

Ethnopharmacognostic survey on botanical compendia for potential cosmeceutic species from Atlantic Forest

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RESUMO: “Levantamento etnofarmacognóstico em compêndios botânicos de espécies da Mata Atlântica com potencial cosmecêutico”. A Mata Atlântica é um dos ecossistemas mais ameaçados do planeta, sendo reconhecida como uma área de grande biodiversidade sob alto nível de stress. A área cosmecêutica abrange medicamentos de uso tópico e cosméticos, e o uso de produtos naturais para aplicação externa sempre foi observado em diversas culturas. Este trabalho trata de uma análise etnofarmacognóstica de dois compêndios botânicos (CB): Dicionário das Plantas Úteis do Brasil - e das exóticas cultivadas, compilado por Pio Correa (PC) e Flora Ilustrada Catarinense (FIC). Destes compêndios, foram selecionadas espécies com uso cosmecêutico ou com características físico-químicas e organolépticas relacionadas. Essas espécies selecionadas foram analisadas quanto à validade da nomenclatura botânica e a ocorrência de publicação científica, e quanto ao risco de extinção. PC e FIC apontaram que 245 espécies vegetais, pertencendo a 98 famílias, possuem uso cosmecêutico no Brasil. As famílias mais citadas foram: Asteraceae, Fabaceae, Myrtaceae, Annonaceae, Clusiaceae, Anacardiaceae, Apiaceae, Bignoniaceae e Solanaceae. As partes usadas mais citadas foram cascas, folhas e partes aéreas. As propriedades mais citadas foram efeito tônico e adstringente, seguido de efeito cicatrizante, emoliente, antiinflamatório, antiúlcera, anti-séptico, parasiticida e clareador da pele. De acordo com a pesquisa bibliográfica no Pubmed, a maioria das espécies selecionadas (65%) não foi investigada farmacológica e quimicamente.

Unitermos: Mata Atlântica, cosmecêuticos, etnobotânica.

ABSTRACT: The Atlantic Forest is one of the most endangered ecosystems on earth, and is acknowledged as an area with truly exceptional levels of biodiversity under enormous levels of stress. Cosmeceutics cover a border area between pharmaceuticals for skin diseases and cosmetics. Natural products for external application, to improve the appearance of the skin or for skin treatment, have always been observed and used by native cultures. The present work deals with the ethnopharmacognostic analysis of two botanical compendia (BC), named: Dicionário das Plantas Úteis do Brasil - e das exóticas cultivadas, compiled by Pio Correa (PC) Flora Ilustrada Catarinense (FIC). From these BC, reported species with cosmeceutical uses or with related physico-chemical or organoleptic characteristics were selected, updated, searched for scientific background and highlighted if endangered. PC and FIC specified that 245 plant species, belonging to 98 plant families, are used in Brazil for cosmeceutical, cosmetic or skin remedies. The families most widely represented were Asteraceae, Fabaceae, Myrtaceae, Annonaceae, Clusiaceae, Anacardiaceae, Apiaceae, Bignoniaceae and Solanaceae. The most frequently cited plant parts were bark, followed by leaves and aerial parts. The most frequently cited properties were astringency and tonic effect followed by uses in skin disorders and wound healing, emollient characteristic, anti-inflammatory uses and healing of skin ulcers, antiseptic effects, parasiticide and skin lightening properties and aphrodisiacs. According to the Pubmed survey, most of the selected species (65%) have not been previously investigated for potential cosmeceutical applications, nor have their chemical composition been investigated.

Keywords: Atlantic forest, cosmeceutics, ethnobotany.

INTRODUCTION

Overview

Biodiversity supplies the structure of the ecosystems that support essential living resources, including wildlife, fisheries and forests, helping to provide basic human needs such as food, and medicines. It comprises the ecosystems that maintain oxygen in the air, enrich the soil, purify the water, and regulate the climate, besides its recreational, cultural, spiritual and aesthetic values. The increasing consumption of resources, and the growing populations in society have led to a rapid loss of biodiversity, eroding the capacity of the earth's natural systems to provide the essential goods and services on which human communities depend (Arcanjo, 2000).

The Atlantic Forest is one of the most endangered ecosystems on earth, and is acknowledged as an area with truly exceptional levels of biodiversity, but it is also an area which is under enormous levels of stress, containing a high level of endemism. The Atlantic Forest is home to about 70% of all Brazilians and contains some of the largest urban centres on the continent. The South Brazilian State of Santa Catarina was originally totally covered by Atlantic Forest; today less than 8% of the original forest remains, occurring mostly in isolated remnants scattered throughout a landscape dominated by agricultural and extractive practices. At a provincial level, people are slowly becoming aware of the importance of the forest and the need to conserve it, but there is still a widespread misconception that the forest is unproductive. Different States still have contradictory policies and there lacks a common strategy for forest conservation (Galindo-Leal; Camara, 2003). It is therefore advisable that conservation mechanisms such as sustainable exploitation be planned to stimulate the continuity of efforts, lessening dependence on international funding. The Convention on Biological Diversity (CBD), signed in 1992, has been ratified by 178 countries, including Brazil, and provides a legal framework for a comprehensive ecosystem-based approach to conservation. It introduced the term access and its respective legal implications in three different contexts: access to genetic resources, access to technology, and access to the benefits derived from the use of biodiversity. In accordance with this treaty, and the tasks required for its implementation, the Brazilian Congress and Government have been working since 1995 to formulate the domestic legislation required to regulate the CBD vector which deals with access to genetic resources.

The last piece of legislation already in force is Provisional Decree 2052 (published for the first time in June 2000). This is the current Brazilian regulation on access to genetic resources, which disciplines substantial parts of the Convention of Biological Diversity. It

recognizes the rights of indigenous peoples and local communities over their knowledge; defines their participation in agreements for use of the knowledge; and establishes general legalization on all uses prior to the day of the decree and the possibility of a registry to entitle the rights (Sant'Ana, 2002).

Cosmeceuticals

As in the case of *functional foods* "food that claims to have health benefits beyond basic nutrition" (Noonan; Noonan, 2004), *cosmeceuticals* cover a border area between pharmaceuticals for skin diseases and cosmetics (that have been labelled as substances for skin application without therapeutic benefits). Natural products for external application, to improve the appearance of the skin or for skin treatment, have always been observed and used by native cultures, but have been neglected in recent ethnobiological and ethnopharmaceutical studies (Pieroni et al., 2004).

There is increasing interest worldwide, in the use of natural ingredients in foods and cosmetics (Leung; Foster, 2003). As an example, the root extract of *Pothomorphe umbellata* (Pariparoba, the indigenous name for a common shrub found in the Atlantic Forest) is being patented for pharmaceutical and dermocosmetics purposes, for the prevention and treatment of cell damage caused by exposure to UV rays and ageing. It contains 4-nerolidylcatechol, an antioxidant compound which protects the cell membrane. Pariparoba is used, over the long term, for digestive problems, liver disease and burns (Moraes, 1986; Ropke et al., 2002, 2003).

Few recent ethnobotanical field studies have been carried out in the Atlantic Forest, and those that do exist have mainly investigated medicinal plants (Di Stasi et al., 2002; Mendonça-Filho; Menezes, 2003; Souza et al., 2004; Morais et al., 2005; Brandão et al., 2006; Agra et al., 2007). Although, primary contact with traditional medical practitioners is the ideal method for carrying out ethnobotanical analysis, there are cases where traditional healers are no longer available. As a surrogate, Botanical Compendia (BC) - which are based on direct work with primary information - may provide sufficient insight to identify potential new lead species. To date, however, there has been no established protocol for investigating BC. Buenz et al. (2004) have developed a technique for carrying out ethnobotanical analysis on historic texts, using *Ambonese Herbal: Volume I* as a case example (Buenz et al., 2005).

The present work deals with the ethnopharmacognostic analysis of two botanical compendia (BC), named: *Dicionário das Plantas Úteis do Brasil - e das exóticas cultivadas*, compiled by Pio Correa (PC) (1926) in which species are alphabetically classified by popular name, without description of origin, but occurring in Brazilian territory, and *Flora Ilustrada Catarinense* (FIC). It is composed of 60

fascicules of botanical families presenting genera and species collected in the State of Santa Catarina - Brazil, and does not discriminate between cultivated and natural species.

From these BC, species were selected which have reported cosmeceutical uses or physico-chemical or organoleptic characteristics which have possible cosmeceutical applications, were chosen. Some of the species may be promising sources of new natural ingredients for cosmetic purposes, and also of new pharmacologically active compounds. Expected outputs with this work are an improvement in the valorization of native resources, and the promotion of sustainable use of species in the Atlantic rainforest.

MATERIAL AND METHODS

Selection of botanical compendia

Dicionário das Plantas Úteis do Brasil - e das exóticas cultivadas: Compiled by Pio Correa (PC). Manoel Pio Corrêa (1874-1934) was a naturalist from the Botanical Garden of Rio de Janeiro, and a member of the Société Botanique de France. The first volume of his Dictionary was published on 1926, and the subsequent volumes were published in 1931, 1952, 1969, 1974 and 1975, being re-edited by the Instituto Brasileiro de Desenvolvimento Federal - IBDF in 1984, in conjunction with the Ministry of Agriculture (1984). His opera has always been a classical reference for research on Brazilian flora, as a starting point.

Corrêa MP 1984. *Dicionário de Plantas Úteis do Brasil*, Ministério da Agricultura, Instituto Brasileiro de Desenvolvimento Florestal, Brasília, DF, vol. I 747 pp.; vol. II 777 pp.; vol. IV 765 pp.; vol. V 687 pp.

Flora Ilustrada Catarinense (FIC): Raulino Reitz (1919-1990) dedicated his life to surveying the flora of Santa Catarina. He discovered five genera and 327 new species of plants, and founded the Herbarium Barbosa Rodrigues which today has around 70,000 exsiccates. He conceived and edited the *Flora Ilustrada Catarinense* with 150 families in 172 fascicules. Sixty botanical specialists have collaborated in the elaboration of monographs, each in his or her own area of specialty. Each plant family is compiled in one fascicule, in the form of an encyclopaedia. To access the complete list of publications see: <http://www.cttmar.univali.br/~hbr/fic.htm>

Experimental design

After the selection of PC and FIC, all citations referring to external applications (topical treatments) of native species of Atlantic forest were extracted and tabled (Table 1). Potential pharmacological functions of plants for the skin, extrapolated from their uses in the treatment of certain disorders, were considered.

Initially, the selected species with cited applications in a) skin and annexes pathologies (such as dermatitis, dermatosis, photo protection, microbial and viral infections, among others), b) prevention of ageing and skin maintenance (with antioxidant, astringent, tonic, hydrating and emollient activities, among others) and c) with physico-chemical or organoleptic characteristics (aromatic, foaming properties, colorant, etc) with possible cosmeceutical applications, were referenced through the International Plant Names Index (The Plant Names Project, 1999) and W³TROPICOS (Missouri Botanical Garden, 2003), to identify binomial names and rule out synonymy or misspelling. The botanical names and author citations were also verified through these two databases. All plant species described as useful were investigated in the PUBMED database, seeking scientific information related to the profile of a cosmeceutical application (biological assays and isolated compounds). All the data collected were consolidated into a table; plants that were recognized for specific uses in PC and FIC but which did not have entries in PUBMED were cited as plants that might warrant further investigation.

RESULTS AND DISCUSSION

PC and FIC specified that 245 plant species, belonging to 98 plant families, are used in Brazil for cosmeceutical, cosmetic or skin remedies. Table 1 outlines all the plants detailed by the two compendia and the results of the scientific name search in the Pubmed database. The expanded data summarized in the Table 1 can be accessed in Marensi (2004). The families most widely represented were Asteraceae (13 species from *Baccharis*, *Blanchetia*, *Calea*, *Elephantopus*, *Helenium*, *Heterothalamus*, *Leucopsis*, *Melampodium*, *Vernonia*), Fabaceae (11 species from *Acacia*, *Bauhinia*, *Cassia*, *Enterolobium*, *Erythrina*, *Myrocarpus*, *Parapiptadenia*, *Pithecolobium*, *Pterodon*), Myrtaceae (11 species from *Calyptanthus*, *Eugenia*, *Myrcia*, *Psidium*, *Stenocalyx*, *Pseudocaryophyllus*), Annonaceae (8 species from *Annona*, *Guatteria*, *Rollinia*, *Xylopia*), Clusiaceae (7 species from *Hypericum* and *Kielmeyera*), Meliaceae and Anacardiaceae also with 7 species; Apiaceae, Bignoniaceae and Solanaceae (6 species each). The most frequently cited plant parts were bark (n = 52) or bark and other parts of the plant (n = 17), followed by leaves (n = 56) and aerial parts (n = 33). Roots, flowers, seeds, stems, fruits, rhizomes, resins, pulp and ashes were also reported.

The most frequently cited properties were astringency (n = 68) and tonic effect (n = 33), followed by uses in skin disorders (n = 25) and wound healing (n = 22), emollient characteristic (n = 22), anti-inflammatory uses (n = 14) and healing of skin ulcers (n = 12), antiseptic effects (n = 05), parasiticide and skin lightening properties (2 each) and aphrodisiacs (n = 8). The sum of listed references to physico-chemical and organoleptic

Table 1. Species indicated as cosmeceutical and to skin disorders from the botanical compendia (BC). Dicionário das Plantas Úteis do Brasil - e das exóticas cultivadas compiled by Pio Correa (PC) and Flora Ilustrada Catarinense (FIC). The species shown in (*) are endangered.

Botanical family Scientific name	Part used	Uses/observations from authors and BC	Occurrence	Pubmed
AIZOACEAE				
<i>Sesuvium portulacastrum</i> (L.) L.	Leaves	Emollient and anti-scorbutic (FIC)	All tropical coast	2
<i>Mollugo verticillata</i> L.	Aerial parts	Saponins and aromatic principle (PC)	MA to RJ	1
ALISMATACEAE				
<i>Echinodorus grandiflorus</i> (Cham.&Schltdl.) Micheli	Leaves	Skin disorders as cataplasm (PC)	CE to RS, MT	0
ANACARDIACEAE				
<i>Anacardium occidentale</i> L.	Bark, Leaves	Astringent, against aphthas (PC)	Abundant on BR	34
<i>Astronium urundeuva</i> (Allemão) Engl. (*)	Bark	Tannin rich, used to tan (PC)	ES to SC, MT, MG, CE	4
<i>Lithraea molleoides</i> (Vell.) Engl.	Bark, Leaves	Tannin rich and colorant (PC)	MG, SP, RJ to RS	7
<i>Schinus molle</i> (Cav.) Cabrera.	Not cited	Myiasis (FIC)	RJ to SC	0
<i>Schinus terebinthifolius</i> Raddi	Bark, Leaves	Astringent, wound healing (FIC)	PE to RS	5
<i>Spondias lutea</i> L.	Bark, Leaves	Aromatic and astringent (PC)	AM to MG, SP and BA	2
<i>Tapirira guianensis</i> Aubl.	Leaves	Contains aromatic oil (PC)	Atlantic forest, cerrado	1
ANNONACEAE				
<i>Annona cherimolioides</i> var. <i>amplifolia</i> Triana & Planch.	Not cited	Ananas flavor. Cataplasm to inflammations.	BA to RS	0
<i>Annona furfuracea</i> A. St.-Hil.	Seeds	Fish poisoning (PC)	MG, SP, GO	0
<i>Annona glabra</i> L.; <i>A. australis</i> A. St.-Hil.	Not cited	Parasitoides against head lice (PC)	From BA to SC	12
<i>Annona spinescens</i> Mart.	Powdered seeds	Very aromatic, to perfumery (PC)	From BA to south BR	2
<i>Guatteria nigrescens</i> Mart	Whole plant	Aromatic, against psoriasis (PC)	BR	0
<i>Rollinia exaltida</i> (Vell.) Mart.	Bark	Aromatic (PC)	RJ to RS	0
<i>Rollinia salicifolia</i> Schltdl.	Bark	Tonic and astringent (PC)	RJ to RS	0
<i>Xylopia sericea</i> A. St.-Hil	Seeds	Tonic and astringent (PC)	RJ to RS	0
APIACEAE				
<i>Apium australe</i> Thouars	Whole plant	Wound healing (PC)	RJ to RS	0
<i>Apium sellowianum</i> H. Wolff	Whole plant	Wound healing, skin disorders (FIC)	RJ to RS	0
<i>Hydrocotyle asiatica</i> L.	Roots	Skin ulcers, skin disorders (PC)	BR, in the coast side	3
<i>Hydrocotyle callicephalata</i> (Chamisso) Urb.	Whole plant	Against freckles, skin spots (FIC)	RJ to RS	0
<i>Hydrocotyle leucocephala</i> (Cham. & Schltdl.	Whole plant	Contains essential oil, toxic (FIC)	RJ to RS	0
<i>Hydrocotyle umbellata</i> L.	Whole plant	Against freckle, spots, erysipela (FIC)	RJ to RS	0
APOCYNACEAE				
<i>Aspidosperma gomezianum</i> A. DC. <i>Aspidosperma pyricollum</i> Müll. Arg.	Bark	Tonic and tannin rich (PC)	All Brazilian coast	0
<i>Geissospermum vellosii</i> Allemão	Bark	Tonic (PC)	ES, RJ, MG and BA	1
AQUIFOLIACEAE				
<i>Ilex acrodonia</i> Reiss.	Bark	Astringent and tonic (PC)	RJ and MG	0
ARACEAE				
<i>Philodendron cordatum</i> Kunth; <i>Philodendron corcovadense</i> Kunth	Flowers	Carnation perfume (PC)	PA, RJ and PE	0
<i>Xanthosoma pentaphyllum</i> (Vell.) Schott	Resin	Aromatic(PC/FIC)	South BR and MG	4

BROMELIACEAE									
<i>Bromelia antiacantha</i> Bertol.	Juice of fresh fruits	Vulnerary, aphthas, mucosa infection (FIC)	South BR	0					
<i>Ananas bracteatus</i> (Lindl.) Schult. & Schult. f.	Fresh fruit	Vulnerary, aphthas (FIC)	BR	0					
<i>Tillandsia usneoides</i> (L.) L.	Whole plant juice	With fat unguent for hemorrhoids (FIC)	South BR	8					
BURSERACEAE									
<i>Bursera leptophloeos</i> Mart.	seeds	Contains medicinal oil (PC)	BR	0					
<i>Protium kleinii</i> Cuatrec	Resin	Antifungal (FIC)	South BR	3					
CACTACEAE									
<i>Cereus macrogonus</i> Salm-Dyck	Flowers	Aromatic (PC)	RJ to RS	0					
<i>Pereskia aculeata</i> Mill.	Leaves	Emollient (PC)	BA to RS and MG.	0					
CANNACEAE									
<i>Canna warszewiczii</i> A. Diert	Leaves	Emollient (PC)	MG, SC and RS	0					
CANELLACEAE									
<i>Cinnamodendron axillare</i> Endl. Ex Walp.	Bark	Aromatic, pungent, wound healing (FIC)	South BR.	0					
<i>Cinnamodendron dinisii</i> Schwacke	Bark	Remedy for all affections (FIC)	MG, SP, PR, RS	0					
CAPPARACEAE									
<i>Crataeva benthamii</i> Eichler	Roots leaves	Tonic (PC)	AM	0					
CAPRIFOLIACEAE									
<i>Sambucus australis</i> Cham. & Schltdl.	Leaves flowers	To skin inflammation, boil (FIC)	South BR	0					
CARYOPHYLLACEAE									
<i>Alsine vulgaris</i> Moench.	Planta	Astringent, used in perfumery (PC)	South BR	0					
CECROPIACEAE									
<i>Cecropia peltata</i> L.	Leaves	Astringent (PC)	RJ to RS	2					
CELASTRACEAE									
<i>Maytenus gonoclada</i> Mart.	Leaves and bark	Tonic and stimulant (PC)	SP to RS	0					
<i>Maytenus obtusifolia</i> Mart.	Leaves	Ulcers healing (PC)	PI to RJ, MG and GO	1					
CHLORANTHACEAE									
<i>Hechyosnum brasiliense</i> Miq.	Leaves	To heal athletes foot (PC/FIC)	RJ, MG, SP, south BR	1					
CHRYSOBALANACEAE									
<i>Licania dealbata</i> Hook. F.	Bark	Astringent (PC)	PE to BA	0					
<i>Licania incana</i> Aubl.	Bark	Astringent (PC)	AM, RJ e MG	0					
CLUSIACEAE									
<i>Hypericum brasiliense</i> Choisy	Aerial parts	Astringent and aromatic (FIC)	South BR	6					
<i>Hypericum connatum</i> Lam.	Aerial parts	Tonic and astringent (FIC)	South BR	5					
<i>Hypericum laxusculum</i> A. St.-Hil	Leaves	Astringent, aromatic, excitant (PC)	SP to RS and MG	0					
<i>Hypericum teretiusculum</i> A. St.-Hil	Leaves	Excitant and aromatic (FIC)	Meridional plateaus	0					
<i>Kielmeyera petiolaris</i> var. <i>cipoensis</i> N.Saaddi	Not cited	Emollient properties (PC)	GO, RJ and MG	0					
<i>Kielmeyera rosea</i> (Spreng.) Mart.	Not cited	Emollient (PC)	MG and SP	0					
<i>Kielmeyera speciosa</i> A. St.-Hil.	Rhizome	Emollient (PC)	BA to SP, MG and GO	0					

FLACOURTIACEAE									
<i>Casearia cambessedesii</i> Eichler	Not cited	Improves cicatrisation (PC)	MG and RJ.	0					
<i>Casearia obliqua</i> Spreng.	Not cited	Skin disorders (FIC)	BA to RS	0					
<i>Casearia sylvestris</i>	Leaves	Anti-herpetic (FIC)	BA to RS	1.5					
<i>Carpotroche brasiliensis</i> (Raddi.) Endl.	Not cited	Against dandruff, anti-herpetic (PC)	BA to SP and MG	0					
<i>Xylosma salzmannii</i> (Clos) Eichler	Bark	Astringent and colorant (PC)	RJ to RS and MG	0					
GESNERIACEAE									
<i>Gesneria allagophylla</i> Mart.	Root	Tonic and emollient (PC)	RJ to RS and MG	0					
HIPPOCRATEACEAE									
<i>Salacia sylvestris</i> (Mart.) Steud.	Pulp and leaves	Mucilaginous, anti-inflammatory (PC)	RJ, MG, SP	0					
ICACINACEAE									
<i>Villaresia congonha</i> Miers				0					
IRIDACEAE									
<i>Tigridia lutea</i> Link, Klotzsch & Otto	Not cited	Aromatic and stimulant (PC)	SP to RS, MG, GO	0					
LAMIACEAE									
<i>Glechom ciliata</i> Benth.	Flowers	Aromatic (PC)	MG, SC	0					
<i>Mentha rotundifolia</i> (L.) Huds.	Whole plant	Aromatic (PC)	SC, RS and SP	0					
<i>Ocimum micranthum</i> Wild.	Whole plant	Aromatic (PC)	South BR	3					
<i>Peltodon longipes</i> Kunth ex Benth.	Leaves	Aromatic oil (PC)	South BR	3					
LAURACEAE									
<i>Aiovea saligna</i> Meisn.	Leaves	Aromatic oil (PC)	South BR and SP	0					
<i>Aniba gardneri</i> (Meisn.) Mez.	Bark	Astringent (FIC)	South BR and MG	0					
<i>Cryptocarya moschata</i> Nees & C. Mart	Roots, Bark	aromatic oil to perfumery (PC)	RJ, SP (littoral) MG PR	0					
<i>Nectandra leucantha</i> Ness & Mart.	Bark	Bitter and aromatic(PC/FIC)	BA to RS and MG	2					
<i>Nectandra leucothyrsus</i> Meisn.; <i>N. rigida</i> Ness	Wood	Aromatic bitter and tonic (PC)	AL to SC	0					
LECYTHIDACEAE									
<i>Carintana legalis</i> (Mart.) Kuntze (*)	Bark	Seed to heal wounds (PC)	RJ to SC and MG	0					
LILIACEAE									
<i>Herreria salsaparilha</i> Mart.	Bark	Mouth and vagina affections (PC/FIC)	ES to SP, MG and TO	0					
LYTHRACEAE									
<i>Cuphea aperta</i> Koehne	Roots	Skin disorders (PC)	BA, SP, MG, MT	0					
MAGNOLIACEAE									
<i>Talauma ovata</i> A. St-Hill	Whole plant	Depurative; skin affections (FIC)	Endemic in BR	0					
MALPIGIACEAE									
<i>Galphimia brasiliensis</i> (L.) A. Juss.	Flowers	Aromatic oil (PC)	RJ and MG	3					
<i>Byrsonima verbascifolia</i> (L.) DC.	Whole plant	Tonic and astringent (PC)	PA to RS and MG	0					
MALVACEAE									
<i>Abutilon purpurascens</i> (Link) K. Schum.	Bark	Astringent and febrifuge (PC)	BR	1					
<i>Hibiscus bifurcatus</i> Cav	Aerial parts	Emollient (PC)	South BR	0					
<i>Malva leitocarpa</i> Iljin	Leaves	Emollient, eliminate acne (PC)	Wetlands of BR	0					
	Leaves	Emollient (PC)	MT and RS	0					

<i>Sida macrodon</i> DC	Leaves	To wash wounds (PC)	MG and SP	0
<i>Sphaeralcea miniata</i> var. <i>cisplatina</i> (St.Hil.) K. Schum.	Leaves	Emollients (PC)	South BR	0
MELASTOMATACEAE				
<i>Tibouchina mutabilis</i> (Vell.) Cogn.	Bark	Very astringent. To wash ulcers (PC)	RJ to SC	0
MELIACEAE				
<i>Cabralea canjerana</i> (Vell.) Mart.	Folia	Febrifuge, against arthritis (FIC)	RJ to RS	0
<i>Cedreia fissilis</i> Vell. (*)	Bark	Astringent, against leucorrhea (FIC)	South BR	0
<i>Cedreia lilloi</i> C.DC. (*)	bark	Idem <i>Cedreia fissilis</i> Vell. (FIC)	South BR	1
<i>Cedreia odorata</i> L. (*)	Bark	Aromatic (FIC)	BR	2
<i>Guarea macrophylla</i> Vahl	Roots	Astringent, to treat skin affections (FIC)	RJ, MG, MS to PR	2
<i>Guarea spicaeflora</i> A. Juss.	Roots	Astringent, tonic, to treat skin (PC)	SP and RJ	0
<i>Trichilia catigua</i> A. Juss.	Bark	To heal rheumatism, astringent (PC/FIC)	SP to RS and MG	6
MENISPERMACEAE				
<i>Cissampelos ovalifolia</i> DC.	Roots	Tonic (PC)	BR	2
MONIMIACEAE				
<i>Siparuna camporum</i> (Tul.) A. DC	Leaves	Aromatic (PC)	Brazilian coast	0
MORACEAE				
<i>Dorstenia brasiliensis</i> Lam.	Whole plant	Against skin disorders, tonic (PC)	PE to RS and MG	3
<i>Trophis racemosa</i> (L.) Urb.	Bark	Tannin rich (PC)	RJ, cultivated	1
MUSACEAE				
<i>Musa paradisiaca</i> L.	Stem and flowers	To manufacture of soap (PC)	BR	55
MYRISTICACEAE				
<i>Virola biculhyba</i> (Schott) A.C.Sm.	Bark	Astringent (FIC)	RJ to RS	0
MYRSINACEAE				
<i>Myrsine coriacea</i> (Sw.) R. Br. ex Roem. & Schult.	Bark	Tannin rich (PC)	BR	0
<i>Rapanea guyanensis</i> Small	Bark	Tannin rich (PC)	BR	0
MYRTACEAE				
<i>Calyptanthes tuberculata</i> O. Berg	Bark	Astringent (PC)	RJ, SP and MG	0
<i>Calyptanthes variabilis</i> O. Berg	Not cited	Aromatic and excitant (PC)	SP to RS and MG	0
<i>Eugenia astringens</i> Cambess.	Fruit	Astringent (PC)	RJ to RS	0
<i>Eugenia cauliflora</i> O. Berg.	Bark	Astringent, erysipelas (PC)	South BR	0
<i>Eugenia crenata</i> Vell. (*)	Bark and leaves	Astringent and aromatic (PC)	RJ and SP	0
<i>Eugenia ovalifolia</i> Camb.	Whole plant	Astringent (PC)	RJ and SP	0
<i>Eugenia tomentosa</i> Aubl.	Leaves, seeds, fruit	Astringent, refrigerant (PC)	RJ to RS	0
<i>Myrcia tingens</i> O. Berg	Bark	Astringent, to wash ulcers (PC)	RJ and SP	0
<i>Psidium guajava</i> L.	Bark	Astringent, aromatic oil (PC)	Abundant BR	89
<i>Stenocalyx sulcatus</i> (Spring ex Martius) O. Berg	Fruit	Aromatic (PC)	RJ to RS	0
<i>Pseudocaryophyllus sericeus</i> O. Berg	Bark	To perfumery (PC)	RJ, SP, MG	0
NYCTAGINACEAE				
<i>Mirabilis jalapa</i> L.	Flowers	Very aromatic (FIC)	Abundant BR	9

<i>Tariri ciliata</i> Baill.	Bark	Aromatic (PC)	RJ and SP	0
SOLANACEAE				
<i>Cestrum nocturnum</i> L.	Not cited	Emollient and calming (PC)	SP, MG	8
<i>Cestrum parqui</i> L'Her.	Not cited	Against skin affections (PC)	SP e RS	6
<i>Solanum aculeatissimum</i> Jacq	Root	Against skin affections (PC)	BA to SP	0
<i>Solanum americanum</i> Mill.	Leaves	Fresh over wounds and ulcers, (FIC)	Abundant BR	7
<i>Solanum cernuum</i> Vell.	Leaves	Against ulcers (PC)	ES to SP	0
STERCULIACEAE				
<i>Basilloxylon brasiliensis</i> (Allemão) K. Schum.	Bark	Astringent (PC)	ES, RJ	0
<i>Waltheria douradinha</i> St. Hilaire	Whole plant	Emollient, to wash wounds (FIC)	South BR	1
STYRACACEAE				
<i>Syrax glabratus</i> Schott	Resin	Balsamic (FIC)	South BR	0
SYMPLOCACEAE				
<i>Symplocos platyphylla</i> (Pohl) Benth.	Bark and roots	Astringent, tonic, mucilaginous (PC)	MG and RS	0
TILIACEAE				
<i>Triumfetta rhomboidea</i> Jacq.	Leaves and roots	Mucilaginous and astringent (PC)	BR	1
URTICACEAE				
<i>Boehmeria caudata</i> Sw	Leaves	Against hemorrhoid, eye infection (PC)	PE to PR, MG	0
VERBENACEAE				
<i>Avicennia officinalis</i> L.	Not cited	Aphrodisiac (PC)	All Brazilian coast	0
<i>Citharexylum barbinerve</i> Cham.	Flowers	Perfumery (PC)	RS	0
<i>Stachytarpheta dichotoma</i> (Ruiz & Pav.) J.Vahl	Leaves	Aromatic (PC)	PA, BA to SP and MG	0
VIOLACEAE				
<i>Anchithea salutaris</i> A. St-Hil	Whole plant	Useful to the skin (PC)	ES to SP, MG and GO	0
WINTERACEAE				
<i>Drimys angustifolia</i> Miers.	Bark	Aromatic, sudorific and tonic (FIC)	South BR	0
XYRIDACEAE				
<i>Xyris laxifolia</i> Mart.	Whole plant	Against eczemas (PC)	AM to RS and MG	0

AL = Alagoas; AM = Amazonas; BA = Bahia; BR = Brazil; ES = Espírito Santo; GO = Goiás; MA = Maranhão; MG = Minas Gerais; MT = Mato Grosso; PA = Pará; PE = Pernambuco; PI = Piauí; PR = Paraná; RJ = Rio de Janeiro; RS = Rio Grande do Sul; SC = Santa Catarina; SP = São Paulo; TO = Tocantins.

characteristics of interest for cosmeceutical purposes are: aromatic or essential oil (n = 66), mucilages (n = 12), tannins (n = 10), foaming properties (n = 11) and resins (n = 02). In the forest, the most popular method of classifying plants is based on the bark color and shape, and this empirical classificatory system may be reflected in the number of citations of bark as the part of the plant used.

Proanthocyanidins or condensed tannins are a group of antioxidant active polyphenolic bioflavonoids that are synthesized by many plants. Proanthocyanidins and other tannins are known to facilitate wound healing (Khanna et al., 2001). The mode of action, however, remains unclear. Some authors speculate that antioxidant activity contributes favorably to the healing of wounds, because reactive oxygen species produced during the inflammatory process aggravate the disorders in the tissues (Lopes et al., 2005; Souza et al., 2007).

According to the Pubmed survey, most of the selected species (65%) have not been previously investigated for potential cosmeceutical applications, neither has their chemical composition been investigated. This fact suggests that the data compiled in this work constitutes a valuable source of primary information for scientific investigation in cosmeceutical and related areas.

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