

ETHNOPHARMACOLOGICAL USAGE OF MEDICINAL PLANTS IN GENITOURINARY INFECTIONS BY RESIDENTS OF *CHAPADA DO ARARIPE*, CRATO, CEARÁ – BRAZIL

Uso etnofarmacológico de plantas medicinais em infecções geniturinárias por moradoras da Chapada do Araripe, Crato, Ceará – Brasil

Artigo Original

ABSTRACT

Objective: To determine the ethnopharmacological use of plants in the treatment of urogenital tract infections (UTIs) by women living in the city of Crato, located in Chapada do Araripe, in the interior of the State of Ceará, Brazil. **Methods:** A cross-sectional study, with a quantitative approach, performed from September to November, 2010, with 25 residents of Chapada do Araripe, who use and/or recommend plants for the treatment of UTIs. **Results:** The prevalent characteristics of the informants were: age-group between 56 and 60 years old, married, all of them farmers with a monthly income of minimum wage, and most of them with incomplete schooling. Nine plant species were identified as being used by the population against infection, inflammation and pain. The most common forms of usage are the decoction, cooking and the maceration of leaves and barks. Barbatimão and mallow were the most reported species by informants. **Conclusion:** Popular medicine is greatly adopted by traditional communities and represents an incalculable cultural wealth which should be preserved and evaluated to assure sustainable development. Information brought out by this research may be useful in further pharmacological studies.

Descriptors: Plants, Medicinal; Medicine, Traditional; Women's Health.

RESUMO

Objetivo: Conhecer o uso etnofarmacológico de plantas no tratamento de infecções do trato geniturinário (ITU) por mulheres residentes no município de Crato, na Chapada do Araripe, no interior do Estado do Ceará, Brasil. **Métodos:** Estudo transversal com abordagem quantitativa, realizado entre setembro e novembro de 2010, com 25 moradoras da Chapada do Araripe que utilizam e/ou recomendam plantas para o tratamento de ITU. **Resultados:** As características prevalentes das informantes foram: faixa etária de 56 a 60 anos, casadas e com renda mensal de um salário mínimo, todas agricultoras e a maior parte delas com ensino fundamental incompleto. Foram identificadas nove espécies vegetais empregadas pela população contra processos infecciosos, inflamatórios e algícos. As principais formas de uso são o decocto, o cozimento e a maceração de folhas e cascas. Barbatimão e malva foram as espécies mais citadas pelas informantes. **Conclusão:** A medicina popular é amplamente adotada por comunidades tradicionais e representa uma riqueza cultural inestimável que deve ser preservada e valorizada para garantia do desenvolvimento sustentável. As informações levantadas nesta pesquisa podem ser aplicadas em futuros estudos farmacológicos.

Descritores: Plantas Medicinais; Medicina Tradicional; Saúde da Mulher.

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INTRODUCTION

The historical perspective on the use of plants for the treatment and cure of diseases gives evidence that this practice (known as popular medicine) has accompanied humanity since primordial times. In addition, it is understood that a significant part of the world's population uses plants for medicinal purposes as the only therapeutic source. Traditional knowledge of plants and their medicinal uses results from experience accumulated for thousands of years, where it is a factor in the sustainability of the species^(1,2).

Traditional practices exert a direct influence on the country development and on the rational use of the biodiversity with valuable cultural importance. Natural products and studies in the area of botany have helped in the elucidation of various bioactive compounds and their mechanisms of action. Therefore, traditional knowledge requires validation with scientific research⁽³⁻⁵⁾. Data from the World Health Organization (WHO) shows evidence that about 65-80% of the world's population, especially in developing countries, depend largely on plants as a source of medicines for their health care⁽⁶⁾.

With the passing of time, popular knowledge (socio-cultural context) has given ground to medical-scientific knowledge, initially in a mechanistic or Cartesian conception, a change observed since the XVIth and XVIIth centuries, and characterized by a fragmentation of health care⁽⁷⁾. This time was accompanied by a gradual substitution of the plants used for the production of medications, by synthetic drugs, which was observed between the 1950s and 1970s. The sale and utilization of medicinal plants in street markets and traditional marketplaces are still common, especially in the poorest regions of Brazil; this practice provides for an alternative treatment, due to the lack of resources, and even for a source of income for these communities⁽⁸⁾.

In Brazil, women's health was incorporated into the national health policies in the first decades of the XXth century, a period when it was limited to the demands related to pregnancy and delivery. However, with strong action in the field of health, the women's movement contributed to the introduction in the national political agenda, of relevant questions which were, until then, relegated to the second plane, particularly social aspects related to husband-wife, contraception, sexuality, prevention of sexually transmitted diseases (STDs) and reproduction⁽⁹⁾.

Following a timeline, in 1984, the Brazilian Ministry of Health established the Women's Total Health Care Program (PAISM), which focuses on women, integrality and promotion of health as guiding principles and aims to incorporate other policies besides those concerning the reproduction program⁽⁹⁾.

In this context, when women's health is approached with basis on broad conceptions, which include all its aspects, some disturbances that affect women should be singled out. Disorders of the female urogenital tract are relatively common and can cause minor alterations up to systemic reactions. These alterations include: infections of the upper urinary tract (pyelonephritis, interstitial nephritis and renal abscesses) and lower urinary tract (cystitis and urethritis) and even vulvovaginal infections (candidiasis, bacterial vaginosis and trichomoniasis)⁽¹⁰⁾.

Urogenital tract infections (UTIs) represent extremely frequent diseases, with predominance among females and peaks of greater occurrence in the beginning of - or related to - sexual activity, during pregnancy or in menopause, such that 48% of women show at least one UTI episode during their life. The greater susceptibility to UTI in women is due to the shorter urethra and closer proximity of the anus to the vaginal vestibule and urethra⁽¹¹⁾.

Reproductive tract infections (RTIs), including sexually transmitted diseases (STDs), deserve special attention⁽¹²⁾ because *sequelae* that are serious and of long duration can arise in the female population. Among their consequences are female infertility, vertical transmission determining pregnancy losses or congenital disease and the increase in the risk of HIV infection⁽¹³⁾.

The high prevalence of such diseases, plus the fact that, for a large part of the population, access to necessary medicines and medical treatments is precarious and unequal, lead to the growing search for alternative therapies, in order to achieve an improvement in the quality of health, where the utilization of phytotherapy plays a prominent role. These products are obtained from medicinal plants, or their derivatives, for a prophylactic, curative or palliative purpose, where the extraction method determines different preparations⁽¹⁴⁾.

Phytotherapy, which refers to the utilization of plants for a therapeutic purpose, accompanies the history of pharmacological science as evidenced by the fact that, up to the last century, the production of drugs was substantially based on the extraction of biological principles from plants⁽¹⁵⁾.

Taking into account Brazil's historical panorama of the utilization of plant species medicinal treatments, its origin was the reality of the indigenous communities, which had direct influence on Europeans and later blacks. This diversified baggage of information survived technological development and cultural changes, and today it is widely utilized and commercialized, mainly by the less fortunate population, not only financially, but also in terms of access to health services⁽¹⁶⁾.

The utilization of plants for medicinal purposes is widely evident in all the world, while in Brazil, there are few

studies evaluating the extent of the utilization of medicinal plants and their insertion in popular culture, despite the existence of a great tradition of their use in various biomes, such as Amazon region, the *Cerrado* and Atlantic Forest⁽¹⁷⁾.

However, in the above cited study, on the utilization of phytotherapeutic products in the Southeast region, when asked who indicates the plants to be utilized for each disease, 90.1% of the interviewees answered that it was learned from family or close persons, and only 3.1% responded utilizing medicinal plants with medical indication and 1.1% with indication by health care agents⁽¹⁷⁾.

Thus, it can be stated that the utilization of phytotherapeutic products has grown, but this growth does not occur in an orientated fashion, since most indications are based on popular knowledge, without a more elaborate scientific study⁽¹⁸⁾.

Therefore, the aim of the present study was to determine the ethnopharmacological use of plants in the treatment of infections of the urogenital tract by women in *Chapada do Araripe*, in Northeast Brazil, specifically in the area of the *cerrado* in the municipality of Crato, interior of the State of Ceará.

It is expected that ideal results can satisfy an academic demand, as well as, stimulate preclinical studies on the evaluation of the pharmacological properties of the plants, so that the community can benefit from findings with scientific basis for the utilization of these phytotherapeutic products. Also, there is the possible distribution of these products, making them available to people outside the *Chapada* area.

METHODS

A cross-sectional study with a quantitative approach was conducted in the *cerrado* area of *Chapada do Araripe*, Crato, State of Ceará, with a protected environmental area and a national forest. The Bioregion of Araripe encompasses an area of more than eighty municipalities, called the *Mesorregião do Araripe*, including, besides the State of Ceará, the States of Piauí, Pernambuco and Paraíba⁽¹⁹⁾.

This place was elected considering the relevance and perpetuation of cultural knowledge among the residents of *Chapada do Araripe* and the necessity of approximation to this knowledge as a possibility of conducting preclinical researches from ethnopharmacological knowledge of communities.

The research project was presented to the Committee of Ethics in Research of the Universidade Regional do Cariri – URCA and obtained approval under number 01/2010.

The population was represented by women living in *Chapada do Araripe* in the municipality of Crato - CE. For composition of the sample, we used the non-probability sampling technique by the intentional method, where the investigator decides on the interviewees intentionally⁽²⁰⁾.

Thus, the sample consisted of farm women connected to the local Union of Farm Workers (*Sindicato de Agricultores Rurais do Crato*), with an age range of 50 to 65 years and who utilized and recommended native plants for the treatment of urogenital tract symptoms.

Sample size was determined using the criterion of data saturation, which means sampling up to the point at which the information obtained from new participants in the study becomes repetitive or redundant with little or no increase in the material already obtained⁽²¹⁾.

The data was collected using a questionnaire in the period of September to November 2010, based on the following variables: plants known and recommended for diseases of the female urogenital tract; part of the plant recommended and utilized in the treatment; mode of preparation and mode of utilization; and specific medicinal indications for each plant.

The data was collected using the “snowball” technique, recommended for studies of this nature, in which the selection of interviewees occurs through the identification of a principal informant, based on information from the community itself, who will then indicate to the investigator, other informants also considered of great importance for obtaining information. This technique allows gathering data from persons already known by the local population as having knowledge about that which is being investigated.

The data was treated on the basis of simple statistics and grouped in tables and figures. Additionally, the daily use of such plant species for medicinal purposes in the communities of the region was determined by calculating the relative frequency of citation (RFC) as the ratio FC/N , where FC represents the number of informants that mentioned the species and N, the total number of informants of the study^(22,23).

RESULTS

INFORMANTS

The study was carried out with twenty-five women living in *Chapada do Araripe*, Crato-CE. The characteristics of the informants are listed in Table I, which shows the prevalence of the 56-60 age range, where these were mostly married and with monthly income of one minimum salary; all were farm women and most had an incomplete primary education.

Table I - Characteristics of the inhabitants. Chapada do Araripe, Crato - CE, Brazil, 2010.

Municipality	Locality	n	%
Crato – CE	Sítio Minguiriba	07	28
	Sítio Boa Vista	06	24
	Sítio Santo Antônio	06	24
	Sítio Manoel Coco	03	12
	Sítio Matinha	01	4
	Sítio Mata Velha	01	4
	Sítio Barreiro Grande	01	4
Age range			
50-55		07	28
56-60		12	48
60-65		06	24
Time of residence in the area			
< 5 Years		02	8
≥ 5 < 10 Years		01	4
≥ 10 < 20 Years		02	8
≥ 20 < 30 Years		03	12
> 30 < 40 Years		05	20
> 40 < 50 Years		02	8
≥ 50 < 60 Years		06	24
> 60 < 75 Years		04	16
Occupation			
Farming		25	100
Marital status			
Married		18	72
Single		04	16
Widow		03	12
Monthly income			
< 1 Salary		07	28
1 Salary		13	52
> 1 Salary		05	20
Education			
Illiterate		11	42.2
Incomplete primary education		14	53.8
Complete secondary education		01	3.8

Based on the data gathered in the study, 9 plant species were cited. In relation to medicinal indications, these varied from inflammation, discharges, urinary infections and others listed in Chart I.

Chart I - Distribution of the plant species according to common name, scientific nomenclature, part of the plant utilized and medicinal indication. Chapada do Araripe, Crato-CE, Brazil, 2010.

Common name	Scientific name	Part of the plant	Indication
Barbatimão	<i>Stryphnodendron rotundifolium</i> Mart	Bark, roots and leaves	Inflammation, vaginal discharge, urinary infection, uterine lesions
Malva Corama	<i>Kalcinchoe pinnata</i> L.	Leaves	Inflammation, vaginal discharge, urinary infection, ardor and warmth in the genital region
Malva do Reino	<i>Plectranthus</i> (genus)	Leaves	Inflammation, uterine lesions, urinary infection, vaginal discharge and ardor and warmth in genital region
Aroeira	<i>Mynacrodium urundeuva</i> Alemão	Bark and leaves	Inflammation, vaginal discharge and control of menstrual flow
Joanaguba	<i>Himatanthus drasticus</i> (Mart.)Plumel	“Milk” extracted from the stem	Inflammation, vaginal discharge, prevention of cervical cancer, menopause symptoms
Ameixa	<i>Ximenia americana</i> L.	Bark and leaves	Inflammation
Mangaba	<i>Harconia speciosa</i> Gomez	“Milk” extracted from the stem	Inflammation and vaginal discharge
Babosa	<i>Aloe</i> (genus)	Leaves	Inflammation, vaginal discharge
Arruda	<i>Ruta</i> (genus)	Leaves	Menstrual colic and inflammation

With regard to the form of preparation, there was great variation between the species, but it was mostly decoction, boiling and a maceration of leaves and bark, as seen in Figure 1.

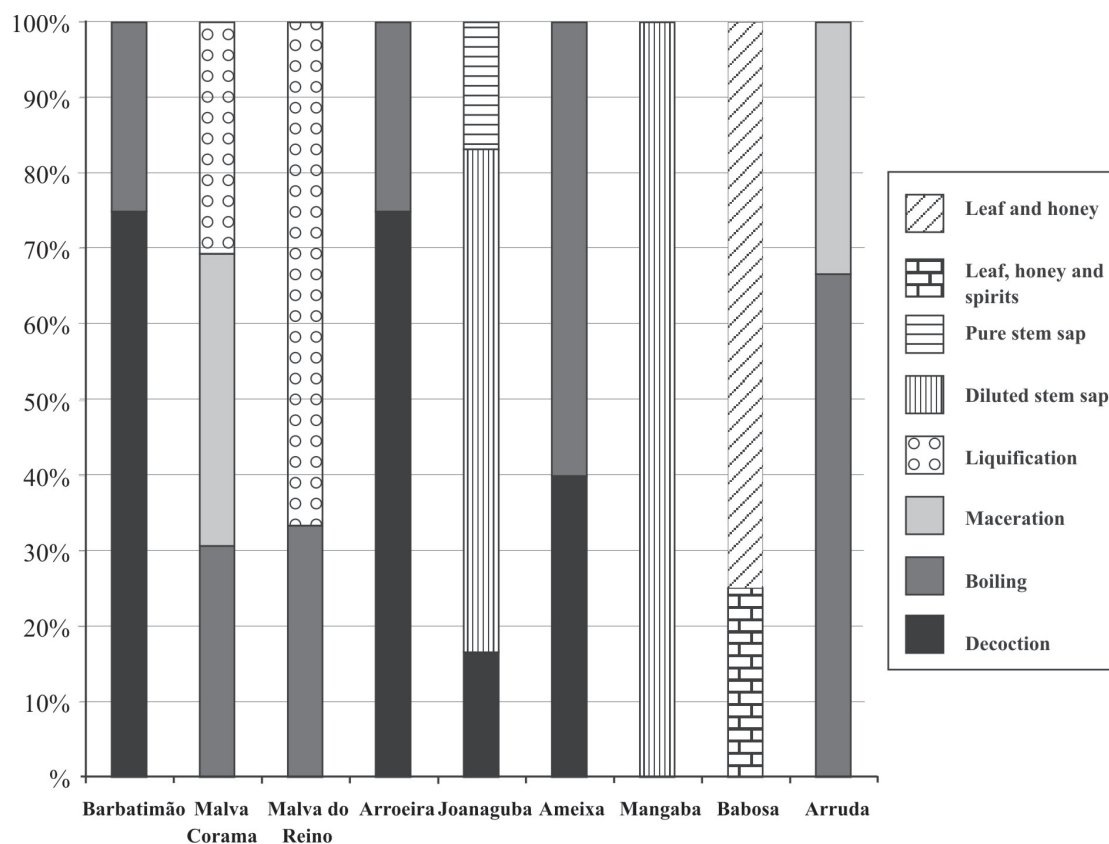


Figure 1 - Distribution of the plant species according to mode of preparation and medicinal utilization. Chapada do Araripe, Crato-CE, Brazil, 2010.

The relative frequency of citation (RFC) was determined, indicating the frequency of a particular species being mentioned by the informants. This data is shown in Chart II, where it is therefore observed that *barbatimão* was cited in all localities with the exception of *Sítio Matinha*, as well as *malva corama*, which was mentioned in all of them, but in *Sítio Manoel Coco*.

Chart II - Relative frequency of citation (RFC) of the plant species according to locality. Chapada do Araripe, Crato-CE, Brazil, 2010.

Species	Minguiriba	Boa Vista	Santo Antonio	Manoel Coco	Matinha	Mata Velha	Barreiro Grande	RFC Total
Barbatimão	0.2	0.08	0.16	0.12	-	0.04	0.04	0.64
Malva Corama	0.08	0.16	0.12	-	0.04	0.04	0.04	0.48
Malva do Reino	-	0.20	0.08	-	-	-	-	0.28
Aroeira	0.08	0.04	-	-	-	-	-	0.12
Janaguba	0.04	0.04	0.08	0.08	-	-	-	0.24
Ameixa	0.12	-	0.08	-	-	-	-	0.2
Mangaba	0.08	0.04	-	0.04	-	-	-	0.16
Babosa	0.04	-	0.04	-	-	0.04	-	0.12
Arruda	0.08	-	0.04	-	-	-	-	0.12

DISCUSSION

This study consisted of an ethnopharmacological survey of plants utilized by female inhabitants of *Chapada do Araripe* in Crato-CE for the treatment of diseases of the urogenital system, with the aim of understanding and getting botanical identification of such species, which can be the target of later preclinical studies, considering that most of these plants are native to Northeast Brazil and still lack studies of this nature.

It is possible to observe, therefore, that the natural products assume an important role in the discovery of new drugs, accompanying the evolution of humanity, present in the use for the cure and treatment of diseases^(24,25), which has certainly stimulated interest among investigators in various areas in the sense of identifying bioactive substances from natural products. Furthermore, we cannot ignore the relevance of natural products to a population that sees these as the only form of acquiring remedies for their everyday health problems.

Thus, regarding the species pointed out by the informants, data in the literature points that principal medicinal indications for the popular use of *barbatimão* (use of its bark in a decoction) are leukorrhea and gynecological problems, uses that verify the descriptions by the informants of this study, and even as an antibacterial, antihemorrhagic, antiulcerogenic, antidiarrheal, anti-inflammatory, astringent and antiseptic, diuretic and for cleaning and healing wounds^(26,27,28). In traditional medicine, the decoction of the stem bark of *Stryphnodendron adstringens* Mart., the most studied species of *barbatimão*, is widely utilized for the treatment of vaginal inflammations and cleaning of wounds. These pharmacological properties are attributed to the presence of tannins^(29,30).

There are studies that demonstrate that species of the genus *Plectranthus* are also used by traditional communities for infectious problems, urogenital symptoms and skin diseases⁽³¹⁾.

Even with respect to the above-mentioned species, *ameixa prune* (*Ximenia americana*) shows diverse activities and has been used for various medicinal purposes such as: treatment of leprosy, malaria, headache, infections, wound-healing, hemorrhoids, inflammations and dysmenorrhea. The wound-healing action reported in the literature can be explained by the presence of some substances such as tannins⁽³²⁾.

Numerous medicinal properties are attributed to *aroeira*. Popular medicine recommends using the tea of the bark for the treatment of rheumatism, infections, diarrhea and uterine symptoms. The leaves are utilized for gastritis and wounds, while antidiarrheal and astringent activities are attributed to the fruits^(33,34).

It is found in the literature that *Himatanthus drasticus* (commonly known as *joanaguba*) is a very common plant in some states in Northeast Brazil and Amazonia. According to its popular medicinal use, the latex, as well as the bark, is very efficacious in the treatment of tumors, verminoses, gastritis and arthritis and also for the prevention of cancer. In Northeast Brazil, it is extensively utilized in the treatment of cancer, but with almost no record in the literature⁽³⁵⁾, which indicates the necessity of preclinical investigations for the validation of the pharmacological potential of this species.

There are reports that species of the genus *Aloe*, such as *babosa*, cited by the informants in this study, are widely utilized in traditional medicine for various health problems, where these are attributed antibacterial properties, for example, *Aloe excelsa*⁽³⁶⁾.

The information provided by the participants are in line with those described in the literature for some of the species mentioned, emphasizing that other plants had still not been investigated from a pharmacological and ethnopharmacological viewpoint and, therefore, represent a promising source of study for such purpose with the objective of favoring the safe and sustainable use of the species by the traditional communities.

CONCLUSION

The ethnopharmacological study about plant species used in popular medicine to the treatment of the urogenital tract infections by women from *Chapada do Araripe* demonstrated the actual use of plants for this purpose, as well as pointed out the form of specific use of each species.

The research brings, therefore, data susceptible to preclinical investigation directed toward the pharmacological properties indicated by the informants, which reflects in wide possibilities of scientific evidence

to the use, which certainly will contribute to safe and sustainable use of natural resources.

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REFERENCES

1. Calixto JB. Twenty-five years of research on medicinal plants in Latin America. A personal view. *J Ethnopharmacol.* 2005; 100(1-2):131-4.
2. Signorini MA, Piredda M, Bruschi P. Plants and traditional knowledge: an ethnobotanical investigation on Monte Ortobene (Nuoro, Sardinia). *J. Ethnobiol. Ethnomed.* 2009; 5(6):5
3. Vandebroek ICJ, De Jonckheere S, Sanca S, Semo L, Van Damme P, Van Puyvelde L, De Kimpe N. Use of medicinal plants and pharmaceuticals by indigenous communities in the Bolivian Andes and Amazon. *Bull. WHO.* 2004; 82(4):243-50.
4. Vicente T, Omar M, Paola VF, Giovanni V, Chabasco A, Tomás Z. An ethnobotanical survey of medicinal plants used in Loja and Zamora-Chinchiipe, Ecuador. *J. Ethnopharmacol.* 2007; 111(1):63-81.
5. World Health Organization - WHO. Traditional Medicine Strategy 2002-2005. In: Promoting the role of traditional medicine in health care systems: A strategy for the Africa Region, WHO Regional Office for Africa. Geneva, 2002. p. 43-8.
6. Calixto JB. Efficacy, safety, quality control, marketing and regulatory guidelines for herbal medicines (phytotherapeutic agents). *Braz J Med Biol Res.* 2000; 33(2):179-89.
7. Siqueira KM, Barbosa MA, Brasil VV, Oliveira LMC, Andraus LMS. Crenças populares referentes à saúde: apropriação de saberes sócio-culturais. *Texto & Contexto Enferm.* 2006; 15(1):68-73.
8. Maciel MAM, Pinto AC, Veiga Júnior VF. Plantas medicinais: a necessidade de estudos multidisciplinares. *Quim Nova.* 2002; 25(3):429-38.

9. Ministério da Saúde (BR). Política nacional de atenção integral a saúde da mulher: princípios e diretrizes. Brasília: Ministério da Saúde; 2009.
10. Smeltzer SC, Bare BG. Tratado de enfermagem médico-cirúrgica. 10ª ed. Rio de Janeiro: Guanabara Koogan; 2005.
11. Heilberg IP, Schor N. Abordagem diagnóstica e terapêutica na infecção do trato urinário: ITU. Rev Assoc Med Bras. 2003; 49(1):109-16.
12. Barcelos MRB. Infecções genitais em mulheres atendidas em Unidade Básica de Saúde: prevalência e fatores de risco. Rev Bras Ginecol Obstet. 2008; 30(7):349-54.
13. Ministério da Saúde (BR). Manual de controle das doenças sexualmente transmissíveis. Brasília: Ministério da Saúde; 2005.
14. Ministério da Saúde (BR). Programa nacional de plantas medicinais e fitoterápicos. Brasília: Ministério da Saúde; 2008.
15. Ferro D. Fitoterapia: conceitos clínicos. São Paulo: Editora Atheneu; 2006.
16. Rezende HÁ, Cocco MIM. A utilização da fitoterapia no cotidiano de uma população rural. Rev Esc Enferm USP. 2002; 36(3):382-8.
17. Veiga Júnior VF. Estudo do consumo de plantas medicinais na Região Centro-Norte do Estado do Rio de Janeiro: aceitação pelos profissionais de saúde e modo de uso pela população. Rev Bras Farmacogn. 2008; 18(2):308-13.
18. Arnous AH, Santos AS, Beininger RPC. Plantas medicinais de uso caseiro - conhecimento popular e interesse por cultivo comunitário. Rev Esp Saúde. 2005; 6(2):1-6.
19. FUNDETEC. Plano de Gestão da APA: Área de Proteção Ambiental do Araripe. Ceará: Fundação Araripe; 1998.
20. Polit DF, Beck CT, Hungler BP. Fundamentos de pesquisa em enfermagem: métodos de avaliação e utilização. 5ª ed. Porto Alegre: Artmed; 2004.
21. Fontenala BJB, Ricas J, Turato ER. Amostragem por saturação em pesquisas qualitativas em saúde: contribuições teóricas. Cad Saúde Pública. 2008; 24(1):17-27.
22. Albuquerque UP, Lucena RFP, Cunha LVFC. Métodos e técnicas na pesquisa etnobotânica. Recife: Comunigraf; 2008.
23. Tardio J, Pardo-De-Santayana M. Cultural importance indices: a comparative analysis based on the useful wild plants of Southern Cantabria (Northern Spain). Econ Bot. 2008; 62(1):24-39.
24. Penildon S. Farmacologia. 7ª ed. Rio de Janeiro: Guanabara Koogan; 2006.
25. Newman DJ, Cragg GM, Snader KM. Natural products as sources of new drugs over the period 1981-2002. J Nat Prod. 2003; 66(7):1022-37.
26. Vasconcelos MCA, Rodvalho NCM, Pott A, Pott VJ, Ferreira AMT, Arruda ALA, Marques MCS, Castilho RO, Bueno NR. Avaliação das atividades biológicas das sementes de *Stryphnodendron obovatum* Benth. (Leguminosae). Rev Bras Farmacogn. 2004; 14(2):121-7.
27. Silva EA. O extrato aquoso do barbatimão como cicatrizante em feridas cirúrgicas do tecido cutâneo em gatos [monografia]. Campo Grande: Universidade Castelo Branco; 2006.
28. Silva CHTP. Validação de metodologia analítica para matéria-prima e produto acabado contendo *Stryphnodendron adstringens* (Martius) Coville. Recife: Universidade Federal de Pernambuco; 2007.
29. Nunes GP. Plantas medicinais comercializadas por raizeiros no Centro de Campo Grande, Mato Grosso do Sul. Rev Bras Farmacogn. 2003; 13(2):83-92.
30. Macedo M, Ferreira AR. Plantas medicinais usadas para tratamentos dermatológicos, em comunidades da Bacia do Alto Paraguai, Mato Grosso. Rev Bras Farmacogn. 2004; 14(1):40-4.
31. Lukhoba CW, Simmonds MSJ, Paton AJ. *Plectranthus*: A review of ethnobotanical uses. J. Ethnopharmacol. 2006; 103(1):1-24.
32. Brasileiro MT, Egito AL, Lima JR, Randau KP, Pereira GC, Rolim Neto PJ. *Ximenia americana* L.: botânica, química e farmacologia no interesse da tecnologia farmacêutica. Rev Bras Farm. 2008; 89(2):164-7.
33. Balbachas A. As plantas curam. São Paulo: Missionária; 1959.
34. Correa MP. Dicionário das plantas úteis do Brasil e das exóticas cultivadas. 1926-1978. Rio de Janeiro: Imprensa Nacional; 1984. v. 1.
35. Sousa EL, Sousa ARS, Grangeiro IVGA, Bastos GCR, Rodrigues MJ, Silva FBR, Anjos IA, Souza CEL. Antitumor activity of leaves of *Himatanthus drasticus* (Mart.) Plumel-Apocynaceae (Janaguba) in

the treatment of Sarcoma 180 tumor. Braz J Pharm Sci. 2010;46(2):199-203.

36. Coopoosamy RM, Magwa M. I. Antibacterial activity of aloe emodin and aloin A isolated from Aloe excelsa. Afr J Biotechnol. 2006; 5(11):1092-4.

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