

# Traditional uses of American plant species from the 1st edition of Brazilian Official Pharmacopoeia

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**RESUMO:** “Usos tradicionais das plantas Americanas presentes na 1ª Edição da Farmacopéia Brasileira”. A 1ª Edição da Farmacopéia Brasileira, publicada em 1929, é uma rica fonte de informação sobre as plantas medicinais nativas das Américas, uma vez que ela lista as espécies usadas na medicina tradicional e oficial da época. Neste estudo, foi feita uma extensa revisão sobre os usos tradicionais de plantas descritas em oitenta e sete Monografias presentes na FBRAS 1ª Edição, em vinte livros publicados do século 19 até a década de 1970. Oitenta e seis diferentes usos medicinais foram citados e três ou mais livros; mesmos usos foram descritos em dez ou mais referências, mostrando seu amplo emprego e importância como medicamento. Os resultados mostram que as espécies nativas presentes na 1ª Edição da FBRAS têm longa tradição em uso, confirmado pelos dados históricos. É necessário, portanto, que estudos farmacológicos com essas plantas sejam estimulados, como forma de promover seu melhor aproveitamento.

**Unitermos:** Plantas nativas da América, Farmacopéia, usos tradicionais.

**ABSTRACT:** The first edition of the Brazilian Official Pharmacopoeia (FBRAS), published in 1929, is a rich source of information about American medicinal plants, since it lists species used in both traditional and conventional medicine. In this study, we have performed a survey of the traditional uses of plants described in eighty-seven Monographs from the FBRAS in twenty bibliographies written from the 19<sup>th</sup> century to the 1970s. Eighty-six different traditional uses are described in three or more books; some of them were cited in ten or more books, illustrating their widespread use and importance in medicine. The species from the first edition of the FBRAS have a long tradition of medical utility, which is confirmed by historical records. In surveying these medically relevant species, we hope to encourage policy makers and the scientific public as a whole to engage in a strong debate in an attempt to improve and facilitate the pharmacological study of these species.

**Keywords:** American native plants, Pharmacopoeia, traditional uses.

## INTRODUCTION

Latin-American countries are rich in medicinal species due to the vast plant biodiversity and a rich tradition of plant utilization practiced by Americans for centuries. In Brazil, however, the intense mixture of cultures (Native, African and European) led to an introduction of species native from other continents. The accelerating destruction of Brazil's botanically rich native ecosystems is also contributing to a gradual loss of knowledge about the native plants used in traditional medicine (Dean, 1995; [Shanley and Rosa, 2005](#); [Brandão](#)

and [Montemor, 2008](#)). Native medicinal species were also used for decades by pharmaceutical companies in Brazil for preparing commercial products. The lack of pharmacological studies on the efficacy and toxicity of these species, however, is promoting a progressive substitution of them by species from other continents in the manufacture of these products ([Brandão et al., 2009](#); [Carvalho et al., 2008](#)). This situation illustrates the growing need to recuperate data about native American plant species and to promote studies on them.

Information on the use of native American species in Brazil can be obtained in older bibliographies.

Travel diaries written by European naturalists that traveled throughout Brazil in the 19<sup>th</sup> century, for example, are rich in descriptions of the use of native medicinal plants by the Brazilians (Brandão et al., 2008a). The first edition of the Brazilian Official Pharmacopoeia (FBRAS), published in 1929, is also a very important document, since it listed plant species used in the practice of both traditional and conventional medicine. In previous studies, we listed the plants and botanical products described in this edition of the FBRAS, and discussed the trend towards intense replacement of native species by others products in recent decades (Brandão et al., 2006; 2008b). In the present study, we show the results of an extensive revision of the traditional uses of American plant species from the first edition of the FBRAS in twenty books and other bibliographies about the use of plants written in Brazil from 19<sup>th</sup> century to the 1970s decade.

## MATERIAL AND METHODS

### Ethnopharmacological survey on books of the 19<sup>th</sup> century

Six books were surveyed about the use of medicinal plants in the 19<sup>th</sup> century (Table 1). The oldest were written by the French A. Saint-Hilaire (1779-1853) and the German K.F. von Martius (1794-1868), both naturalists who traveled throughout Brazil in the 19<sup>th</sup> century (Brandão et al., 2008b). The contributions

they made to knowledge of the Brazilian flora are incalculable - thousands of new plants were discovered and innumerable new genera were described, based on the material they collected. The use of some native species were detailed by Saint-Hilaire in his book *Plantes Usuelles des Brésiliens* (Saint-Hilaire, 1824) and *Flora Brasiliae Meridionalis* (1825-1852) as did von Martius in *Systema de Materia Medica Vegetal Brasileira* (Martius, 1843). Two other influential books from the 19<sup>th</sup> century were written by the botanists J.M. Caminhoá (1836-1896) and Theodor Peckolt (1822-1912). Caminhoá, who was influential in the 19<sup>th</sup> century Brazilian empire, wrote a vast bibliography about medical materials, including the *Elementos de Botânica Geral e Médica* (1877). T. Peckolt was a German botanist who came to work in Brazil in 1847, and revised the material collected by K.F.P. Martius. He wrote extensive medical literature, with almost 170 publications, including the series of books used in this study entitled *Historia das Plantas Medicinaes e Úteis do Brazil*, which were published between 1887 and 1896 (Hering, 1912). Another 19<sup>th</sup> century author was Piotr Czerniewicz, known as Pedro Luiz Napoleão Chernoviz (1812-1881), who left Poland in 1840 to live in Rio de Janeiro. In 1841, Chernoviz published the *Formulário e Guia Médico*, widely used by the population in areas bereft of doctors. In the 8<sup>th</sup> Edition (1868), he included the descriptions and uses of almost 200 native Brazilian plant species. This book remained widely used as a medical manual by official medical institutions in Brazil, until it was finally replaced

**Table 1.** Year of publication, author and title of the books used in the study.

N° in Table 2	Year of publication	Author	Title of the book
(1)	1824	A. Saint-Hilaire	<i>Plantes Usuelles des Brésiliens.</i>
(1a)	1825-1852	A. Saint-Hilaire	<i>Flora Brasiliae Meridionalis</i>
(2)	1843	K.F. Von Martius	<i>Systema de Materia Medica Vegetal Brasileira</i>
(3)	1877	J.M. Caminhoá	<i>Elementos de Botânica Geral e Médica.</i>
(4)	1887-1896	Peckolt and Peckolt	<i>Historia das Plantas Medicinaes e Uteis do Brazil.</i>
(5)	1911	J. Monteiro da Silva	<i>Contribuição para o estudo da Flora Brasileira</i>
(6)	1926-1978	M.P. Corrêa	<i>Dicionário das Plantas Úteis do Brasil e das Exóticas Cultivadas.</i>
(7)	1930	Araújo & Lucas	<i>Catálogo de Extratos Fluidos.</i>
(8)	1939	F.C. Hoehne	<i>Plantas e Substâncias Vegetais Tóxicas e Medicinais.</i>
(9)	1940	J. Badini	<i>Arquiclamídeas Medicinais de Ouro Preto.</i>
(10)	1941	M. Penna	<i>Dicionário Brasileiro de Plantas Medicinais.</i>
(11)	1942	R. Coimbra	<i>Notas de Fitoterapia.</i>
(12)	1947	P. Le Cointe	<i>Amazônia Brasileira. Árvores e Plantas Úteis.</i>
(13)	1954	Laboratórios Catedral	<i>Dicionário de Sinônimos das Plantas Medicinais Brasileiras Industrializadas pelo Laboratório Catedral.</i>
(14)	1960	R. Braga	<i>Plantas do Nordeste, especialmente do Ceará.</i>
(15)	1965	G.L. Cruz	<i>Livro Verde das Plantas Medicinais e Industriais do Brasil.</i>
(16)	1967	A. Balbach	<i>As Plantas Curam.</i>
(17)	1996	P.L.N. Chernoviz	<i>Formulário e Guia Médico*</i>
(18)	1997	F.J.A. Matos	<i>O Formulário Fitoterápico do Professor Dias da Rocha*</i>
(19)	1999	Botsaris & Machado	<i>Flora Medicinal: Memento Terapêutico*</i>

\* more recent editions/ publications but with informations from 1860 to 1930.

**Table 2.** Traditional uses of Brazilian plants from the first edition of the FBRAS.

Name of Monography/ part Species/ FAMILY	Uses in books of the 19th century until the 1970s
<u>Abacateiro/ leaves</u> <i>Persea gratissima</i> L./ Lauraceae	carminative <sup>2,10,11,13,15</sup> , diuretic <sup>6-8,10-15</sup> , emmenagogue <sup>6,10,11,14,15</sup> , liver disorders <sup>11-13,18</sup> , urinary diseases <sup>6,7,10-13,15,18</sup>
<u>Abútua/ roots</u> <i>Chondrodendron platyphyllum</i> (A.St-Hil.) Miers; <i>Cocculus platyphyllum</i> ; <i>Cissampelos</i> sp./ MENISPERMACEAE	diuretic <sup>4-6,7,11-13,16,19</sup> , dysmenorrhea <sup>6,10,13,16</sup> , dyspepsia <sup>5,6,13,16</sup> , emmenagogue <sup>6,7,10,11,17,19</sup> , intermittent fevers <sup>1a, 3-8,10-12,15,19</sup> , hydrops <sup>6,7,10,11,16</sup> , liver disorders <sup>1a,11,16,19</sup> , tonic <sup>3,5-7,10,12,15,19</sup>
<u>Agoniada/ rind</u> <i>Plumeria lancifolia</i> Müll. Arg./ <i>P. phagedaenica</i> Mart./ APOCYNACEAE	adenitis <sup>6,11,15,16,19</sup> , amenorrhea <sup>5-7,11,19</sup> , asthma <sup>6,10,15,16,19</sup> , chlorosis <sup>6,7,10,15,16</sup> , digestive disorders <sup>7,15,16,19</sup> , dysmenorrhea <sup>6,7,10,11,13,15,16</sup> , intermittent fevers <sup>7,10,11,15,16,19</sup> , hysterics <sup>6,7,10,16,19</sup> , purgative <sup>5-7,11,19</sup> , cutaneous affections <sup>6,19</sup> , vermifuge <sup>6,8,17</sup>
<u>Agrião do Pará/ leaves and flowers</u> <i>Spilanthes acmella</i> (L.) Murray; <i>S. oleraceae</i> L./ ASTERACEAE	anti-scorbutus <sup>7,12,15-17</sup> , anemia <sup>7,15,16</sup> , dyspepsia <sup>7,10,15,16</sup> , excitatory <sup>6,7,10,15,17</sup> , odontalgia <sup>6-8,12,15-17</sup>
<u>Alecrim bravo/ flowers</u> <i>Hypericum laxiusculum</i> A. Saint-Hil./ HYPERICACEAE	anti-spasmodic <sup>6,8,10</sup> , snake bites <sup>1a,2,6,8,10,17</sup> , vulnerary <sup>2,6,8,10,17</sup>
<u>Algodoeiro/ rind of roots</u> <i>Gossypium herbaceum</i> L./ MALVACEAE	diuretic <sup>10-12,15,16</sup> , dysmenorrhea <sup>7,10-13,15,17</sup> , emmenagogue <sup>7,8,10,11,12,17,19</sup> , hemostatic <sup>10,11,16</sup> , metrorrhagia <sup>10,11,13,15,16</sup> , women-associated troubles <sup>10,13,15</sup>
<u>Angico/ rind</u> <i>Piptadenia colubrina</i> (Vell.) Benth./ <i>Anadenanthera colubrina</i> (Vell.) Benth./ FABACEAE	anti-diarrheal <sup>13,15,16</sup> , astringent <sup>3,10,11,13,14,16</sup> , bronchitis <sup>7,10,11,15,17,18</sup> , depurative <sup>9,11,14</sup> , expectorant <sup>7,11,13,15,16</sup> , hemostatic <sup>11,14,16</sup> , respiratory diseases <sup>7,9,10,11,14,16,18</sup>
<u>Aroeira/ rind</u> <i>Schinus terebinthifolius</i> Raddi; <i>S. molle</i> L. / ANACARDIACEAE	anti-diarrheal <sup>7,9,10,11,16</sup> , astringent <sup>3,7,9,11,14-18</sup> , febrifuge <sup>6,7,9,10,11</sup> , hemoptysis <sup>6,7,9,10,11,14,16</sup> , rheumatism <sup>2,7,9,10,17</sup> , urinary diseases <sup>6,11,14</sup> , venereal diseases <sup>2,10,17</sup>
<u>Balsamo de copaiba/ balsam</u> <i>Copaiba officinalis</i> (L.) Kuntze/ <i>C. coriacea</i> (Mart.) Kuntze/ <i>C. langsdorffii</i> (Desf.) Kuntze/ <i>C. oblongifolia</i> (Mart.) Kuntze/ FABACEAE	anti-diarrheal <sup>6,10,16</sup> , bronchitis <sup>6,10,12,14,16</sup> , leucorrhea <sup>5,6,12,17</sup> , cutaneous affections <sup>5,6,13,16,17</sup> , skin wounds <sup>5,6,13,14</sup> , urinary diseases <sup>6,10,16</sup> , venereal diseases <sup>2,5,6,12,14,17,18</sup>
<u>Bálsamo de Tolu/ balsam</u> <i>Myrospermum balsamum</i> (L.) Harms/ FABACEAE	asthma <sup>6,10,11,13,15</sup> , balsamic <sup>7,10,11,13-15</sup> , bronchitis <sup>7,11,13,15</sup> , diuretic <sup>7,10,13</sup> , expectorant <sup>10,13-15</sup> , respiratory diseases <sup>6,7,11</sup> , urinary diseases <sup>6,7,11,14,15</sup>
<u>Barbasco/ leaves</u> <i>Buddleja brasiliensis</i> Jacq. Ex Spreng./ LOGANIACEAE	anti-hemorroidal <sup>2,6,10,15,16</sup> , arthritis <sup>6,10,15,16</sup> , bronchitis <sup>5,6,10,11,15,16</sup> , emollient <sup>3,5,6,10,11,15-17</sup> , hemoptysis <sup>6,10,16</sup> , respiratory diseases <sup>5,6,10,11,15,16</sup>
<u>Barbatimão/ rind</u> <i>Stryphnodendron adstringens</i> (Mart.) Coville; <i>S. guyanensis</i> Benth./ FABACEAE	anti-scorbutus <sup>6,7,9,10,11,13,16</sup> , anti-diarrheal <sup>6,9,10,11,15-17</sup> , astringent <sup>2,3,5,6,7,9,10,11,12</sup> , hemostatic <sup>6-16</sup> , leucorrhea <sup>6,7,9-17</sup> , metrorrhagia <sup>6,11,15</sup> , skin wounds <sup>6,11,12,14,15,17</sup> , tonic <sup>7,10,11,15</sup>
<u>Baunilha/ fruits</u> <i>Vanilla planifolia</i> Andrews/ ORCHIDACEAE	amenorrhea <sup>11,15,17</sup> , aphrodisiac <sup>11,15,17</sup> , hysterics <sup>7,10,11,15</sup> , stimulant <sup>6,7,11,12,17</sup>
<u>Cainca/ roots</u> <i>Chiococca brachiata</i> Ruiz & Pav; <i>C. anguifuga</i> Mart./ RUBIACEAE	amenorrhea <sup>2,6,7,11-13,16</sup> , diuretic <sup>2,5-7,10-17</sup> , emetic <sup>2,3,17</sup> , purgative <sup>3,5-7,11-19</sup> , rheumatism <sup>10,13,14,19</sup> , snake bites <sup>2,6,7,8,10-12,14,16,19</sup> , cutaneous affections <sup>6,7,10,15</sup>
<u>Cajueiro/ rind</u> <i>Anacardium occidentale</i> L./ ANACARDIACEAE/	astrigent <sup>6,7,11,17</sup> , diabetes <sup>6,7,10-17</sup> , halitosis <sup>10,12,16</sup> , tonic <sup>7,11,14,15</sup>
<u>Calumba/ roots</u> <i>Jatrorrhiza palmata</i> (Lam.) Miers./ MENISPERMACEAE	anti-diarrheal <sup>3,6,7,11,17</sup> , anorexia <sup>6,7,11</sup> , anti-emetic <sup>6,11,17</sup> , dyspepsia <sup>6,7,11,17</sup> , stomach problems <sup>7,8,11</sup> , cutaneous affections <sup>6,7,15,17,18</sup> , tonic <sup>3,11,17</sup>
<u>Cangerana/ rind</u> <i>Cabralea cangerana</i> Saldanha da Gama / MELIACEA	emetic <sup>3,6,17</sup> , purgative <sup>3,6,17</sup>
<u>Camará/ leaves</u> <i>Lantana camara</i> L. / VERBENACEAE	anti-tussive <sup>8,10,13,15-18</sup> , asthma <sup>10,15-18</sup> , balsamic <sup>7,10,11,13,15</sup> , bronchitis <sup>8,10,11,15,18</sup> , expectorant <sup>5,7,10,11,13,15</sup> , febrifuge <sup>7,10,11,13,14</sup> , rheumatism <sup>2,6,10-12,17</sup> , respiratory diseases <sup>2,6,11</sup> , cutaneous affections <sup>6,11,12</sup> , tonic <sup>6,10,11</sup> , whooping cough <sup>10,11,15,16</sup>
<u>Canela Sassafras/ rind</u> <i>Ocotea sassafras</i> (Meisn.) Mez; <i>Laurus sassafras</i> ; <i>Sassafras sassafras</i> / LAURACEAE	depurative <sup>7,9,11,15,16</sup> , diaphoretic <sup>3,10,11</sup> , rheumatism <sup>4,6,7,10,11,13,15,16</sup> , sudorific <sup>4,6,7,11,15,16</sup> , venereal diseases <sup>7,11,16</sup>
<u>Carapiá/ roots</u> <i>Dorstenia multififormis</i> var. <i>arifolia</i> (Lam.) Bureau; <i>D. brasiliensis</i> Lam.; <i>D. reniformis</i> Pohl/ MORACEAE	amenorrhea <sup>2,7,9,10,11,14,17</sup> , anemia <sup>7,11,15</sup> , anti-diarrheal <sup>2,6,7,11,19</sup> , chlorosis <sup>4,5,6,7,15,17</sup> , diuretic <sup>2,3,6,11,12,14,19</sup> , diaphoretic <sup>2,3,4,6,7,9,11,14</sup> , digestive disorders <sup>1,2,5,6,7,10-12,15,17,19</sup> , emmenagogue <sup>6,7,9,11-14,17,19</sup> , febrifuge <sup>2,5-7,9-13,15,17</sup> , gangrene <sup>6,7,12,17</sup> , snake bites <sup>3,4,7,8,9</sup> , stimulant <sup>4,6,11,12,17</sup> , tonic <sup>6,7,9,11,13,15,19</sup>

Name of Monography/ part Species/ FAMILY	Uses in books of the 19th century until the 1970s
<u>Carnaubeira/ roots</u> <i>Copernicia cerifera</i> (Arruda) Mart./ ARECACEAE	arthritis <sup>6,7,11</sup> , diuretic <sup>4,6,7,10,11,16</sup> , rheumatism <sup>4,6,7,10,11,16</sup> , cutaneous afections <sup>7,10,11,17</sup> , venereal diseases <sup>4,6,7,10,16</sup>
<u>Caroba/ leaves</u> <i>Jacaranda caroba</i> (Vell.) A.DC.; <i>J. brasiliana</i> Person./ BIGNONIACEAE	rheumatism <sup>7,11,13,15,16</sup> , skin wounds <sup>6,10,14,15,18</sup> , cutaneous afections <sup>2,3,6,7,10,11,13,14,15-18</sup> , tonic <sup>6,11,14</sup> , urinary diseases <sup>7,10,11,13</sup> , venereal diseases <sup>3,6-8,10,11,14-18</sup>
<u>Carqueja amarga/ whole plant</u> <i>Baccharis genisteloides</i> Persoon; <i>B. trimera</i> (Less.) DC/ ASTERACEAE	anemia <sup>2,15,16</sup> , anorexia <sup>2,11,13,15</sup> , anti-diarrheal <sup>17,10,11,15,16</sup> , diabetes <sup>6,15-19</sup> , dyspepsia <sup>2,7,10,12,13,15,16</sup> , intermittent fevers <sup>2,3,7,10,11,13,15,17</sup> , liver disorders <sup>6,7,10,13,16</sup> , stomach problems <sup>2,6,11,15,13,16,19</sup> , tonic <sup>2,3,6,7,10-13,17</sup> , vermifuge <sup>6,10,15</sup>
<u>Casca d'anta/ rind</u> <i>Drymis winteri</i> Winter/ WINTERACEAE	anemia <sup>5,6,11,12,15,19</sup> , anorexia <sup>10,13,16</sup> , anti-emetic <sup>7,10,15,16,19</sup> , antiscorbutus 6,7,10,11-13,15, anti-diarrheal <sup>6,7,10,11,13,16</sup> , anti-spasmodic <sup>2,6,7,10,13,16,17,19</sup> , convalescence <sup>6,11,16</sup> , digestive disorders <sup>5,10,13,15,16</sup> , dyspepsias <sup>5-7,10-13,15,16</sup> , febrifuge <sup>8,10,16</sup> , facial paralysis <sup>6,7,10,13</sup> , stomach problems <sup>1,3,6,7,8,10-13,15,19</sup> , stimulant <sup>1a,2,12,17</sup> , tonic <sup>1,1a,2,5-7,11-13,15,17,19</sup>
<u>Cassaú/ wood and roots</u> <i>Aristolochia cymbifera</i> Mart. & Zucc. & variedades/ ARISTOLOCHIACEAE	Amenorrhea <sup>5,7,9,11,12,14,16,18</sup> , anti-diarrheal <sup>5,7,9,12</sup> , anti-convulsant <sup>5-7,11,16</sup> , antiseptic <sup>2,7,10,16,17</sup> , anorexia <sup>2,9,10,14-17</sup> , chlorosis <sup>2,7,9,10,15-17</sup> , dyspepsia <sup>4,5,7,10,15,16,19</sup> , diuretic <sup>2,4,6,7,11,14,19</sup> , diaphoretic <sup>2,6,7,10,15-17</sup> , emmenagogue <sup>2,7,9,11,14,17,19</sup> , epilepsy <sup>7,11,14,16</sup> , intermittent fevers <sup>2,4,5-7,9,11-17,19</sup> , hysterics <sup>4,5,7,11,14,16</sup> , orchitis <sup>6,7,9,16</sup> , stimulant <sup>2,7,9,14,15,17</sup> , skin wounds <sup>4,5-7,9</sup> , snake bites <sup>2,4,6-9,11,14,17</sup> stomach problems <sup>6,10,11,15,16</sup> , tonic <sup>2,7,11-13,15,19</sup>
<u>Catuaba/ rizome</u> <i>Anemopaegma mirandum</i> (Cham.) Mart. ex DC/ BIGNONIACEAE/	aphrodisiac <sup>2,7,11,14,17,19</sup> , erectile dysfunction <sup>11,13,16-19</sup> , stimulant <sup>7,8,11,13,19</sup> , tonic <sup>7,11,14,13,16,19</sup>
<u>Chá de pedestre/ leaves and flowers</u> <i>Lippia pseudo-thea</i> Schauer; <i>Lantana pseudothea</i> St. Hil./ VERBENACEAE	expectorant <sup>2,7,15</sup> , respiratory diseases <sup>2,6,7,8,10,15</sup> , rheumatism <sup>2,6,7,15</sup> , stimulant <sup>4,6,7</sup>
<u>Chapéu de couro/ leaves</u> <i>Echinodorus macrophyllus</i> (kunth) Micheli/ ALISMATACEAE	anti-inflammatory <sup>6,7,13</sup> , arthritis <sup>6,7,10</sup> , depurative <sup>5,6,10,11,15</sup> , diuretic <sup>5,7,8,11,13,15</sup> , urinary disorders <sup>6,10,15</sup> , hydrops <sup>7,8,10,13,15</sup> , liver disorders <sup>6,11,15</sup> , rheumatism <sup>5,6,7,10,11,13,15</sup> , cutaneous afections <sup>4,6,7,10,11,13,15</sup> , venereal diseases <sup>6,7,10</sup>
<u>Cipó azogue/ roots</u> <i>Apodanthera smilacifolia</i> Cogn./ CUCURBITACEAE	Depurative <sup>5,7,10,11,13,15</sup> , rheumatism <sup>10,11,15</sup> , cutaneous afections <sup>5,6,7,10,11,13,15</sup> , venereal diseases <sup>7,11,13,15</sup>
<u>Cipó cabelludo/ whole plant</u> <i>Mikania hirsutissima</i> DC./ ASTERACEAE	diuretic <sup>7,10-13,15</sup> , urinary diseases <sup>1,6,7,10-13,15</sup>
<u>Cipó caboclo/ leaves</u> <i>Davilla rugosa</i> Poir./ DILLENIACEAE	astringent <sup>1,2,11,14,17,19</sup> , depurative <sup>6,14,19</sup> , legs edema <sup>1,1a,10,11,15-17,19</sup> , lymphedema <sup>7,11,15,16,19</sup> , orchitis <sup>1a,2,7,8,10,11,16,19</sup>
<u>Cipó chumbo/ whole plant</u> <i>Cuscuta umbellata</i> Kunth/ CONVOLVULACEAE	anti-diarrheal <sup>7,12,16</sup> , astringent <sup>6,11,12,16</sup> , diuretic <sup>7,12,16</sup> , hemoptysis <sup>3,6,7,10- 12,15,16</sup> , respiratory diseases <sup>6,7,10,11,15-17</sup> , skin wounds <sup>7,8,10-12,15,16</sup> , tonic <sup>4,7,11</sup>
<u>Cipó cravo/ wood</u> <i>Tynnanthus fasciculatus</i> Miers; <i>T. elegantus</i> Miers/ BIGNONIACEAE /	aphrodisiac <sup>6,15,19</sup> , carminative <sup>7,11,13,19</sup> , dyspepsia <sup>10,11,15,19</sup> , stomach problems <sup>7,10,11,13,15,19</sup> , stimulant <sup>6,10,13</sup> , tonic <sup>7,11,15,19</sup>
<u>Cipó suma/ roots</u> <i>Anchietea salutaris</i> A. Saint-Hil./ VIOLACEAE	depurative <sup>1,5-9,11,13,14,15</sup> , purgative <sup>1,5-7,10,17</sup> , cutaneous afections <sup>1-3,6,7,9-11,13-15,17</sup>
<u>Coerana/ leaves</u> <i>Cestrum laevigatum</i> Schlecht./ SOLANACEAE	anti-spasmodic <sup>2,6,15,16</sup> , emollient <sup>3,6,7,14,15</sup> , sedative <sup>3,6,7,14-16</sup>
<u>Cordão de Frade/ whole plant</u> <i>Leonotis nepetifolia</i> (L.) R. Brown./ LAMIACEAE	asthma <sup>6,7,10,15,16</sup> , anti-spasmodic <sup>6,7,12,16</sup> , diuretic <sup>6,7,10-12,14-16,18</sup> , metrorrhagia <sup>12,13,15,16</sup> , rheumatism <sup>6,7,10-12,16</sup> , stimulant <sup>12,15,16</sup> , stomach problems <sup>13-15,18</sup> , tonic <sup>7,11,14</sup>
<u>Douradinha/ whole plant</u> <i>Waltheria douradinha</i> A. Saint-Hil./ STERCULIACEAE	anti-tussive <sup>1,3,8,15,17</sup> , bronchitis <sup>8,15,16</sup> , emollient <sup>1,1a,3,8,17</sup> , respiratory diseases <sup>2,6,10,15,16</sup> , skin wounds <sup>1,6,8</sup> , venereal diseases <sup>1a,15-17</sup>
<u>Elemi/ balsam</u> <i>Protium heptaphyllum</i> (Aubl.) March.; <i>P. icicariba</i> (DC.) March./ BURSERACEAE	balsamic <sup>11,12,14</sup>
<u>Eselina/ roots</u> <i>Cayaponia eselina</i> (Silva Manso) Cogn./ CUCURBITACEAE	anti-diarrheal <sup>6,10,13</sup> , asthma <sup>6,10,11,17</sup> , bronchitis <sup>6,10,11</sup> , dyspepsia <sup>6,10,13</sup> , hemostatic <sup>6,10,13</sup>

Name of Monography/ part Species/ FAMILY	Uses in books of the 19th century until the 1970s
<u>Fedegoso/ roots</u> <i>Cassia occidentalis</i> L.; <i>Senna occidentalis</i> / FABACEAE	amenorrhea <sup>6,11,12,14,15</sup> , diuretic <sup>7,11,12,14,16,17</sup> , intermitent fever <sup>6,7,10-12,15,16</sup> , hydrops <sup>7,10,12,15,16-18</sup> , liver disorders <sup>5,6,10,13,15-17</sup> , purgative <sup>2,13,15,17</sup> , tonic <sup>5,7,11,12,14,17</sup> , vermifuge <sup>8,9,12,16</sup> , venereal diseases <sup>9,10,15</sup>
<u>Gervão roxo/ leaves</u> <i>Stachytarpha dichotoma</i> (Ruiz & Pav.) Vahl; <i>S. caeniensis</i> Cham; <i>Verbena jamaicensis</i> L./ VERBENACEAE	debility <sup>7,10,11,13,15</sup> , diuretic <sup>13,15,16</sup> , dyspepsia <sup>6,7,10,11,13,15,16</sup> , febrifuge <sup>2,7,10-12,14-16</sup> , hepatitis <sup>7,10,13,16</sup> , liver disorders <sup>11,13,15-17</sup> , stimulant <sup>7,10-12,15,17</sup> , sudorific <sup>7,11,12,15-17</sup> , stomach problems <sup>1,11,16,17</sup> , tonic <sup>7,11,14</sup>
<u>Goiabeira/ rind</u> <i>Psidium guayava</i> Raddi./ MYRTACEAE	antidiarrheal <sup>16,7,10-12,17</sup> , astringent <sup>6,7,11,12,14</sup>
<u>Guaco/ leaves</u> <i>Mikania glomerata</i> Spreng; <i>M. guaco</i> Bonpl./ ASTERACEAE	febrifuge <sup>7,8,11,12,13,16</sup> , neuralgia <sup>10,11,15</sup> , respiratory diseases <sup>7,11,13,15,17</sup> , rheumatism <sup>7,10-13,15,16</sup> , sudorific <sup>11,13</sup> , snake bites <sup>7,8,11,16,17</sup> , venereal diseases <sup>7,11,16</sup>
<u>Guaraná/ seeds</u> <i>Paullinia cupana</i> Kunth; <i>P. sorbilis</i> Mart./ SAPINDACEAE	anti-diarrheal <sup>6,7,11,12,13,16,17</sup> , depression <sup>7,11,13,15</sup> , migraine <sup>2,6,7,12,17</sup> , neuralgia <sup>7,12,13,17</sup> , stimulant <sup>6,11,13,15</sup> , stomach problems <sup>2,6,7,11,13</sup> , tonic <sup>7,8,11-13,15,17</sup>
<u>Guaycuru/ roots</u> <i>Statice brasiliensis</i> Boiss/ PLUMBAGINACEAE	anti-diarrheal <sup>7,11,17</sup> , astringent <sup>7,11,17</sup> , hydrops <sup>7,11,17</sup>
<u>Herva de bugre/ leaves</u> <i>Casearia sylvestris</i> Swartz./ FLACOURTIACEAE	depurative <sup>7,9,11,16</sup> , febrifuge <sup>7,9,10,11</sup> , rheumatism <sup>7,10,11</sup> , cutaneous affections <sup>7,9-11,16</sup> , venereal disease <sup>7,9-11,16</sup>
<u>Herva de Santa Maria/ leaves</u> <i>Chenopodium ambrosioides</i> L./ CHENOPODIACEAE	vermifuge <sup>4-8,11,12,14,15,18</sup> , tonic <sup>6,7,12,15</sup> , emmenagogue <sup>6,7,8,12,15</sup>
<u>Herva macahê/ leaves and flowers</u> <i>Leonurus sibiricus</i> L./ LAMIACEAE	anti-emetic <sup>6,10,11</sup> , intermitent fever <sup>7,11,13,15</sup> , gastroenteritis <sup>7,10,15</sup> , rheumatism <sup>8,11,13</sup> , stomach problems <sup>6,7,10,11,13,15</sup>
<u>Herva de passarinho/ leaves</u> <i>Struthanthus marginatus</i> (Desr) Blume./ LORANTACEAE	bronchitis <sup>4,9,11-13,15</sup> , hemoptysis <sup>9,12,15</sup> , leucorrhea <sup>9,10,12,15</sup>
<u>Herva tostão/ roots</u> <i>Boerhavia hirsuta</i> Jacq./ NYCTAGINACEAE	diuretics <sup>2,4,7,10,11,13,16,17,19</sup> , intermitent fevers <sup>6,11,13,15,19</sup> , hemoptysis <sup>10,15,16</sup> , liver disorders <sup>2-4,7,8,10,11,13-17,19</sup> , urinary diseases <sup>4,7,11,16,19</sup>
<u>Imbaúba/ shoots</u> <i>Cecropia hololeuca</i> Miq.; <i>C. pachystachya</i> Trec.; <i>C. palmata</i> Willd./ CECROPIACEAE	anti-diarrheal <sup>2,6,11,12</sup> , asthma <sup>6,10,11</sup> , cardiotoxic <sup>6,7,10-12,14,16</sup> , diuretic <sup>2,6,9,12-14</sup> , leucorrhea <sup>2,6,9,12,13</sup> , respiratory diseases <sup>6,7,9,10,11,13,16</sup> , skin wounds <sup>2,6,8</sup> , venereal diseases <sup>2,9,12</sup> , whooping cough <sup>2,6,7,9,10,11,13,16</sup>
<u>Ipecacuanha/ roots</u> <i>Evea ipecacuanha</i> (Brot.) Satandley; <i>Cephaelis ipecacuanha</i> (Brot.) Stokes; <i>C. acuminata</i> Karsten/ RUBIACEAE	anti-diarrheal <sup>1,2,5-7,10-16</sup> , bronchitis <sup>5,7,11,13,16-18</sup> , diaphoretic <sup>7,11,13,14</sup> , emetic <sup>1,2,4,5-8,10-17</sup> , expectorant <sup>1,2,5-7,10-17</sup> , pneumonia <sup>11,13,16</sup> , whooping cough <sup>1,6,12,17</sup>
<u>Jaborandi/ leaves</u> <i>Pilocarpus jaborandi</i> Holmes/ <i>P. microphyllus</i> Stapf ex Wardlewort/ RUTACEAE	bronchitis <sup>7,10,11,13,16-18</sup> , diaphoretic <sup>8,10,11,14,17</sup> , diabetes <sup>10,11,17</sup> , hydrops <sup>7,10,11,13,17</sup> , sialagogue <sup>6,7,8,10,11,13,17,19</sup> , sudorific <sup>6,7,10,13,16,17,19</sup>
<u>Jalapa do Brasil/ tubercule</u> <i>Operculina macrocarpa</i> (Linn) Urb./ CONVULVULACEAE	Purgative <sup>2,3,8,10,14,16,17</sup>
<u>Japecanga/ roots</u> <i>Smilax japicanga</i> Griseb. / SMILACACEAE	anti-syphilitic <sup>4,5,7,10,11,15-18</sup> , depurative <sup>5,7,11,14,15,16</sup> , diuretic <sup>4,5,7,11,13,14,15</sup> , gout <sup>6,7,10,15,16</sup> , rheumatism <sup>4,6,7,10,11,13,15-18</sup> , cutaneous affections <sup>2,4,6,7,9,11,13,15-17</sup>
<u>Jequitibá/ rind</u> <i>Cariniana brasiliensis</i> Casar./ LECYTHIDACEAE	astringent <sup>6,11,16</sup> , leucorrhea <sup>10,11,16</sup> , metrorrhagia <sup>10,11,16</sup>
<u>Jurubeba/ roots</u> <i>Solanum paniculatum</i> L./ SOLANACEAE	anorexia <sup>11,15,19</sup> , diuretic <sup>8,14,16,19</sup> , intermitent fevers <sup>6,7,11,13,15,17,19</sup> , hepatitis <sup>6,7,8,11,12,15,17</sup> , jaundice <sup>6,7,8,11,13,15,16-19</sup> , liver disorders <sup>6,7,8,11,16-19</sup> , tonic <sup>3,8,11,13-16,19</sup>
<u>Limoeiro bravo/ leaves</u> <i>Siparuna apiosyce</i> (Mart. Ex Tul.) A. DC./ MONIMIACEAE	carminative <sup>6,7,11</sup> , excitatory <sup>6,7,17</sup>
<u>Mãe boa/ leaves</u> <i>Cissus alata</i> Jacq./ VITACEAE	beriberi <sup>6,7,13</sup> , rheumatism <sup>6,7,10,11,13,16</sup>
<u>Mamoeira/ flowers</u> <i>Carica papaya</i> L./ CARICACEAE/	bronchitis <sup>6,10,11,14</sup> , respiratory diseases <sup>6,7,10,11,14</sup>
<u>Manacá/ roots</u> <i>Brunfelsia hopeana</i> Benth.; <i>Franciscea uniflora</i> Pohl/ SOLANACEAE	Depurative <sup>5,11,12,14</sup> , diuretic <sup>7,10,11,15,16</sup> , emmenagogue <sup>7,10,14,15,16</sup> , purgative <sup>5,7,10,12,14,15,16</sup> , rheumatism <sup>7,11,12,15,16</sup> , venereal diseases <sup>2,7,8,11,12,15-17</sup>
<u>Maracujá/ leaves</u> <i>Passiflora alata</i> Curtis/ PASSIFLORACEAE	Convalescence <sup>5,10,12,17</sup> , sedative <sup>5,7,9,11,13,19</sup>

Name of Monography/ part Species/ FAMILY	Uses in books of the 19th century until the 1970s
<u>Mate/ leaves</u> <i>Ilex paraguariensis</i> A. Saint-Hil./ AQUIFOLIACEAE	convalescence <sup>7,10,15</sup> , diuretic <sup>6,9,11</sup> , digestive disorders <sup>2,5,6,9,10,11,15</sup> , sudorific <sup>2,9,17</sup> , stimulant <sup>2,6-11,15,17</sup> , tonic <sup>6,7,9,15</sup>
<u>Matico/ leaves</u> <i>Piper angustifolia</i> Ruiz e Pavon/ PIPERACEAE	antidiarrheal <sup>4,7,11,12,17</sup> , astringent <sup>4,11,14,17</sup> , balsamic <sup>4,7,11,14</sup> , diuretic <sup>3,7,11</sup> , hemostatic <sup>4,7,11,12,14,17</sup> , leucorrhea <sup>4,7,10,12,17</sup> , venereal diseases <sup>3,4,7,10,11,12,17</sup>
<u>Milho/ stigma</u> <i>Zea mays</i> L./ POACEAE	diuretic <sup>2,7,10,11,13-15,17</sup> , urinary diseases <sup>2,6,7,10,11,13,15,17</sup>
<u>Monésia/ rind</u> <i>Chrysophyllum glycyphaelum</i> Casaretto/ SAPOTACEAE	anti-diarrheal <sup>6,7,10,11,13,17</sup> , astringent <sup>2,3,6,7,10,11,17</sup> , hemostatic <sup>6,7,10,11</sup> , tonic <sup>7,11,17</sup>
<u>Muirapuma/ roots</u> <i>Ptychopetalum olacoides</i> Benth.; <i>Liriosma ovata</i> Miers/ OLACACEAE	aphrodisiac <sup>6,7,11,13,19</sup> , depression <sup>7,11,17,19</sup> , digestive disorders <sup>7,11,12,16</sup> , erectile dysfunction <sup>7,11-13,16,19</sup> , facial paralysis <sup>11,12,16</sup> , rheumatism <sup>6,7,11,19</sup> , tonic <sup>7,12,13,16</sup>
<u>Mulungu/ rind</u> <i>Erythrina mulungu</i> Mart.ex Benth.; <i>E. corallodendron</i> L./ FABACEAE	anti-tussive <sup>6,7,15</sup> , asthma <sup>7,11,15,17,19</sup> , bronchitis <sup>7,11,17</sup> , hepatitis <sup>6,10,15,16</sup> , liver disorders <sup>7,10,11,15,16,19</sup> , sedative <sup>5-7,11-15,17,19</sup>
<u>Nhandiroba/ seed</u> <i>Fevillea trilobata</i> L./ CUCURBITACEAE	liver disorders <sup>5,10,12,16</sup> , purgative <sup>5,10,12,16,17</sup>
<u>Óleo de Sapucainha/ oil</u> <i>Carpotroche brasiliensis</i> (Raddi) Endl./ FLACOURTIACEAE	morphea <sup>8,9,15</sup> , cutaneous afections <sup>5,9,13,15</sup> , vermifuge <sup>6,12,13</sup>
<u>Pacova/ seeds</u> <i>Renealmia exaltata</i> L. f.; <i>Alpinia aromatica</i> Aubl./ ZINGIBERACEAE	stomach problems <sup>6,10,11,15</sup> , vermifuge <sup>4,5,6,8,10,12,15,16</sup>
<u>Paracary/ flowers</u> <i>Peltodon radicans</i> Pohl/ LAMIACEAE	asthma <sup>6,7,10,16,17</sup> , anti-tussive <sup>5,7,10,17</sup> , balsamic <sup>2,5,10,11</sup> , carminative <sup>2,6,10,16</sup> , diuretics <sup>2,6,10,16</sup> , snake/insect bites <sup>6,10,11,16,17</sup> , cutaneous afections <sup>7,10,11,16</sup> , venereal diseases <sup>6,7,10</sup>
<u>Pariparoba/ roots</u> <i>Heckeria umbellata</i> (L.) Kunth; <i>Pothomorphe umbellatum</i> / <i>Piper umbellatum</i> H.B.K./ PIPERACEAE	diuretic <sup>2,6,7,9,10,12,14,15,16</sup> , febrifuge <sup>6,12,16</sup> , jaundice <sup>6,12,16</sup> , liver and spleen disorders <sup>3,4,6,7,9,11-16,19</sup> , sudorific <sup>6,12,16,17</sup> , stomach problems <sup>6,7,9,12,13,16,17,19</sup>
<u>Pau Pereira/ rind</u> <i>Geissospermum laeve</i> (Vell.) Miers; <i>G. vellosi</i> Allemão/ APOCYNACEAE	anorexia <sup>7,11,13,15</sup> , digestive disorders <sup>7,11,13,15</sup> , intermittent fevers <sup>2,3,5,6,7,10-12,13, 15,17</sup> , tonic <sup>3,6,7,10,11,13,15</sup>
<u>Quássia/ rind</u> <i>Quassia amara</i> L./ <i>Picrasthma excelsa</i> (Sw.) Planch./ SIMAROUBACEAE	anti-diarrheal <sup>6,10,15</sup> , carminative <sup>6,10,15,16</sup> , dyspepsias <sup>2,6,7,11,15-17</sup> , febrifuge <sup>3,7,12,17</sup> , stomach problems <sup>6,7,11,15,16</sup> , tonic <sup>2,3,7,11,12,17</sup> , venereal diseases <sup>10,15,16</sup>
<u>Quina do campo/ rind</u> <i>Strychnos pseudo-quina</i> A.Saint-Hil./ LOGANIACEAE	intermittent fevers <sup>1,2,3,6,8,10,15,17</sup> , tonic <sup>6,10,15</sup>
<u>Quina mineira/ rind</u> <i>Remijia ferruginea</i> (A. St.-Hil.) DC./ RUBIACEAE	intermittent fevers <sup>1-3,10,13,14,15,17</sup> , tonic <sup>6,8,11,10,13</sup>
<u>Ratanhia/ roots</u> <i>Krameria argentea</i> Mart. ex Spreng./ KRAMERIACEAE	anti-diarrheal <sup>6,10,11,14,15</sup> , astringent <sup>2,7,10,11,14,17</sup>
<u>Sabugueirinho do campo/ whole plant</u> <i>Borreria centranthoides</i> Cham. & Schlecht./ RUBIACEAE	liver disorders <sup>7,11,13</sup>
<u>Sabugueiro/ flowers</u> <i>Sambucus australis</i> Cham. & Schlech./ CAPRIFOLIACEAE/	diaphoretic <sup>2,6,10</sup> , excitatory <sup>6,10,15</sup> , influenza <sup>11,15,16</sup> , rheumatism <sup>6,10,15</sup> , sudorific <sup>6,11,14,15,17</sup>
<u>Salsaparrilha/ roots</u> <i>Smilax papyracea</i> Duhamel, <i>S. syphilitica</i> Griseb./ <i>S. officinalis</i> Kunth/ <i>S.medica</i> Schltld. & Cham./ SMILACACEAE	depurative <sup>11,12,15,16</sup> , diuretics <sup>2,6,10,13,16</sup> , gout <sup>6,10,11,17</sup> , rheumatism <sup>6,7,10,11,13,16,17</sup> , sudorific <sup>11,16,17</sup> , skin wounds <sup>6,7,13</sup> , cutaneous afections <sup>2,6,10-13,16,17</sup> , venereal diseases <sup>3,4,6,7,11,12,15-17</sup>
<u>Sapé/ rizome</u> <i>Imperata exaltata</i> Brong.; <i>I. brasiliensis</i> Trin/ POACEAE	diuretic <sup>6,7,11,13</sup> , urinary diseases <sup>7,11,13</sup>
<u>Simaruba/ rind</u> <i>Simaruba amara</i> Aubl.; <i>S. officinalis</i> , D. C./ SIMAROUBACEAE	anti-diarrheal <sup>2,7,10-13,15-17</sup> , intermitent fevers <sup>2,7,12,13,15,16-17</sup> , febrifuge <sup>3,7,11</sup> , hemostatic <sup>12,15,17</sup> , tonic <sup>2,3,7,11-13,15,17</sup> , vermifuge <sup>2,8,15-17</sup>
<u>Sucupira/ rind</u> <i>Bowdichia virgilioides</i> Humbolt, Bonpland, Kunth; <i>B. major</i> / FABACEAE	Depurative <sup>5,6,11,14</sup> , rheumatism <sup>2,7,11,13</sup> , cutaneous afections <sup>11,13,17</sup> , tonic <sup>7,11,15,17</sup> , venereal diseases <sup>10-13</sup>
<u>Tayuiá/ roots</u> <i>Cayaponia tayuya</i> (Mart.) Cogn.; <i>Trianospermum tayuia</i> / CUCURBITACEAE	depurative <sup>5,7,8,11,16</sup> , diuretic <sup>10,11,17,19</sup> , purgative <sup>2,5,7,17</sup> , rheumatism <sup>11,13,16-19</sup> , cutaneous afections <sup>5,10,11,15-18</sup> , venereal diseases <sup>6,7,10,11,15,16,19</sup>

Name of Monography/ part Species/ FAMILY	Uses in books of the 19th century until the 1970s
<u>Tinguaciba/ rind</u> <i>Xanthoxylum tingoassuiba</i> A. Saint-Hil/ RUTACEAE	anti-spasmodic <sup>5-7,10,11,13,15,16</sup> , carminative <sup>7,11,13,19</sup> , dyspepsia <sup>10,11,13,15,16,19</sup> , intermittent fevers <sup>2,7,16,17,19</sup> , febrifuge <sup>7,11,13,19</sup> , stomach problems <sup>6,8,11,13,15</sup>
<u>Trapoeiraba/ whole plant</u> <i>Tradescantia diuretica</i> Mart. /COMMELINACEAE	antipruritic <sup>4,7,10,11,16</sup> , angina <sup>7,12,16</sup> , diuretic <sup>2,4,7,10,11,12,16,17</sup> , emollient <sup>10,11,12,15</sup> , hydrops <sup>7,11,12,15-17</sup> , liver disorders <sup>10,15,16</sup> , rheumatism <sup>2,4,7,10,15,12,16,17</sup> , urinary diseases <sup>7,11,15,16</sup>

by the first edition of the FBRAS, in 1929 (Guimarães, 2005). Although we have used the edition published in 1920 in this study, it should be noted that it describes the same data as the previous editions, published in 19<sup>th</sup> century (Chernoviz, 1996).

### Ethnopharmacological survey on books of the 20<sup>th</sup> century

The data were extracted from fourteen books with data about plants collected before 1970 (Table 1). Five of these books were written by botanists who worked in different parts of Brazil. Included among these works was the *Dicionário das Plantas Úteis do Brasil e das Exóticas Cultivadas* (1926-1978), written by M. Pio Correia (1844-1934). Correia was a Portuguese author who had specialized in Economic Botany while working in Brazil, and who focused particularly on species with industrial potential. F.C. Hoehne (1882-1959) worked mainly in São Paulo and founded the Institute of Botany in 1942 (Franco and Drummond, 2005). His book *Plantas e Substâncias Vegetais Tóxicas e Medicinais*, first published in 1939, described the effects of several native plant species on animals. Another influential writer was J. Badini, a botany professor who worked at the Faculty of Pharmacy of Federal University of Ouro Preto for more than forty years (Badini, 1940). Also included in our study, was the French naturalist Paul Le Cointe, the first director of the Technical Chemical School of Pará. His book *A Amazônia Brasileira* was first published in French in 1922 (Le Cointe, 1947). Additionally, we utilized the writings of R. Braga, the first Director of the Agronomy School of Ceará, who wrote significant works including *Plantas do Nordeste Especialmente do Ceará* (Braga, 1960), as well as the work of Dias da Rocha published in 1997 (Matos, 1997). Four books used in this study were prepared by pharmaceutical laboratories. Among them were: Laboratório Silva Araújo (Araújo & Lucas, 1930), Laboratórios Catedral (Laboratórios Catedral, 1954) and Laboratório Rodomonte (Cruz, 1965). These books served as compilations in which they described data about the plants used in the preparations of their products. In addition, we used the work by Botsaris and Machado (1999), because it described the plants used in the preparation of the remedies from the Flora Medicinal Laboratory, which existed in Rio de Janeiro in the 1920s. The remaining books used were written

by Monteiro da Silva (1911), Meira Penna (1941), Raul Coimbra (1942) and Balbach (1967). Data about pharmacological studies performed with the plants were obtained from Pubmed.

### Obtention and organization of the data

We prioritized plants described in eighty-seven Monographs from FBRAS, native to Latin-America that are found in Brazil. Species indigenous to America, but that do not grow here, such as guáiacó (Caribbean), boldo (Chile), quillaia (Panamá), quinas (Peru) or Peruvian balsam (Peru), were not included, since that the difficulties associated with obtaining the botanical material may difficult their use in local traditional medicine. Species without references about their origin were also not included, such as the Buchu (*Manicaria saccifera*), which was described as native to Amazonia only by Peckolt & Peckolt. Data about each species were collected in the books by searching both scientific and popular names. The presence of any synonymies was checked at the site of the Missouri Botanical Garden ([www.tropicos.org](http://www.tropicos.org)). Only data about the part of the plant (vegetal drug) described in the FBRAS were recorded. For example, while the leaves of the capeba (*Pothomorphe umbellata*) and herva tostão (*Boerhavia hirsuta*) are widely described in books as being medicinal, only data about the roots was included in Table 2. Data about the preparation of the remedies and doses were also not included. In Table 2, we have inserted only those medicinal uses that appear in three or more books ( $\geq 3$  books). This was necessary given the sheer volume and variety of traditional uses described for each plant in some bibliographies. Many uses that do not have any medical significance, such as “hydrophobia”, “calmante do sangue,” “inércia dos órgãos da geração,” “resfriamento,” “esurino,” “descongestionante dos vasos genitais” or “asma úmida”, for example, were not considered. We excluded other plants with traditional uses that are not medically relevant, including the amendoim (*Arachis hypogaea*) as aphrodisiac, araruta (*Marantha arundinacea*) that protects against insect bites, and borracha (*Hevea brasiliensis*), as an anthelmintic.

### RESULTS AND DISCUSSION

Information on the use of native American



species in Brazil was obtained from old bibliographies, written before 1970 (Table 1). It was important to limit our study to this time frame because after the 1950s, Brazilian society experienced a series of intense transformations (Carvalho, 2003). These changes ranged from a reorganization of the Brazilian industrial park to a large cultural reordering that was characterized by intense repression of mysticism, including the traditional use of plants. These transformative processes were fully realized by the 1970s, and they contributed to a significant loss of interest in medicinal botany (Brandão and Montemór, 2008; Manhã et al., 2008). This decline in popularity is clearly evident in the Brazilian Official Pharmacopoeia, in which most of the Monographs about medicinal plants were excluded from the second Edition, published in 1959 (Brandão et al., 2006; 2008a). Within the twenty books encompassed in this study, about 2,500 records exist that discuss the traditional uses for these pharmacologically relevant plants. The data refer to twenty-two roots, twenty-one leaves, nineteen rinds, seven whole plants, seven flowers, three balsams, three seeds, two woods, one fruit, one oil, two rizome, one tubercule, one shoot and one stigma. Raul Coimbra is responsible for specifying the highest number of traditional uses for the plants, with 312 records. This was followed by Araujo and Lucas (295 records), M.P. Correia (245 records), Meira Penna (241 records), Cruz (232 records) and Balbachas (210 records). The other books with a high number of traditional indications for the plants were those of Chernoviz (170 records), Catedral (163 records) and Le Cointe (134 records). The numbers of uses recorded in the remaining books were 97 from Renato Braga's

work, 96 from Martius, 77 from Botsaris and Machado, 63 from Monteiro da Silva, 58 from Hoehne, 55 from Badini, 44 from Caminhoá, 38 from Peckolt, 29 from Matos and 38 from Saint-Hilaire. Eighty-six different medicinal uses have been described by the authors examined here and those cited in three or more books are shown in Table 2. The most common of these were as diuretics and tonics, which accounted for twenty-eight plant species. Anti-rheumatic and anti-diarrhetic indications were also very frequent among the useful species, corresponding to 22 and 21 plants, respectively. Nineteen plants were reported to treat venereal diseases, seventeen to heal cutaneous infections and thirteen to alleviate intermittent fevers and stomach problems. The other most frequently documented applications were treatments for bronchitis, as depurative and to treat liver disorders (12 species). Eleven species were cited as being useful as astringents, stimulants and febrifuges, or for the treatment of dyspepsia and urinary disorders. Properties involved in asthma therapy, and wound healing, as well as those that are purgative and sudorific are attributed to as many as eight species. Seven species were described as emmenagogues, vermifuges, and hemostatic agents. The other uses were indicated for one to six plant species.

The uses of some of species from Table 2 were already noted by both naturalists Saint-Hilaire and von Martius, already in the first decades of the 19<sup>th</sup> century (Brandão et al., 2008b). The uses of *Psychotria ipecacuanha* as an anti-diarrhetic, emetic and expectorant, *Strychnos pseudoquina* and *Remijia ferruginea* as treatment for intermittent fevers, *Dorstenia* sp. as a therapy for liver disorders, *Drymis winteri* as a

**Table 3.** Example of traditional uses cited in the bibliography ( $\geq$  ten books/ 50%) and evidences in recent pharmacological studies.

Uses/ total of plants	Plants (number of books)	Recent pharmacological studies
Anti-diarrheal/ 21	ipeacacuanha (12)	Several studies (WHO 2007)
Diabetes/3	cajueiro (10)	Alexander-Lindo <i>et al.</i> , 2004; Ojewole, 2003
Digestive disorders/ 6	carapiá (11)	None
Diuretic/ 28	cainca (12)	None
Emetic/ 3	ipeacacuanha (17)	Several studies (WHO 2007)
Expectorant/ 5	ipeacacuanha (13)	Several studies (WHO 2007)
Febrifuge/ 11	abútua (12)	None
	carapiá (11)	None
Intermittent fever/ 13	cassáu (14)	None
	pau pereira (11)	Bourdy <i>et al.</i> , 2004.
Leucorrhoea/ 6	barbatimão (11)	Ishida <i>et al.</i> , 2006
Liver disorders/12	herva tostão (13)	None
	jurubeba (11)	None
	pariparoba (12)	None
Cutaneous affections/17	cipo suma (12)	Di Stasi <i>et al.</i> , 1999
	caroba (12)	None
	japecanga (10)	None
Tonic/ 28	casca d'anta (11)	None
Venereal diseases/ 19	caroba (11)	None
Vermifuge/ 7	herva de santa maria (10)	Mac Donald <i>et al.</i> , 2004



tonic and *Davilla rugosa* as an astringent, for example, are detailed in their books about medicinal plants (Saint-Hilaire, 1824; von Martius, 1843). Many uses described by these naturalists were cited in the other books from 19<sup>th</sup> century (Caminhoá, 1877; Peckolt & Peckolt, 1887-1896) including: *Chiococca brachiata* and *C. anguifuga* as emetics, *Dorstenia* sp. and *Tradescantia diuretica* as diuretics, *Jacaranda caroba*, *J. brasiliensis*, *Anchietea salutaris* and *Smilax japicanga* to treat cutaneous infections, *Baccharis genistelloides* and *B. trimera* as a cure for intermittent fever, *Waltheria douradinha* as an anti-tussive, and *Boerhavia hirsuta* to treat liver disorders. These descriptions dating back to the 19<sup>th</sup> century serve as historical records to confirm that these species have a long tradition of medical applications.

The uses most frequently cited ( $\geq$  ten books) are described in Table 3, as well as data resulting from their corresponding pharmacological studies. Roots of *Psychotria ipecacuanha* (ipecacuanha) were used as emetics, antidiarrheal and expectorant while *Boerhavia hirsuta* (erva tostão) was utilized to treat liver disorders, as evidenced by the high frequency of references to these applications within 13 books. The use of *P. ipecacuanha* as an emetic, expectorant and anti-diarrhetic is well known and this species is considered an important medicine also by World Health Organization (WHO, 2007). Despite its wide use, no pharmacological studies have been performed with *B. hirsuta*, in order to verify its efficacy in treating liver disorders. Other examples of medicinal uses widely cited in the bibliography that have not been verified by pharmacological studies include the roots of *Chiococca brachiata* and *C. anguifuga* (cainca) as diuretics (12 books), *D. wintery* (casca danta) as a tonic (11 books), *Smilax japicanga* as a rheumatism treatment (10 books) and *J. caroba* (caroba) as a treatment for venereal disease (11 books). It is important to note that all studies performed with the species shown in Table 3 have confirmed their efficacy. Research has validated, for example, *A. occidentalis* (cajueiro) as a hypoglycemic (Alexander-Lindo et al., 2004; Ojewole, 2003), *G. laevae* (pau Pereira) as an anti-malarial medication (Bourdy et al., 2004), *S. adstringens* (barbatimão) as treatment for leucorrhoea (Ishida et al., 2006), *A. salutaris* (cipó) as a remedy for cutaneous infections (Di Stasi et al., 1999) and *C. ambrosioides* (Santa Maria) as a vermifugal agent (Mac Donald et al., 2004).

For decades, Brazilian pharmaceutical companies have exploited the medicinal properties of numerous native species to create commercial products on the basis of traditional formulas. Since 1995, however, Brazilian governmental agencies have required scientific studies to prove the efficacy and safety of any herbal medicine before the therapeutic claims can be accepted completely (Brasil, 1995; Brasil 2008). Thirty-seven species from Table 2 (42.5%) were already used by companies in Minas Gerais for preparing their

products, but few species still in use today due the lack of pharmacological studies with them (Brandão et al., 2009).

## CONCLUSION

The results of this study show that the American plant species described in the first edition of the FBRAS have a long tradition of use that has been confirmed by historical records. Few pharmacological studies on these widely utilized species have performed, but all of them confirmed their efficacy as medicinal agents. These encouraging results indicate that the medicinal properties of these historically used, native species warrant further attention. We suggest that a strong debate take place amongst the scientific public and policy makers in an attempt to improve and facilitate the pharmacological study of them.

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