**Therapeutic uses of false sesame (*Ceratotheca sesamoides* Endl.) in the Sudanian and Sudano-Sahelian part of Burkina Faso**

**Abstract**

The present study investigates the ethnomedicinal knowledge related to the use of false sesame (*Ceratotheca sesamoides* Endl.) among rural populations, with a particular focus on how this knowledge varies across different social parameters. The research aims to evaluate the extent and distribution of local knowledge about the medicinal uses of false sesame, especially regarding the ailments for which this plant is used as a remedy. The study considers variables such as ethnic affiliation, gender, and age group, and the various plant parts employed for therapeutic purposes. Data were gathered through semi-structured ethnobotanical interviews conducted individually among 240 participants, representing 12 distinct ethnic groups. Quantitative analysis was performed using a combination of use indices, Shannon diversity indices, and the Chi-square test of independence to determine patterns and significance in knowledge distribution. The findings revealed that gender and age had a statistically significant effect on the knowledge of false sesame uses (p = 0.034 and p = 0.004, respectively), whereas ethnic group showed no significant influence. Nonetheless, the Shannon indices reflected a generally high diversity of knowledge across all demographics. These results highlight the richness of traditional knowledge and its potential for resource conservation and ethnopharmacological research.

**Keywords**: *Ceratotheca sesamoides* , traditional use, ethnic group, resource conservation, plant parts.

**1. Introduction**

Burkina Faso is a low-income country (Traoré et al., 2022). This scarcity of financial resources has resulted in a poverty rate estimated at 40.1% according to the new Human Capital Index established by the World Bank in 2024 (CPIA Africa, 2024). Although there is an increased sense of poverty, this has not prevented rapid population growth, especially in rural areas (CPIA Africa, 2024). As a result, populations in rural areas are more exposed to food insecurity. This sometimes leads to health crises to which the victims remain unable to provide a curative response. However, certain plants found in rural environments are a source of remedy for these ailments (Schultz et al., 2021 ; Nzuki Bakwaye et al., 2013 ; Leonard & Viljoen, 2015). However, plants with high curative potential remain unknown to the younger generation. And this lack of knowledge of therapeutic plants by the younger generation may be due to the lack of teaching by the older generation to the younger. To this end, the introduction of endogenous knowledge would be the hope of a new era in traditional medicine, especially in developing countries. Numerous ethnobotanical studies have been carried out in Burkina Faso, but none has focused strictly on false sesame. To this end, an ethnobotanical survey was carried out on false sesame in the Sudano-Sahelian and Sudanian zone of Burkina Faso. The aim of this study was to gather medicinal information on the use of false sesame from rural populations. Specifically, the aim is to assess the variation in endogenous knowledge of the uses of false sesame, in particular the diseases for which false sesame is the remedy, according to ethnic group, sex and age, using different parts of the species.

**2. Material and methods**

**2.1. Study area**

This study was carried out in four regions of Burkina Faso. These four regions are divided equally into the Sudan-Sahel climatic zone and the Sudanian climatic zone. In both climatic zones, rainfall varies from 900 to 1200 mm/year (Thiombiano & Kampmann, 2010 ; Tindano *et al.*, 2014). The Sudano-Sahelian zone is the largest in Burkina Faso, covering the central part of the country and characterized by annual rainfall of between 600 and 900 mm over 4 to 5 months and temperatures of between 20 and 30°C. The Sudanian zone is the country's wettest, with annual rainfall in excess of 1,100 mm. The rainy season in this area lasts four to five months, with average annual temperatures fluctuating between 20 and 25°C. It is home to the majority of the country's forests, with the formation of forest galleries along watercourses. The climate in this zone favours the development of a denser savannah. Edaphically, the Sudanian zone has ferruginous soils and eutrophic brown soils (Fontes & Guinko, 1995 ; (Tindano et al., 2014).

**2.2. Description of *Ceratotheca sesamoides***

False sesame (*Ceratotheca sesamoides* Endl.) can grow to around 120 cm in height, and sometimes bears woody rhizomes (Sienebou *et al*., 2012). The species has an erect, pubescent stem of variable coloration. False sesame stems are usually prostrate, giving rise to around 10 creeping secondary stems (Sienebou et al., 2012) ; (Brink & Belay, 2006). The species' leaves are simple, without stipules and opposite or almost opposite (Plate 1). Stalk length averages 6 cm for short leaves and 8 cm for long leaves (Stevels, 1990). The root of false sesame has similar characteristics to those of sesame. The plant has a taproot with a dense network of secondary roots.



 **Plate 1**: *Ceratotheca sesamoides* plant

**2.3. Data collection**

Data were collected in 2020 through semi-structured ethnobotanical surveys and individual interviews in selected localities. The method chosen was that used by (Dossou *et al*., 2024) and Saoud *et al*. (2010), which involved exposing the plant to respondents prior to the interview. To this end, questions on the survey form concerned medicinal importance and diseases treated.

**2.3. Statistical analysis**

The data obtained during the survey were entered into the Excel 2016 spreadsheet. After entry, the data were used to calculate frequencies using the same spreadsheet. A histogram and pie chart illustrating the number of ethnic groups surveyed and the percentage of organs used were then produced. The data were then analyzed using R3.3.3 software to perform the Chi-2 test of independence and to highlight Shannon diversity indices between categorical uses. For this purpose, the significance threshold of the probability P associated with the Chi-2 test statistic is 5%. In addition, the Shannon diversity index was used to estimate the specific diversity of uses according to locality, gender and age. Diversity is low when Shannon diversity index values are close to 0. On the other hand, Shannon index values close to lnS indicate high diversity with "S" categorical number of uses.

**3. Results**

**3.1. Profile of respondents**

A total of 240 farmers from 12 ethnic groups were interviewed (Plate 2). The ethnic groups with the highest numbers were Mossé (28%), followed by Bwaba (25%) and Gurunsi (18%). The least numerous ethnic groups were the Dafing (2%), Peuhl (2%) and San (2%). Table 1 shows that the majority of respondents were over 50 years old (85.41%) and mostly female (63.75%).



 **Plate 2:** Distribution of respondents by ethnic group

**Table 1**: Distribution of respondents by gender, age, function and religion

|  |  |  |
| --- | --- | --- |
| Factors | Number of respondents | Factors Proportion of sample (%) |
| Age categories≤ 35 years[36 years; 49 years] | 1619 | 6,667,91 |
| ≥ 50 years | 205 | 85,41 |
| SexWomen | 153 | 63,75 |
| Male | 87 | 36,25 |

**3.2. Medicinal importance**

False sesame is one of the species most coveted by the populations surveyed. Some 65% of the population surveyed use false sesame for health care. In fact, all the Dagara and Peuhl people surveyed use the species to treat themselves. What's more, with the exception of the Djan ethnic group, the majority of ethnic groups find health satisfaction in acquiring *C. sesamoides*. To this end, several illnesses are treated by infusion of the leaves, leaf juice, leaf paste and charred stems (Table 2).

**Table 2**: Therapeutic uses of *Ceratotheca sesamoides* (Endl.) by ethnic groups

|  |  |  |  |
| --- | --- | --- | --- |
| **Ethnic groups** | **Recipes** | **length of treatment** | **Therapeutic uses** |
| Bwaba, Gurunsi, Mossé, San, Lobi et Dan | Leaf infusion | One week's treatment, applied morning and evening | Treatment of furuncle, fontanel, panicitis and ringworm. |
| Two days of treatment, applied morning and evening/day | Treatment for sore eyes, toothache, sore ribs and ulcers. |
| One day's treatment, applied once during the course of the illness | Treatment of gastric ailments and malaria. |
| Bwaba  | Paste of fresh leaves and charred stems | Two weeks of treatment, applied every three days | Treating incurable wounds. |
| One day's treatment, applied once during the night. | Extraction of spines in the body. |
| Gurunsi  | Fresh and dried leaf paste | One day's treatment, applied during the course of the illness. | Treats constipation, diarrhoea, snake bites and scorpion stings. |
| San | Mixing soil with leaf paste | Three weeks' treatment, applied morning and evening/day. | Treats neurological disorders. |
| Mossé, Dioula, Bwaba, Gurunsi | Aqueous leaf extract | Two days' treatment, applied morning and evening/day. | Treats conjunctivitis. |
| One day's treatment, applied once during the course of the illness. | Facilitates childbirth for women. |
| Mossé  | Fresh leaf paste | One day's treatment, applied once during the course of the illness. | Gets rid of lice in the hair. |
| Peulhs | Leaf juice and paste | Two weeks' treatment, applied once a day. | Treats aches and fever, eliminates toxins from poisons. |
| One day's treatment, applied once during the course of the illness. |  Clears the animal's digestive tract and helps ruminants in difficulty. |

Shannon's diversity test showed a diversity of *Ceratotheca sesamoides* use according to gender (H' = 0.77), age (H' = 0.82) and ethnic group (H' = 0.63) across all surveyed populations. In addition to the Shannon diversity index, the Chi-2 test reveals a significant difference in medicinal use of the species between age groups, genders and ethnic groups (Table 3).

**Table 3**: Diversity of uses of *C. sesamoides* according to sex and age.

|  |  |  |
| --- | --- | --- |
| Factors  | Test of Shannon (H’)   | Test of Khi2  (p-value) |
| Knowledgeof respondents on usage according to age | 0,82 | 0,004 |
| Respondents' knowledge of usage by gender | 0,77 | 0,034 |
| Respondents' knowledge of usage by ethnic group | 0,63 | 0,072 |

**4. Discussion**

The present study, based on the calculation of Shannon diversity indices, the Chi-2 test and the frequencies of medicinal use of *Ceratotheca sesamoides* according to ethnic group, age and gender, made it possible to determine the level of knowledge of use of the species. The results show that Shannon diversity indices reveal that the diversity of knowledge about the species is high within age groups, genders and ethnic groups (Seguena *et al*., 2013 ; Houètchégnon *et al*., 2015 ; Reyes-García *et al*., 2004). These same findings have been revealed by previous studies of A. digitata in Benin (Atakpama et al., 2012 ; Avocèvou-Ayisso et al., 2011 ; Dominique, 2002). The diversity of knowledge about the species across age groups is thought to be due to the transmission of ancestral cultural knowledge, insofar as knowledge about the species is passed down from generation to generation within the same ethnic group. Similar revelations were evoked by (Houètchégnon *et al. (2015)* and Lira *et al*. (2009), on vegetable species medicinal value. However, in this study, there were no differences between ethnic groups in the medicinal use value of *C. sesamoïdes*. This may be due to the cultural link between the 12 ethnic groups surveyed. This could be explained by the mobility of individuals from one ethnic area to another, by ethnic mixing and by the sharing of knowledge between two individuals from different ethnic groups (Adomou, 2005 ; (Joel et al., 2017). It will also be important to consider cultural values, insofar as ethnobotanical knowledge is also caught up in this current of cultural cross-fertilization. For this reason, cultural origin could be a factor included in the evaluation of the medicinal value of *C. sesamoides*. From these surveys, the medicinal knowledge provided by ethnic groups about the species may have interests that could lead to its conservation and enhancement in local community areas. In addition, especially as the Shannon index values are significant, they confirm that the species is more in demand as a medicinal plant by the populations (Djego *et al*., 2012 ; Akpi *et al*., 2019) ; Montgomery & Chazdon, 2001). People who use the species for medicinal purposes are more likely to be women, particularly those over the age of 50. This shows that older women have more medicinal knowledge of the species. This finding could be linked to the fact that due to their responsibilities as wives and mothers, old women in rural areas administer first aid using medicinal plants (Ngotta *et al*., 2023 ; Mpondo Mpondo *et al*., 2017 ; Padonou, 2014). Older women's responsibility for their children and their constant contact with them make them traditional practitioners by circumstance.

**5. Conclusion**

A total of 12 ethnic groups were surveyed. The use of leaf infusion, leaf paste, leaf juice and charred stems of the species in traditional medicine is well known. The specific uses and the number of uses vary significantly from one genus to another and from one generation to another. As a result, the promotion and conservation of the species through its rational use and protection is becoming a priority action because of its high medicinal value for populations.

**Ethical approval**

All authors consent to the publication of this work.

the three authors have read and approved the work.

**Ethical statement**

This study is not directed towards research involving human beings or animals, nor is it aimed at vulnerable populations.

**References**

**Adomou, A. (2005). Vegetation patterns and environmental gradients in Benin [Wageningen University]. https://doi.org/10.18174/121707**

**Akpi, P. B., Houehanou, T. D., Yaoitcha, A. S., Ahoyo, C. C., Gouwakinnou, G., Biaou, S. S. H., Natta, A., & Houinato, M. R. B. (2019). Evaluation of the uses and availability of woody plants used in traditional medicine in the Guineo-Congolese zone of Benin. Annals of the University of Parakou - Natural Sciences and Agronomy Series, 9(2), 15-28. https://doi.org/10.56109/aup-sna.v9i2.51**

**Atakpama, W., Batawila, K., Dourma, M., Pereki, H., Wala, K., Dimobe, K., Akpagana, K., & Gbeassor, M. (2012). Ethnobotanical Knowledge of Sterculia setigera Del. In the Sudanian Zone of Togo (West Africa). ISRN Botany, 2012, 1‑8. https://doi.org/10.5402/2012/723157**

**Avocèvou-Ayisso, C., Avohou, T. H., Oumorou, M., Dossou, G., & Sinsin, B. (2011). Ethnobotany of Pentadesma butyracea in Benin: A quantitative approach. 9, 151-166.**

**Brink, M., & Belay, G. (with PROTA Foundation). (2006). Cereals and Pulses. PROTA Foundation.**

**CPIA Africa. (2024). Structural Reforms for a Vibrant Private Sector. World Bank Group.**

**Djego, J., Djego-Djossou, S., Cakpo, Y., Agnani, P., & Sinsin, B. (2012). Evaluation of the Ethnobotanical Potential of Rural Populations in Southern and Central Benin. International Journal of Biological and Chemical Sciences, 5(4), 1432-1447. https://doi.org/10.4314/ijbcs.v5i4.10**

**Dominique, L. (2002). Prota (Plant Resources of Tropical Africa). Dossou, A. J., Fandohan, A. B., Omara, T., & Chippaux, J.-P. (2024). Comprehensive Review of Epidemiology and Treatment of Snakebite Envenomation in West Africa: Case of Benin. Journal of Tropical Medicine, 2024, 1-10. https://doi.org/10.1155/2024/8357312**

**Fontes, J., & Guinko, S. (1995). Vegetation and Land Use Map of Burkina Faso. Notice / French Ministry of Cooperation – Campus Project: Vol. (88 313 101).**

**Houètchégnon, T., Gbèmavo, D. S. J. C., Ouinsavi, C., & Sokpon, N. (2015). Ethnobotanical knowledge and traditional management of African mesquite (Prosopis africana Guill., Perrot. Et Rich.) populations in Benin, West Africa. 1124-1135.**

**Joel, A. D., Hospice, D. G., Cossi, A. A., Aristide, H. G. H., Brice, T., & Brice, S. A. (2017). Impact of Vegetation Characteristics on Plant Use Diversity Around Two Large Classified Forests and a Botanical Reserve in Southern Benin. European Scientific Journal, ESJ, 13(30), 376. https://doi.org/10.19044/esj.2017.v13n30p376**

**Leonard, C. M., & Viljoen, A. M. (2015). Warburgia: A comprehensive review of the botany, traditional uses and phytochemistry. Journal of Ethnopharmacology, 165, 260-285. https://doi.org/10.1016/j.jep.2015.02.021**

**Lira, R., Casas, A., Rosas-López, R., Paredes-Flores, M., Pérez-Negrón, E., Rangel-Landa, S., Solís, L., Torres, I., & Dávila, P. (2009). Traditional Knowledge and Useful Plant Richness in the Tehuacán–Cuicatlán Valley, Mexico. Economic Botany, 63(3), 271-287. https://doi.org/10.1007/s12231-009-9075-6**

**Montgomery, R. A., & Chazdon, R. L. (2001). FOREST STRUCTURE, CANOPY ARCHITECTURE, AND LIGHT TRANSMITTANCE IN TROPICAL WET FORESTS. Ecology, 82(10), 2707-2718. https://doi.org/10.1890/0012-9658(2001)082[2707:FSCAAL]2.0.CO;2**

**Mpondo Mpondo, E., Ngene, J. P., Mpounze Som, L., Etame Loe, G., Ngo Boumsong, P. C., Yinyang, J., & Dibong, S. D. (2017). Traditional knowledge and uses of medicinal plants in the Upper Nyong Department. Journal of Applied Biosciences, 113(1), 11229. https://doi.org/10.4314/jab.v113i1.12**

**Ngotta, B. J. B., Doumbe, M. L. C., Nnanga, J. F., Mvogo, O. P. B., Nguimfack, D. J., & Ndongo, D. (2023). Traditional knowledge of plants used against upper respiratory tract affections in the Littoral Region of Cameroon. Journal of Medicinal Plants Research, 17(2), 46-56. https://doi.org/10.5897/JMPR2022.7248**

**Nzuki Bakwaye, F., Termote, C., Kibungu Kembelo, A. O., & Van Damme, P. (2013). Identification and local importance of medicinal plants used in the Mbanza-Ngungu region, Democratic Republic of Congo. TIMBER & TROPICAL FORESTS, 316(316), 63. https://doi.org/10.19182/bft2013.316.a20531**

**Padonou, E. A. (2014). Vegetation Characteristics of Bowé in Benin (West Africa). Journal of Plant Sciences (Science Publishing Group), 2(5), 250. https://doi.org/10.11648/j.jps.20140205.27**

**Reyes-García, V., Byron, E., Vadez, V., Godoy, R., Apaza, L., Limache, E. P., Leonard, W. R., & Wilkie, D. (2004). Measuring Culture as Shared Knowledge: Do Data Collection Formats Matter? Cultural Knowledge of Plant Uses Among Tsimane’ Amerindians, Bolivia. Field Methods, 16(2), 135–156. https://doi.org/10.1177/1525822X03262804**

**Saoud, I., Hamrouni, L., Hanana, M., Bouzid, S., & Khouja, M. L. (2010). Ethnobotanical and phytopharmacological notes on Coridothymus capitatus (L.) Reichenb. Fil. Phytotherapy, 8(6), 370-373. https://doi.org/10.1007/s10298-010-0592-3**

**Schultz, F., Anywar, G., Quave, C. L., & Garbe, L.-A(2021). A Bibliographic Assessment Using the Degrees of Publication Method: Medicinal Plants from the Rural Greater Mpigi Region (Uganda). Evidence-Based Complementary and Alternative Medicine, 2021, 1-18. https://doi.org/10.1155/2021/6661565**

**Seguena, F., Soro, K., Soro, D., & N’Guessan, K. (2013). Know-how of local populations of taxa from the Bingerville Botanical Garden, Ivory Coast. Journal of Applied Biosciences, 68(0), 5374. https://doi.org/10.4314/jab.v68i0.95064**

**Sienebou, V., Ahoton, L.E, Etèka, C.A, Amadji, G, Dansi, A, Ahanchédé, A, Hounhouigan, DJ, Vodouhè, SR, & Sanni, A. (2012). Floral biology of Ceratotheca sesamoides Endl., a traditional leafy vegetable undergoing domestication in Benin. 58: 4251–4261, 4251–4261.**

**Stevels, J. M. C. (1990). Traditional vegetables from Cameroon, an agro-botanical study [Agricultural University]. https://doi.org/10.18174/202871**

**Thiombiano, A., & Kampmann, D. (2010). Biodiversity Atlas of West Africa (BIOTA).**

**Tindano, E., Ganaba, S., & Thiombiano, A. (2014). Floristic composition and condition of woody stands in inselbergs along a climatic gradient in Burkina Faso (West Africa). Flora et Vegetatio Sudano-Sambesica, 17, 9-27. https://doi.org/10.21248/fvss.17.24**

**Traoré, S., Keïta, I., Nombré, S. A. H., Nacro, H. B., & Sinsin, B. (2022). Abundance and Diversity of Woody Undergrowth Reservoir as Indicator of Suitable Vegetation Patch for Natural Regeneration. Open Journal of Ecology, 12(02), 113-132. https://doi.org/10.4236/oje.2022.122007**