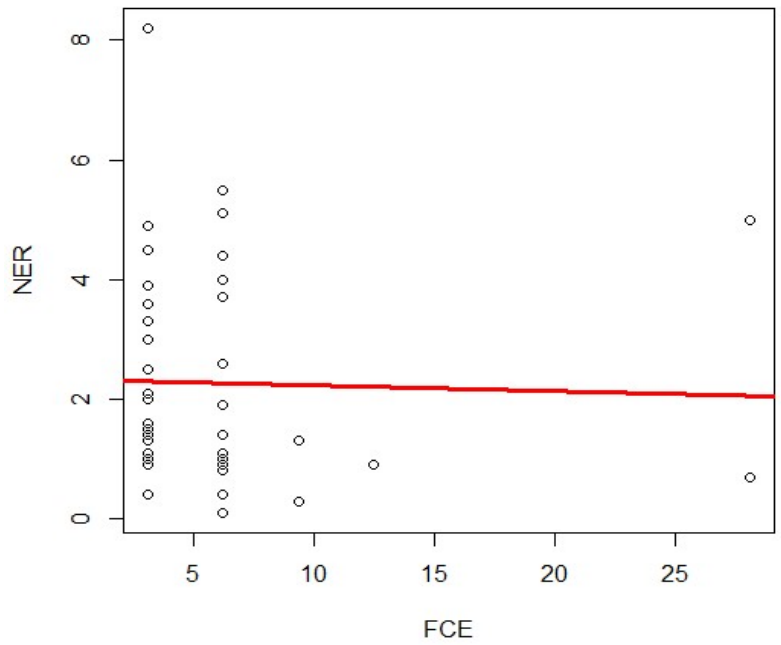

Figure 5. Correlation between FCe and NER in Man's coffee agrosystems

Preparation Technique and Method of Administration: Ethnomedicinal surveys identified six preparation methods: decoction, extraction, infusion, maceration, kneading, and trituration. Among these techniques, decoction was the most commonly used, accounting for 70% of cases. Kneading was employed in 16% of cases, maceration in 6% of cases, trituration in 4%, and infusion and extraction each accounted for 2% of cases. Regarding administration methods, our investigations allowed us to record 7 cases: drink, washes, purges, and macerates. Drink was the predominant method of administration, accounting for 44% of cases.

DISCUSSION

In the rural area of Man, 43 plants of coffee agroforests are used for therapeutic purposes by local populations. These plants are used in the treatment of 32 conditions. The leaves represent the most commonly used part (59%). This finding corroborates the studies by Middleton et al. (2000), which justifies this dominance of leaves in the preparation of remedies, due to their accessibility and high content of active compounds. Decoction is the most common preparation method (70%). For African populations, it is the main preparation method because for them, this method is the simplest and allows for rapid extraction of active ingredients from plant organs. This observation is also made by (Ta *et al*., 2016), Cowan (1999), and Rates (2001). Regarding the method of administration, drinking is more common, with 44% of cases.

This result is consistent with several studies (Ambé *et al*., 2015; Béné *et al*., 2016). With the exception of two species, *Cola gigantea* and *Morinda lucida*, the relative exploitation level (NER) of several species on the inventoried list remains low, with values ranging from 1 to 25%. This observation reflects an underutilization of available resources, possibly due to the gradual loss of traditional knowledge, the distrust of local populations in sharing their knowledge, or the growing preference for modern medicine (Schrauf and Sanchez, 2008). This situation underscores the importance of strengthening the documentation, promotion, and conservation of local knowledge, while encouraging pharmacological studies on identified plants. Man coffee agrosystems offer health benefits, due to a significant number of medicinal plants.

CONCLUSION

This study enabled us to identify 72 plant species, divided into 56 genera and 26 families, with Fabaceae and Moraceae predominating. A total of 43 inventoried species are used by local populations in the treatment of common ailments. Regarding the plant organs used in medicinal recipes, leaves are the majority (59%), frequently prepared as decoctions (70%), and most commonly administered as beverages (44%). *Cola gigantea* and *Morinda lucida* are the most commonly used plants as phytomedicines, while *Alchornea cordifolia* is the most cited species.

The coffee agrosystems of rural Man are therefore veritable reservoirs of plant biodiversity beneficial to the health of local populations. These coffee agroforests in rural Man must be valued because they contain plant resources involved in the treatment of several common pathologies.

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REFERENCES

Ambé A.S.A., Ouattara D., Tiebre M.S., Vroh B.T.A., Zirihi G.N. et N'Guessan K.E. (2015). Diversité des plantes médicinales utilisées dans le traitement traditionnel de la diarrhée sur les marchés d'Abidjan (Côte d'Ivoire). Journal of Animal & Plant Sciences, 26 (2) : 4081-4096

Akinmoladun F.O., Akinrinlola B.L. & Komolafe O.S. (2020). Ethnobotanical survey and pharmacological potentials of selected medicinal plants used in Nigeria. African Journal of Traditional, Complementary and Alternative Medicines, 17(2), 34–45.

APG IV. (2016). An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants. Bot. J. Linn. Soc, 161 : 105-121.

Béné K., Fofie N.B.Y., Camara D., Kanga Y., Yapi A.B., Yapo Y.C. et Zirihi G.N. (2016). Etude ethnobotanique des plantes médicinales utilisées dans le departement de Transua, District du Zanzan (Côte d'Ivoire). Journal of Animal & Plant Sciences, 27 (2) : 4230- 4250

Cowan M.M. (1999). Plant products as antimicrobial agents. Clinical Microbiology Reviews, 12(4), 564–582.

Fah L., Klotoé J.R., Dougnon V., Koudokpon H., Fanou V.B.A., Dandjesso C. et Loko F. (2013). Etude ethnobotanique des plantes utilisées dans le traitement du diabète chez la femme enceinte à Cotonou et Abomey-Calali (Benin). Journal of Animals and plant Sciences 18(1): 2647-2658.

FAO (2019). The state of food security and nutrition in the world 2019: Safeguarding against economic slowdowns and downturns. Rome: FAO. https://openknowledge.fao.org/items/437c1215-556b-4161-9af6-68163f5a1f84.

Hawthorne W. D. (1996). Guide de terrain pour les arbres des forêts denses de la Cote d'Ivoire et pays limitrophes. Avec clés végétatifs sur plus que 650 espèces d'arbres, à partir de 5cm de diamètre. Université Agronomique de Wageningen, Pays-Bas, VII + 276 pp.

Kouadio Y.J. & N'Guessan K.E. (2010). Plantes médicinales de la Côte d'Ivoire : pratiques traditionnelles et perspectives de valorisation. Journal of Applied Biosciences, 32, 1984–1993.

Kouadio K.Y., Yapo A.F., Soro D., et N'Guessan K. (2014). Plantes médicinales de la région de Man et usages traditionnels. Journal of Applied Biosciences, 80, 7157–7169.

Koné M., Djédjé M., Kouassi K., et Traoré D. (2008). Valorisation de la médecine traditionnelle en Côte d'Ivoire. Afrique Science, 4(1), 96–110.

Middleton E., Kandaswami C. & Theoharides T.C. (2000). The effects of plant flavonoids on mammalian cells. Pharmacological Reviews, 52(4), 673–751.

N'Guessan K., Assi K.C., Kouassi K.H. (2015). Ethnobotanical study of antitussive plants used in traditional medicine by Abbey et Krobou populations, in the south of Côte d'Ivoire. International Journal of Advances in Pharmacy Biology and Chemistry, 4 (2): 513 - 522.

Schrauf R.W. & Sanchez J. (2008). Using the Cultural Consensus Model to Assess Variability in the Domain of Medicinal Plants. Field Methods, 20(4), 300–317.

Rates S.M.K. (2001). Plantes comme source de médicaments. Toxicon, 39(5), 603–613.

Ta B.I.H. (2013). Étude ethnopharmacologique des plantes médicinales antidiabétiques vendues sur les marchés de la commune de Yopougon, dans le district d'Abidjan. Mémoire de D.E.A en Écologie Tropicale, Option : Végétale, Université Félix Houphouët Boigny, Abidjan, Côte d'Ivoire, 46 p.

Ta B. I. H., N'Guessan K., Bomisso E., Assa R. & Aké S. (2016). Etude ethnobotanique de quelques espèces du genre Corchorus rencontrées en Côte d'Ivoire. European Scientific Journal, 12 : 415- 431.

Torquebiau E. (2007). La multifonctionnalité de l'agroforesterie. Cahiers Agricultures, 16(4), 303–307.

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