

The Ethnopharmacological Literature: An Analysis of the Scientific Landscape in the Cerrado in Central-Western Brazil

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Received: July 21, 2020 Accepted: August 31, 2020 Online Published: October 15, 2020

doi:10.5539/jas.v12n11p307

URL: <https://doi.org/10.5539/jas.v12n11p307>

Abstract

Research on pharmacology and phytochemistry originating from medicinal plants has resulted in various publications highlighting the Cerrado in central-western Brazil, which has a remarkable diversity of plant species. The reserve area selected was the Cerrado *stricto sensu* settlement “17 April”, Mato Grosso do Sul (MS), Brazil. However, no ethnopharmacological review focusing on the plants present in the reserve area exists, even though the consumption of medicinal plants is a widespread practice. The aims of this study were to 1) survey and document the medicinal plants present in the reserve area; 2) provide an overview of recent ethnopharmacological, phytochemical and pharmacological studies of these species; and 3) provide insight for future studies. A literature search was conducted, and relevant information was collected from authentic resources using databases such as Science Direct, PubMed, Google Scholar, Web of Science and Scopus, as well as peer reviewed articles, books and theses. Eighty-nine species belonging to 39 different families were found; the most abundant were Fabaceae (n = 13), Myrtaceae (n = 7), Rubiaceae (n = 7) and Bignoniaceae (n = 5). In terms of its empirical use, the most utilized parts were leaves (41%), bark (22%) and roots (15%). The most widespread traditional use, according to the literature review of the following plants involves the treatment of gastro-intestinal system diseases (41 spp). Chemical studies reported a high presence of terpene, phenol, and alkaloid classes. Only three are listed in the RENISUS: *Casearia sylvestris*, *Copaifera langsdorffii* and *Stryphnodendron adstringens*. This study demonstrated a large number of medicinal plants in an area of the Cerrado in the state of Mato Grosso do Sul, Brazil. Noting the importance of biodiversity for the development of new pharmacological approaches, many studies prove the empirical use of medicinal plants.

Keywords: Cerrado, Mato Grosso do Sul, medicinal plants, review

1. Introduction

Brazil is characterized by some of the greatest biodiversity on the planet due to the presence of different biomes, such as the Amazon (tropical forest), Caatinga (thorn forest), Pantanal (flooded pasture), Pampas (subtropical pastures or pastures), Atlantic Forest (deciduous forest) and Cerrado (savanna) (Guerra et al., 2020). The Cerrado is the second largest biome in South America, occupying an area of approximately 22% of the Brazilian territory, and had the second greatest biodiversity richness (Sano et al., 2019). The state of Mato Grosso do Sul is located in midwestern Brazil, and most of its territory is occupied by the Cerrado (Amaral et al., 2017). Nevertheless, 46% of the original Cerrado area has been converted to pasture and cropland and is continually threatened by the indiscriminate use of fire (Durigan & Ratter, 2015; Strassburg et al., 2014).

The study of ethnopharmacology is closely related to sustainable development, as it is an effective way to develop medicines from the perspective of traditional plant use. In this sense, the importance of studies in this area is clear, as they contribute to the improvement of the traditional application of natural products, and they emphasize the importance of biodiversity for the sustainability of local populations (Di Stasi et al., 2002). In this context, the Brazilian government encourages the use of herbal remedies and medicinal plants as a strategy to improve the use of Brazil's biodiversity and public access to herbal medicines.

In this study, we conducted a 1) literature survey and documented the medicinal species present in the reserve area of the settlement “April 17”, MS, Brazil, in the Cerrado biome; 2) Exhaustive research has evaluated the

current status of scientific knowledge related to the popular use and phytochemical and pharmacological properties of these species; 3) We also discuss the species found in the study area that are noted in research on herbal medicines. The population residing in this area is characterized by agriculture and their means of subsistence, with different natural resources used for different purposes. Considering the abundant vegetation and the scarcity of financial resources, the local population often uses natural resources to treat diseases without any knowledge of scientific evidence. After the identification of all the species found in this area, a survey of scientific studies involving these species is absolutely relevant and necessary, aiming to contribute to the safety and well-being of those who commonly use these plants, both in the target region of this study and in others.

2. Material and Methods

2.1 Study Sites

In the framework of this study, the selected area, Cerrado *stricto sensu* (21°46'54.6"S and 53°13'23.6"W), comprised the reserve area of the settlement "17 April", located in Casa Verde district, Nova Andradina city, MS (Figure 1).

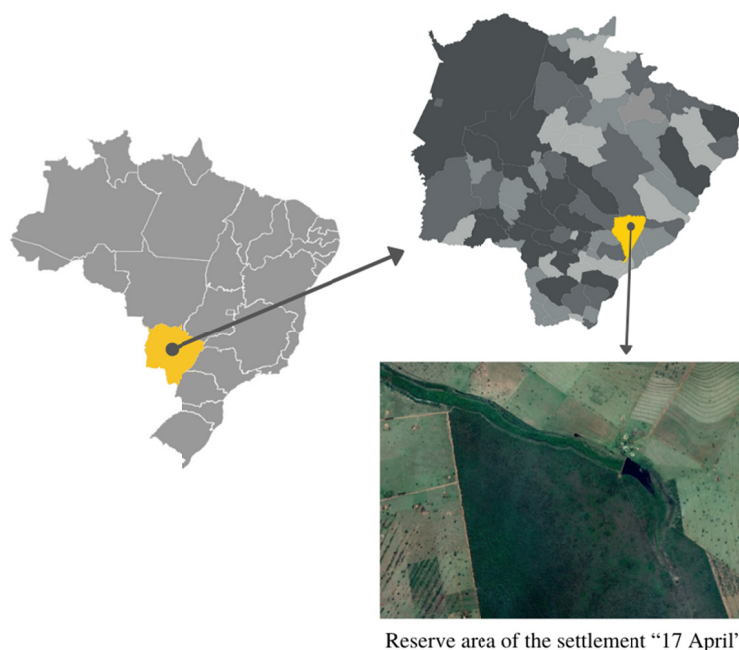


Figure 1. Geographical location of the study area (reserve area of the settlement "17 April")

2.2 Collection and Identification of Species

The collections of the species present in this area were carried out between 09/2017 and 01/2018. Botanical material was identified by Dr. Zefa Valdevina Pereira (Faculty of Biological and Environmental Sciences) and deposited in the herbarium of the Federal University of Grande Dourados-UFGD. Each specimen generated an identification protocol number (DDMS) (Table 1).

2.3 Bibliographic Survey

A review of the popular use and phytochemical and pharmacological data of species found in the reserve region of the settlement "April 17" was performed using online journals and books that were published in English, Portuguese and Spanish. The information related to this article was collected from scientific literature databases including Science Direct, PubMed, Scopus and Google Scholar. Articles were selected according to the family, gender, and species (including synonymous species). Due to the widespread use of terms transcribed (traditional use of diseases, symptoms and effects) in review the species were grouped under 12 categories.

3. Results and Discussion

For the first time, 89 medicinal plants belonging to 39 families were documented in the study area; the documented plants included trees ($n = 60$), bushes ($n = 19$), and shrubs ($n = 1$) (Table 1). Fabaceae ($n = 13$),

Myrtaceae ($n = 7$), Rubiaceae ($n = 7$) and Bignoniaceae ($n = 5$) were the most species-rich families (Table 1). The leaves (41%), bark (22%) and roots (15%) were the most commonly reported plant parts for popular use (Table 1). Table 1 presents information on previous scientific research, describing the forms of use of the plants, as well as the useful part of the plant and its use.

These plant species are used for the treatment and prevention of many ailments and due to the widespread use of terms transcribed in review the species were grouped under 10 specific and 2 general categories diseases. The most widespread traditional use, according to the literature review of 10 specific categories diseases of the following plants involves the treatment of gastro-intestinal system diseases (DSD, 44 spp), followed by the endocrine system diseases (ENM, 24 spp), infectious diseases (IPD, 20 spp), musculoskeletal and joint diseases (MCT, 20 spp), respiratory system diseases (RSD, 19 spp), skin, eye, ear, nose and oropharynx diseases (SST, 18 spp), obstetrics, gynecology and urinary-tract diseases (GUS, 18 spp), malignant diseases (NEP, 9 spp), cardiovascular system diseases (CSD, 8 spp) and central nervous system diseases (NSD, 6 spp) (Figure 2). Many species have been reported grouped into 2 general categories, as for the treatment inflammatory diseases (ID, 16 spp) and other diseases (OD, 41 spp) (Figure 2).

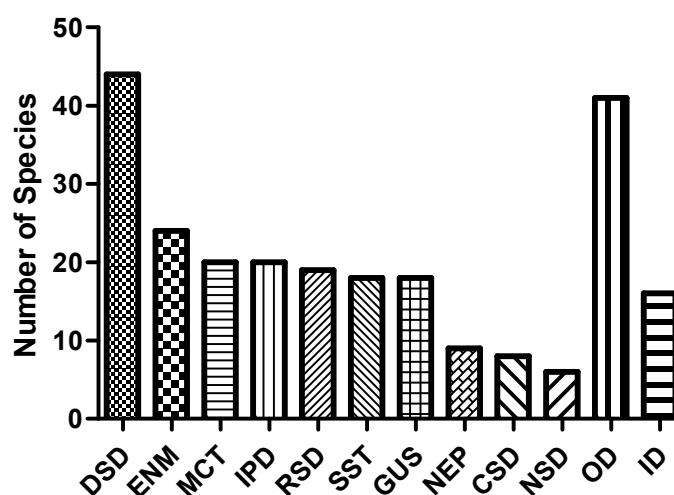


Figure 2. Diseases categories grouped according to a review of species found in the study area. (DSD) Gastro-intestinal System Diseases; (ENM) Endocrine System Diseases; (MCT) Musculoskeletal and Joint Diseases; (IPD) Infectious Diseases; (RSD) Respiratory System Diseases; (SST) Skin, Eye, Ear, Nose and Oropharynx Diseases; (GUS) Obstetrics, Gynecology and Urinary-tract Diseases; (NEP) Malignant Diseases; (CSD) Cardiovascular System Diseases; (NSD) Central Nervous System Diseases; (OD) Others Diseases and (ID) Inflammatory Diseases others

The symptoms and effects mentioned for DSD includes antidiarrheal, carminative, abdominal disorders, dysentery, purgative, laxative, hemorrhoids, hernia, gastritis, ulcer, liver and spleen diseases, flatulent dyspepsia liver abnormalities, gallstones, heartburn, kidney pain and intestinal colic. According to the World Health Organization, gastro-intestinal system diseases (diarrhoeal) are the main cause of death in children under five years old, and there are almost 1.7 billion cases of childhood diarrhoea every year, with approximately 525,000 deaths (Kirk et al., 2017). The OD category include as an example snake bites, aphrodisiac, tonic, emetic, astringent, scurvy, anthelmintic, swelling, malaise and stings insects.

Table 1. Identification of the species found and recorded in the literature (name, popular use and utilized part) in the reserve area of the settlement “April 17”, located in Casa Verde district, Nova Andradina city, MS, Brazil

Family	Botanical taxon (DDMS)/Habit	Popular name	Popular uses (Used parts and application)
Amaranthaceae	<i>Gomphrena officinalis</i> Mart. (4629)/Bush	“Para-tudinho”, “para-tudo”	Roots: Tonic, counteracts weakness, general debility & panacea for all ills (Almeida et al., 1998; Alzugaray & Alzugaray, 1983; Balbach, 1979; Lorenzi & Matos, 2002)
Anacardiaceae	<i>Anacardium humile</i> A. St. Hil (5418)/Bush	“Cajuzinho-do-cerrado”, “caju do campo”	Purgative, diarrhoea, anti-inflammatory, astringent & external ulcers (Pott & Pott, 1994; Thomas & Filho, 1985; Vila Verde et al., 2003; Agra et al., 2007a)
	<i>Astronium fraxinifolium</i> Schott (5107)/Tree	“Gonçalo-alves”	Leaves: Allergies, anti-inflammatory, anti-diarrhoeal & ulcers (Viana et al., 1997; Silva et al., 2011b; Resende et al., 2015)
	<i>Tapirira guianensis</i> Aubl. (6035)/Tree	“Tapirira”, “pau-pombo”, “cupiúva”, “tatapiririca”, jobo, “cedroi”, “fresmo”	Leaves: Antibacterial; treatment of malaria, leishmaniasis & syphilis (David et al., 1998; Roumy et al., 2009) Barks: Anti-leishmanial, anti-plasmodial, antibacterial & anti-fungal, snake bites, oral thrush & sore throat (Deharo et al., 2001; Roumy et al., 2009; Zoghbi et al., 2014; Vásquez et al., 2015)
Annonaceae	<i>Annona coriacea</i> (5818)/Tree	“Araticum”, “marolo”, “araticum-liso”	Leaves: Stomach diseases, stomatitis, neuralgia, headache, anti-rheumatic & anthelmintic (Morais Cardoso et al., 2013); treatment of chronic diarrhoea (Rodrigues & Carvalho, 2001)
	<i>Annona crassiflora</i> Mart. (61640)/Tree	“Araticum-do-cerrado”, “araticum-do-campo”, “pinha-do-cerrado”, “marolo”	Leaves: Tumours & analgesic (Roesler et al., 2007) Seeds: Skin infection & anti-diarrhoeal (Luzia & Jorge et al., 2013; Roesler et al., 2006)
	<i>Annona dioica</i> A.St.-Hil. (6037)/Bush	“Ceraticum”, “arixicum”, “ariticum”	Leaves: Rheumatism, anti-diarrhoeal, sedative & anti-catarrhal (Pott & Pott, 1994)
	<i>Xylopia aromatica</i> (Lam.) Mart. (5937)/Tree	“Pimenta de macaco”	Roots: Anti-malarial (de Mesquita et al., 2007) Fruits: Carminative & aphrodisiac (Oliveira et al., 2014)
Apocynaceae	<i>Aspidosperma macrocarpa</i> Mart. (4835)/Tree	No reports	No reports
	<i>Aspidosperma tomentosum</i> Mart. (3528)/Tree	“Guatambu”	Bark: Hypercholesterolemia, anorexic, diuretic (Silva et al., 2010a; de Almeida et al., 2019)
	<i>Hancornia speciosa</i> Gomes (5822)/Tree	“Mangabeira”, “mangaba”	Leaves: Diabetes, anti-hypertensive & anti-obesity (Hirschmann & Arias, 1990; Rodrigues & Carvalho, 2001; Macedo & Ferreira, 2004; Pereira et al., 2015b)
Araliaceae	<i>Himatanthus obovatus</i> (Müll. Arg.) Woodson	“Tiborna”, “pau-de-leite”, “janaguba”	Leaves: Cancer, herpes & worms (Mesquita et al., 2005)
	<i>Schefflera macrocarpa</i> (Cham. & Schltdl.) Frodin/Tree	“Mandiocão”, “mandiocão-do-campo”, “caixeta”, “caixiteiro”	No reports
Arecaceae	<i>Allagoptera campestris</i> (Mart.) Kuntze (4793)/Tree	“Buri-do-campo”, “pissandó”, “paissandu”, “pissandu”, “coqueiro-pissandó”	No reports
	<i>Syagrus flexuosa</i> (Mart.) Becc./Tree	“Coquinho-babão”, “acumã”, “coco do campo”	No reports
Bignoniaceae	<i>Anemopaegma arvense</i> (Vell.) Stellfeld & J.F. Souza (5247)/Shrub	“Vergateza”, “vergateso”, “catuaba-do-cerrado”, “catuaba”, “pau-de-resposta”, “alecrim-do-campo”	Roots & leaves: Aphrodisiac, nervous system stimulator, treatment of inflammation in the ovaries & varicose veins, stimulant, insomnia, neurasthenia, nervousness, hypochondria, poor memory, in recovery from serious illness, asthenia, anxiety, chronic bronchitis, bronchial asthma & sexual impotence (Barros, 1982; Guarim Neto, 1987; Br&ã, 1991; Lorenzi & Matos, 2002; Longhini et al., 2017)
	<i>Cybistax antisiphilitica</i> (Mart.) (4763)/Tree	“Carobinha verde”, “caroba de flor verde”, “ipê-mandioca”, “ipê-de-flor-verde”, “pê-de-anta”, “cinco-em-folhas”, “ipê mirim”, “ipê-amarelo”	Young branches, roots & leaves: Anti-syphilitic, dysuria, hydrops, water retention, poultice, syphilitic ulcers, fever, headache & invigorating baths (Siqueira, 1982; Guarim Neto, 1987; Sanz-Biset et al., 2009; Breitbach et al., 2013) Stem bark: Anti-rheumatic, anti-arthritic, anti-cancer, anti-malarial & healing of ulcers (Llorente et al., 2016)
	<i>Handroanthus ochraceus</i> (Cham.) Mattos	“Mangabeira”, “mangaba”	Leaves: Diabetes, anti-hypertensive & obesity prevention (Hirschmann & Arias, 1990; Rodrigues & Carvalho, 2001; Macedo & Ferreira, 2004; Pereira et al., 2015b)
	<i>Jacaranda decurrens</i> Cham. (5565)/Bush	“Carobinha”, “carobinha-do-campo”	Inflammatory diseases, infections, syphilis, rheumatism, dermatological diseases, treatment of diarrhoea & dysentery, blood cleanser, wound healing in the uterus & ovary, prostate inflammation, allergies, diabetes, hyperlipidaemia & rheumatic problems (Nunes et al., 2003; Tresvenzol et al., 2007; Gachet & Schühly, 2009; Bieski et al., 2012; Neiva et al., 2014)

	<i>Tabebuia aurea</i> (Silva Manso) Benth. & Hook.f. ex S.Moore (5348)/Tree	“Paratudo”, “craibeira”, “caraiberia”, “caroba-do-campo”, “cinco-em-rama”, “cinco-folhas-do-campo”, “ipê-amarelo”, “craibeira”, “ipê-amarelo-do-cerrado”, “pau-d’arco”	Stem bark: Cancer, wounds, snakebite, colds, bronchitis, rheumatism, malaria, abdominal disorders, kidney disorders, antidiarrhoeal & dysentery (Nunes et al., 2003; Agra et al., 2007a; Hajdu & Hohmann, 2012; Reis et al., 2014)
Bixaceae	<i>Cochlospermum regium</i> (Mart. ex Schrank) Pilg. (5941)/Bush	“Algodão-do-campo”, “algodãozinho”	Shell: Cholesterol, blood depurative, treatment of inflammation in the uterus, ovaries & skin (Nunes et al., 2003) Roots: Treatment of uterine & intestinal infections, gastritis, ulcers, arthritis (Camillo et al., 2009)
Bursaceae	<i>Protium heptaphyllum</i> (Aubl.) Marchand (6142)/Tree	“Almécega”, “breu branco”, “amescla”, “breu”, “almíscar”	Resin: Skin diseases, healing of ulcers, scirrhous, anti-inflammatory, analgesic, expectorant, insect repellent, antioxidant, respiratory disorders (Pernet, 1972; Guarim Neto, 1987; Susunaga et al., 2001; Aragão et al., 2006; Marques et al., 2010)
Calophyllaceae	<i>Kielmeyera coriacea</i> Mart. & Zucc. (5443)/Tree	“Pau-santo”	Leaves: Schistosomiasis, leishmaniasis, malaria, fungal & bacterial infections (Alves et al., 2000; Albernaz et al., 2010)
Caryocaraceae	<i>Caryocar brasiliense</i> Cambess (5937)/Tree	“Pequi”, “piquei”, “pequiá”, “amêndoa de espinho”, “grão de cavalo”, “amêndoa do Brasil”	Chestnut oil & galls: Asthma, bronchitis, pertussis, colds, aphrodisiac & tonic (Rodrigues & Carvalho, 2001; Lima et al., 2007)
Celastraceae	<i>Plenckia populnea</i> Reissek (6189)/Tree	“Marmelinho”, marmeleiro-do-campo”	Leaves & branches: Allergy & wound healing (Rodrigues & Carvalho, 2001)
Combretaceae	<i>Terminalia argentea</i> Mart. (6063)/Tree	“Capitão”, “pau-garrote”, “caxaporra-do-gentio”	Purgative (Pott & Pott, 1986; Ricardo et al., 2017)
Connaraceae	<i>Connarus suberosus</i> Planch. (6038)/Tree <i>Rourea induta</i> Planch. (5345)/Tree	No reports “Chapeudinha”, “pau de porco”, “campeira”	Shell: Antidiarrhoeal (Costa et al., 2014) Leaves: Chagas disease & anti-rheumatic (Kalegari et al., 2014a)
Cucurbitaceae	<i>Cayaponia espelina</i> (Silva Manso) Cogn./Vine (6033)/Bush	“Taiuia-de-Pimenta”, “abobrinha-do-mato”, “espelina”, “espelina-verdadeira”, “tomba”, “purga-de-carijó”, “aspirina”, “purga-de-carijó”, “tomba”, “espelina”, “purga-de-carijó”, “pirima”, “cerejeira-de-purga”, “espelina”, “tomba”	Whole plant: Tonic, stomachic, purgative, emetic, liver disorders, strikes, injuries, depurative, rheumatism, arthritic, bronchopulmonary diseases & secondary syphilitic manifestations (Cardoso Júnior, 2017; Ricardo et al., 2017; Sangalli et al., 2002)
Dilleniaceae	<i>Curatella americana</i> L. (6184)/Bush	“Cajueiro-bravo”, “lixá”, “lixeira”, “sambaíba”	Aerial parts: Hypertension (García-Barriga, 1974) Bark: Cuts, cancer, anaemia, cold, healing wounds, ulcers, diabetes, hypertension, anti-inflammatory, skin diseases. (Corrêa, 1984; Vila Verde et al., 2003; Pinto & Maduro, 2003; Franco & Barros, 2006; Guerrero et al., 2002; Souza & Felfili et al., 2006; Costa et al., 2008). Flowers: cough, bronchitis & flu (Resende, 2012) Leaves & stems: Arthritis, diabetes & high blood pressure, antiseptic & astringent (Macedo & Ferreira, 2004)
	<i>Davilla elliptica</i> A.St.-Hil. (5951)/Tree	“Lixeirinha”, “lixeira”, “lixeira-rasteira”, “bugre”, “sambaibinha”, “muricizinho”, “pau-de-bugre”, “cipó-caboclo”	Leaves: treatment of hemorrhoids, hernia & antidiarrhoeal, & in topical applications as an antiseptic in wound cleaning (Soares et al., 2005) Roots: Astringent, tonic & laxative (Rodrigues & Carvalho, 2001)
Ebenaceae	<i>Diospyros hispida</i> Warm. (5754)/Tree	“Caqui-do-cerrado”, “olho de boi”	Leprosy, skin eruptions, eye infections & other infectious diseases (Mallavadhani et al., 1998; Albernaz et al., 2010)
	<i>Erythroxylum campestre</i> A.St.-Hil. (5933)/Tree	“Cabeça-de-negro”	Barks & stalk: Laxative, astringent in case of bleeding (Rodrigues & Carvalho, 2001)
Erythroxylaceae	<i>Erythroxylum suberosum</i> A.St.-Hil. (5944)/Tree	“Galinha-choca”, “mercúrio-do-campo”, “sessenta-e-dois”, “azougue-do-campo”, “cabelo-de-negro”	Leaves: Astringent, infectious diseases, antidiarrhoeal, anaesthetics, anti-rheumatic & indigestion (Violante et al., 2012; de Oliveira et al., 2015; Rodrigues et al., 2015)
	<i>Erythroxylum tortuosum</i> Mart. (6194)/Bush	“Cabelo-de-negro”	Anti-inflammatory, bronchitis & asthma (Cano & Volpato, 2004; Gonzáles-Guevara et al., 2006)
Euphorbiaceae	<i>Mabea fistulifera</i> Mart./Tree <i>Sapium obovatum</i> Klotzsch ex Müll. Arg.	“Canudo-de-pito, canudeiro”, “mamoninha do mato”, “leiteira preta” “Sarã-do-campo”	No reports Omach pain, headache (Ribeiro et al., 2017)

	<i>Acosmium subelegans</i> (Mohlenbr.) Yakovlev (5068)/Tree	“Genciana”, “perobinha-do-campo”, “leptolobio”	Roots & stem: soothing, tranquilizing & sedative nervous system (Oliveira et al., 1994)
	<i>Anadenanthera peregrina</i> (L.) Speg. (5848)/Tree	“Angico”	No reports
	<i>Andira humilis</i> Mart. ex Benth. (5926)/Tree	“Angelim rasteiro”, “angelim-do-campo”, “mata-barata”	Roots: Diabetes & anthelmintic (Periotto et al., 2004; Conceição et al., 2011)
	<i>Bauhinia rufa</i> (Bong.) Steud. (6029)/Tree	“Pata-de-boi”, “patevaca”, “patebuey”, “pata de vaca”	Fruits: Renal disorders, diuretic & diabetes (Bieski et al., 2015) Leaves: Anti-hyperlipidaemic (Silva et al., 2010a)
	<i>Bowdichia virgilioides</i> Kunth/Tree	“Sucupira”, “sucupira-preta”	Barks: Wound healing, ulcer & diabetes prevention (Macedo & Ferreira, 2004) Seeds: Rheumatism, arthritis & skin diseases (Cruz, 1965)
	<i>Copaifera langsdorffii</i> Desf. (5939)/Tree	“Copaiba”	Trunk resin oil: Sore throat, urinary & pulmonary infections, ulcer & wound healing (Cardoso et al., 2017) Aphrodisiac, abortifacient, expectorant, anthelmintic, anti-pyretic, appetite stimulator, allays thirst, vomiting, burning sensation, skin diseases, ulcers, blood diseases, reduces obesity, dyspepsia, dysentery, eye & nose diseases, syphilis, stomach troubles, leprosy, leukoderma, scabies & ringworm (Nadkarni, 1954; Gregson et al., 1978; Kirtikar & Basu, 1993)
Fabaceae	<i>Dalbergia miscolobium</i> Benth.	“Caviúna-do-campo”	
	<i>Dimorphandra mollis</i> Benth. (4906)/Tree	“Falso barbatimão”, “farinha-seca”, “enche-cangalha”, “barbatimão-de-folha-miúda”	Stem bark: Antidiarrhoeal, gynaecological problems & wound healing (Lorenzi, 1992; Macedo et al., 2000; Santos et al., 2002; Feres et al., 2006; Petacci et al., 2010; Mendes et al., 2013) Bark: Fever (Puebla et al., 2010)
	<i>Dipteryx alata</i> Vogel (5995)/Tree	“Baru”	Seed oil: Snake bites antirheumatic & menstrual regulator (Lorenzi, 1992; Sano et al., 2004; Puebla et al., 2010; Ferraz et al., 2012)
	<i>Diptychandra aurantiaca</i> Tul. (6149)/Tree	“Balsaminho”	No reports
	<i>Pterodon pubescens</i> (Benth.) (5947)/Tree	“Sucupira-branca”, “faveira”	Fruit (oil) & seed: Rheumatic diseases (analgesia & anti-inflammation) (Nucci-Martins et al., 2015)
	<i>Stryphnodendron adstringens</i> (Mart.) Coville/Tree	“Barbatimão”, “barba-de-timão”, “casca-da-vingindade”, “faveira”, “barbatimão-branco”, “barbatimão-verdadeiro”	Bark: Uterine & vaginal conditions, urinary tract infections, skin lesions, ulcer wounds, antidiarrhoeal, inflammation of the throat, bleeding, scurvy, pulmonary complications & respiratory infections (Herzog-Soares et al., 2002; Brasil, 2014; de Freitas et al., 2018)
	<i>Vatairea macrocarpa</i> (Benth.) Ducke (6193)/Tree	“Amargoso”, “maleiteira”, “angelim-do-cerrado”	Stem bark: Diabetes & mycoses (Oliveira et al., 2008)
Lauraceae Juss.	<i>Aiouea trinervis</i> Meisn. (5924)/Tree	“Brinco-de-princesa”, “louro-de-Goiaás”, “uridol”, “urinosa”, “vergateza”	Leaves: Aphrodisiac (Moraes, 2005; Maier, 2016)
	<i>Ocotea minarum</i> (Nees & Mart.) Mez/Tree	“Canelinha”, “canela vassoura”	C&idiasis (Rodrigues et al., 2014)
Loganiaceae	<i>Strychnos pseudoquina</i> A.St.-Hil. (5405)/Tree	“Guararoba”, “quina-do-cerrado”, “quina-branca”, “quina-quina”	Shell: Tonic, antipyretic, antimalarial, liver, spleen & stomach diseases, fever & malaria (&rade-Neto et al., 2003; Honório-França et al., 2008; Bonamin et al., 2011)
Lycopodiaceae Mirb.	<i>Lycopodium clavatum</i> L. (5934)/Herb	“Licopódio”, “pé-de-lobo”, “clavatum”, “musgo-terrestre”	Liver abnormalities, flatulent dyspepsia, abdominal distention & headaches related to digestive disorders (Henrique da Silva et al., 2015; Farmacopeia Brasileira, 2017)
Lythraceae J.St.-Hil.	<i>Lafoensia pacari</i> A.St.-Hil. (6049)/Tree	“Mangava-brava”, “pacari”, “dedaleiro”, “louro-da-serra”	Leaves, roots, bark & sap: Gastritis, ulcers, bloody diarrhoea, venereal diseases, fever, boil, syphilis, worms, cancer, detoxification, diabetes, obesity, haemorrhoids, swelling, labyrinthitis, pneumonia, tuberculosis, heartburn, liver, indigestion, gallstones, back pain, uterine inflammation, diuretic & burn (Ribeiro et al., 2017; Pereira et al., 2018)
Magnoliaceae Juss.	<i>Magnolia ovata</i> (A.St.-Hil.) Spreng. (5954)/Tree	“Pinha-do-brejo”, “bagaçu”	Trunk bark: Fever & diabetes (Kassuya et al., 2009; Mori et al., 2011)
Malpighiaceae	<i>Byrsonima basiloba</i> A. Juss. (6030)/Tree	“Murici”	Leaves: Antidiarrhoeal & gastric ulcer (Figueiredo et al., 2005; Lira et al., 2008)
	<i>Byrsonima coccolobifolia</i> Kunth (6169)/Bush	“Murici”, “murici-de-flor-rósea”, “murici-do-cerrado”	Antidiarrhoeal (Lorenzi, 2002; Br&ão et al., 1992)
	<i>Byrsonima intermedia</i> A. Juss. (5735)/Bush	“Murici pequeno”	Leaves: Fever, ulcers, diuretic, asthma & skin infection (Santos et al., 2019) Stem bark: Antidiarrhoeal, dysentery, anti-fungal & anti-inflammatory activity (Rodrigues & Carvalho, 2001)

	<i>Diplopterys pubipetala</i> (A.Juss.) W.R. Anderson & C.C.Davis (5932)/Bush	“Cipó-preto”	No reports
Malvaceae Juss.	<i>Eriotheca gracilipes</i> (K.Schum.) A.Robyns (6185)/Tree	“Paineira”, “paineira-da-mata”	No reports
	<i>Luehea divaricata</i> Mart. & Zucc. (6046)/Tree	“Açoita cavalo”, “caiboti”	Leaves: Uric acid build-up, kidney disease, throat inflammation, influenza, haemorrhoids, pneumonia, muscle aches, cough & tumours (Tirloni et al., 2018)
Melastomataceae	<i>Miconia albicans</i> (Sw.) Triana (5492)/Bush	“Canela-de-velho”	Leaves: Anti-inflammatory & diabetes prevention (Lima et al., 2018)
Moraceae	<i>Brosimum gaudichaudii</i> Trécul (5406)/Tree	“Mama-de-cadela”, “mama-cadela”, “mamica-de-cadela”, “algodãozinho”, “inharé”, “mama-cachorro”	Stem bark, leaves, roots & latex: Vitiligo, skin diseases, infection, venereal disease, furuncle, “impingem” (superficial skin mycoses), cancer, anaemia, heart disease, pneumonia, burning skin, tonic, anti-inflammatory, rheumatism, kidney disease, wound healing, flu, bronchitis, detoxification, improvement of blood circulation, general pain, & mosquito bite allergy (Rodrigues & Carvalho, 2001; Amorozo, 2002; Agra et al., 2008; Monteiro et al., 2014; Ribeiro et al., 2017)
Myrtaceae	<i>Campomanesia adamantium</i> (Cambess.) O.Berg. (5856)/Tree	“Guavira”	Leaves & fruits: Anti-inflammatory, antidiarrhoeal, urinary infection, anti-depressant, anti-hyperalgesic, rheumatism, hypocholesterolaemia, treatment of cystitis & urethritis, antiseptic & stomach disorders (Lorenzi, 2000; Piva, 2002; Ramos et al., 2007; Coutinho et al., 2008; Lorenzi et al., 2008; Vieira et al., 2011; Pascoal et al., 2014; Lescano et al., 2016; Souza et al., 2017) Roots: Diabetes (Alice et al., 1995)
	<i>Eugenia aurata</i> O. Berg	“Murtinha”, “pitangobi”, “pitangobi-azul-do-cerrado”	No reports
	<i>Eugenia dysenterica</i> (Mart.) DC. (6425)/Tree	“Cagaíta”, “cagaiteira”	Leaves: Antidiarrhoeal, diabetes, jaundice, kidney disease, bladder infections, laxative & cardiovascular diseases (Almeida et al., 1998; Martinotto et al., 2007; Silva et al., 2010a; Lima et al., 2010)
	<i>Eugenia pitanga</i> (O. Berg) Kiaersk. (6111)	No reports	No reports
	<i>Eugenia punicifolia</i> (Kunth) DC. (5925)/Bush	“Pitanga do campo”, “murta vermelha”, “pedra-ume caá”, “pitanga-do-cerrado”, “muta”	Leaves & fruits: Diabetes prevention, cough, antidiarrhoeal, stomach disorders, pain, inflammation, fever, influenza, sores & infections (Brunetti et al., 2006; Leite et al., 2010; Rocha et al., 2011; Pascual et al., 2011; Sales et al., 2014; Basting et al., 2014; Costa et al., 2016)
	<i>Myrcia bella</i> Cambess./Bush	“Pedra-ume caá”, “mercurinho”	Leaves: Astringent, diabetes, antidiarrhoeal, diuretic, coagulant, hypertension & ulcers (Saldanha et al., 2013; Vareda et al., 2014; Serpeloni et al., 2015)
	<i>Myrcia guianensis</i> (Aubl.) DC.	“Pitanga-miúda”, “pedra-ume-caá”	No reports
Ochnaceae	<i>Ouratea spectabilis</i> (Mart.) Engl.	“Folha-de-serra”	Gastric & rheumatic disorders (Paulo et al., 1986)
Primulaceae	<i>Myrsine umbellata</i> Mart./Tree	“Capororoca”, “pororoca”	Snake bites, tumours & wounds (Rodrigues & Carvalho, 2001)
Proteaceae Juss.	<i>Roupala montana</i> Aubl. (6049)/Tree	“Carvalho brasileiro”, “carne de vaca”, “congonha”, “caxua”, “farinha-seca”	Leaves: Pain in the kidneys, legs & spine; malaise; & soothing pain (Souza et al., 2014) Bark: Fever & pain in the stomach (Júnior & Júnior, 2009)
	<i>Alibertia edulis</i> (Rich.) A.Rich.	“Marmelada-bola”, “marmelo-do-cerrado”	Hypertension (de Santana Aquino et al., 2017)
	<i>Cordia sessilis</i> (Vell.) Kuntze (6145)/Bush	“Marmelinho”, “marmelada-de-cachorro”	Leaves: Skin diseases (Rodrigues & Carvalho, 2001)
	<i>Guettarda viburnoides</i> Cham. & Schtdl. (6416)/Tree	“Veludo branco”	Stalk: Anti-inflammatory, antidiarrhoeal, respiratory diseases, rheumatism, fever, diabetes & hepatitis (Capasso et al., 1998; Coelho-Ferreira, 2009; Magalhães et al., 2019)
Rubiaceae Juss.	<i>Palicourea coriacea</i> (Cham.) K.Schum. (5928)/Bush	“Douradinha do campo”, “congonha do campo”, “douradinha”	Roots & leaves: Liver diseases, diuretic, renal calculi, kidney & bladder infections & pain (Laureano, 2001; Nunes et al., 2003; Freitas et al., 2011)
	<i>Psychotria poeppigiana</i> Müll. Arg. (5292)/Bush	“Arbusto da boca dolorida”, “lábios de fogo”, “beijo”, “beijo de negra”, “chapéu do diabo”	Leaves: Gastrointestinal disorders, pain, stomach pain, dyspnoea, anti-inflammatory for bites & stings (snakes, insects & scorpions), fever, infection, diabetes, oral abortifacient, wounds & rashes, cuts & bleeding (Coe & &erson, 1996; Taylor et al., 2006; Pino-Benitez, 2006; Guerrero et al., 2010)
	<i>Tocoyena brasiliensis</i> Mart. (6174)/Tree	“Jenipapinho”	Burn & rheumatism (Souza et al., 2013)
	<i>Tocoyena formosa</i> (Cham. & Schtdl.) K.Schum. (6202)/Tree	“Jenipapo do bravo”	Coughs, torsion, cystitis, rheumatism, & renal & cardiac problems (de Albuquerque et al., 2007)

Salicaceae	<i>Casearia sylvestris</i> Sw. (6411)/Tree	“Guaçatonga”, “guafatonga”, “erva-de-lagarto”, “lingua-de-tiu”, “cafezinho-do-mato”, “corta-lengua”, “erva-de-bugre”, “café selvagem”	Leaves: Diarrhoea, fever, toxicity, rheumatism, skin conditions & snake bites (Ferreira et al., 2011) Stem bark: anti-inflammatory (Ferreira et al., 2016)
Sapindaceae	<i>Allophylus edulis</i> (A.St.-Hil. et al.) Hieron. (3508)/Tree	“Chal-chal”, “vacum”, “fruto-de-pombo”, “vacunzeiro”, “murta vermelha”, “pau-de-pedreira”, “baga-de-morcego”	Leaves: Diabetes, anti-inflammatory, intestinal & digestive problems, high blood pressure, wound washing, liver & digestive troubles, cholecystitis & jaundice (Arisawa et al., 1989; Körbes, 1995; Franco & Fontana, 2001; Diaz et al., 2008)
Sapotaceae	<i>Pouteria torta</i> (Mart.) Radlk. (6414)/Tree	“Guapeva”, “curiola”, “acá ferro”, “abiu do cerrado”, “grão de galo”	Bark: Dysentery (Costa et al., 2014)
Solanaceae	<i>Solanum lycocarpum</i> A.St.-Hil. (5955)/Tree	“Fruta do lobo”, “lobeira”, “jurubebão”, “beringela-do-cerrado”	Roots & green fruits: Sedative, epilepsy, spasms, abdominal & renal pain, haemorrhoids, influenza, hepatitis, diabetes, obesity, snakebite, & tissue atrophy (Munari et al., 2012) Fruits: Fruits: Hypoglycaemic & cholesterol lowering (Schwarz et al., 2007) Leaves: Cough & malaria (Ribeiro et al., 2017)
Vochysiaceae	<i>Qualea grandiflora</i> Mart. (6171)/Tree	“Cinzeiro”, “boizinho”, “pau-terrinhã”	Leaves & bark: Treatment of bloody diarrhoea, intestinal colic, amoebiasis, skin diseases, inflammation, ulcers & gastritis (de Mesquita et al., 2015)
	<i>Qualea multiflora</i> Mart. (6178)/Tree	“Cinzeiro”, “pau-tucano”, “uva-puva-do-campo”, “pau-terra-do-campo”, “pau-terra-liso”	Bark: Antidiarrhoeal, ulcers, gastric diseases & anti-inflammatory (Santos et al., 2011)
	<i>Qualea parviflora</i> Mart. (6026)/Tree	“Pau-terra”, “pau-ferro”, “pau-de-tucano”	Leaves & bark: Treatment of bloody diarrhoea, intestinal colic, amoebiasis, skin diseases, ulcers & gastritis (de Mesquita et al., 2015)
	<i>Vochysia tucanorum</i> Mart./Tree	“Pau-de-tucano”, “tucaneiro”, “vinheiro”.	No reports

3.1 Pharmacological and Phytochemical Studies

Many of the species found in the study area have already been chemically and biologically evaluated, possibly in an attempt to prove their popular indication. Table 2 comprises a scientific survey reporting the chemical and pharmacological studies that have already been carried out on the target species. Regarding pharmacological studies, only *Gomphrena officinalis*, *Schefflera macrocarpa*, *Allagoptera campestris*, *Syagrus flexuosa*, *Cayaponia espelina*, *Sapium obovatum*, *Diptychandra aurantiaca*, *Diplopterys pubipetala*, *Eugenia pitanga*, *Myrsine umbellate*, *Anadenanthera peregrina*, *Andira humilis*, *Dalbergia miscolobium*, *Eriotheca gracilipes* and *Tocoyena brasiliensis* have not been studied (Table 2).

Scientific evidence has shown that most studies are related to the main popular uses. *Anacardium humile*, *Astronium fraxinifolium*, *Cochlospermum regium*, *Protium heptaphyllum*, *Curatella americana*, *Davilla elliptica*, *Lafoensia pacari*, *Byrsonima basiloba*, *Byrsonima intermedia*, *Eugenia dysenterica*, *E. puniceifolia*, *Qualea grandiflora* and *Q. parviflora* are grouped gastro-intestinal system diseases category and have associated scientific studies that validate their effects on some classes of intestinal disorders, mainly diarrhoea and gastrointestinal conditions (Table 1, 2).

Another prominent category is infectious diseases, among which some species, such as *Tapirira guianensis*, *Annona coriacea*, *A. crassiflora*, *Xylopia aromatica*, *Himatanthus obovatus*, *Jacaranda decurrens*, *Cochlospermum regium*, *Kielmeyera coriacea*, *Diospyros hispida*, *Erythroxylum suberosum*, *Stryphnodendron adstringens*, *Ocotea minarum*, *Strychnos pseudoquina*, *Byrsonima intermedia*, *Brosimum gaudichaudii*, *Campomanesia adamantium* and *Eugenia dysenterica*, have popular indications and associated studies that prove their effects (Table 1, 2). These data show high herbal diversity among medicinal plants in the reserve area of the settlement “April 17”, located in Casa Verde district, Nova Andradina city, MS, Brazil, as well as great potential for further studies on therapeutic activities. Moreover, the conservation of biodiversity ensures the sustainability of natural resources and allows the maintenance of various services essential to human well-being.

In the review, only twelve species were not chemically studied, and fourteen did not have associated pharmacological studies. Among the studied species for which contents were isolated, the predominant class of substances was terpenes, followed by phenolic compounds and alkaloids (Table 2).

Table 2. Pharmacological and chemical studies of the species found in the reserve area of the settlement “April 17”, located in Casa Verde district, Nova Andradina city.

Species	Pharmacological studies	Chemical studies
<i>Gomphrena officinalis</i> Mart.	No reports	No reports
<i>Anacardium humile</i> A. St. Hil.	Larvicidal (Porto et al., 2008); gastric lesion reduction (Luiz-Ferreira et al., 2008; Luiz-Ferreira et al., 2010); anthelmintic (Nery et al., 2010); anti-microbial (Pereira et al., 2011; Perim et al., 2018) & anti-hypoglycaemic effects (Urzêda et al., 2013)	Tannins, flavonoids, terpenes, coumarins, saponins (Agra et al., 2007a); tannins, flavonoids, alkaloids (Nery et al., 2010); flavonoids (Luiz-Ferreira et al., 2010); phenolic compounds, catechins & terpenes (Cecílio et al., 2012)
<i>Astronium fraxinifolium</i> Schott.	Antiviral (Cecílio et al., 2012); antibacterial (Montanari et al., 2012); gastroprotective & antioxidant effects (Martins et al., 2017)	Terpenes (Montanari et al., 2012)
<i>Tapirira guianensis</i> Aubl.	Cytotoxic (David et al., 1998; Taylor et al., 2013); anti-protozoal, antibacterial, anti-fungicidal (Roumy et al., 2009); anti-proliferative (Silva-Oliveira et al., 2016); vasodilatory & antioxidant effects (Rodrigues et al., 2017)	Terpenoids (Correia et al., 2003, 2008; Zoghbi et al., 2014; Silva-Oliveira et al., 2016); flavonoids (Silva-Oliveira et al., 2016; Rodrigues et al., 2017); norisoprenoids (Silva-Oliveira et al., 2016); tannins (Rodrigues et al., 2017); flavonoids & phenolic acids (Martins et al., 2017)
<i>Annona coriacea</i> Mart.	Insecticidal (Coelho et al., 2007; Costa et al., 2012; Freitas et al., 2014); phytotoxic (Formagio et al., 2010; Novaes et al., 2016); anti-protozoal (Toledo et al., 2011; Siqueira et al., 2011); antioxidant (Benites et al. 2015; Novaes et al., 2019); anti-proliferative, enzymatic inhibitory (Formagio et al., 2015); cytoprotective (Júnior et al., 2016); anti-tumour (Tundis et al., 2017; Gomes et al., 2019); anti-fungal (Almeida-Apolonio et al., 2019); anxiolytic & anti-depressant effects (Monteiro et al., 2020)	Terpenes (Mussini et al., 1973; Siqueira et al., 2011); acetogenins (Yu et al., 1994; Silva et al., 1996; Silva et al., 1997; Silva et al., 1998); alkaloids (Machado et al., 2013); phenolic compounds (Freitas et al., 2014; Júnior et al., 2016; Novaes et al., 2018; Novaes et al., 2019; Monteiro et al., 2020) & tannins (Benites et al. 2015)
<i>Annona crassiflora</i> Mart.	Antioxidant (Santos et al., 1996; Roesler et al., 2006, 2011; de Souza et al., 2012; Justino et al., 2016); cytotoxic (Santos et al., 1996); larvicidal (Pimenta et al., 2003); antimutagenic (Vilar et al., 2008); anti-arthritic, anti-plasmodial (de Mesquita et al., 2007); antibacterial (Silva et al., 2014); anti-glycant (Justino et al., 2016) & pancreatic lipase inhibitive effects (Pereira et al., 2017)	Phytosterols, tocopherols & unsaturated fatty acids (de Mesquita et al., 2007); flavonoids, isoflavones, carotenoids (Justino et al., 2016) & alkaloids (Pereira et al., 2017)
<i>Annona dioica</i> A.St.-Hil.	Anti-inflammatory, anti-hypoglycaemic, anti-proliferative & antioxidant effects (Formagio et al., 2013)	Flavonoids (de Souza et al., 2012; Formagio et al., 2013) & alkaloids (Justino et al., 2016)
<i>Xylopia aromatica</i> (Lam.) Mart.	Anti-malarial (Garavito et al., 2006); larvicidal (Rodrigues et al., 2006); anti-plasmodial (de Mesquita et al., 2007); cytotoxic (Suffredini et al., 2007; Taylor et al., 2013); anti-tumour, anti-protease (Peter et al., 2008) & anti-inflammatory effect (Oliveira et al., 2014)	Terpenes (Martins et al., 1998); phenolic acids (de Souza et al., 2012) & flavonoids (Oliveira et al., 2014)
<i>Aspidosperma macrocarpa</i> Mart.	Antioxidant effect (Silva et al., 2009)	Indole alkaloid (Bolzani et al., 1987)
<i>Aspidosperma tomentosum</i> Mart.	Anti-nociceptive & anti-inflammatory effects (Aquino et al., 2013a)	Indole alkaloids (Pereira et al., 2007; Dolabela et al., 2012)
<i>Hancornia speciosa</i> Gomes	Anti-hypertensive (Ferreira et al., 2007a; Ferreira et al., 2007b); chemopreventive (Endringer et al., 2009b); antioxidant & anti-inflammatory effects (Endringer et al., 2009a; Silva et al., 2011a)	Terpenoids, steroids & tannins (Honda et al., 1990; Br&ao et al., 2010)
<i>Himatanthus obovatus</i> (Müll. Arg.) Woodson	Anti-tumour & anti-microbial effects (Mesquita et al., 2009; Toledo et al., 2011)	Iridoides (Lima, 2005)
<i>Schefflera macrocarpa</i> (Cham. & Schltdl.) Frodin	No reports	No reports
<i>Allagoptera campestris</i> (Mart.) Kuntze	No reports	No reports
<i>Syagrus flexuosa</i> (Mart.) Becc.	No reports	No reports
<i>Anemopaegma arvense</i> (Vell.) Stellfeld & J.F. Souza	Antioxidant (Tabanca et al., 2007); anti-plasmodial (de Mesquita et al., 2007) & anti-fungal effects (Costanzo et al., 2013)	Flavanolignans (Tabanca et al., 2007) & flavonoids (Costanzo et al., 2013)
<i>Cybitax antisiphilitica</i> (Mart.) Mart.	Activity against <i>Aedes aegypti</i> larvae (Rodrigues et al., 2005)	Iridoids (Felicio et al., 1994) & quinones (Rodrigues et al., 2005)
<i>Handroanthus ochraceus</i> (Cham.) Mattos	Cytotoxic effects (Correia et al., 2016)	Glycerides, carboxylic acids, phytosteroid & terpenoids (Salatino et al., 2020)
<i>Jacaranda decurrens</i> Cham.	Cytotoxic (Subbaramaiah et al., 2000; Casagr&e et al., 2014); antioxidant (Carvalho et al., 2009); anti-microbial, chemopreventive effects (Zatta et al., 2009); effects on the development of the reproductive system in male rats (Aren&a et al., 2012); anti-inflammatory (Santos et al., 2012a) & anti-obesity effects (Antunes et al., 2016)	Triterpenes (Var&a et al., 1992; Subbaramaiah et al., 2000; Carvalho et al., 2009) & flavonoids (Blatt et al., 1998; Antunes et al., 2016)
<i>Tabebuia aurea</i> (Silva Manso) Benth. & Hook.f. ex S. Moore	Anti-microbial (Barbosa-Filho et al., 2004a; Santos et al., 2015); anti-inflammatory, myotoxic, anti-haemorrhagic (Reis et al., 2014) & anti-dematogenic effects (Santos et al., 2015)	Phenolic acids & terpenes (Barbosa-Filho et al., 2004a)

<i>Cochlospermum regium</i> (Mart. ex Schrank) Pilg.	Cytotoxic (Ceschini & Campos, 2006; Taylor et al., 2013); antioxidant, anti-diabetic, antiglycation, anti-cholinesterase (Agra et al., 2007b); gastroprotective (Hajdu & Hohmann, 2012); antibacterial & anti-fungal effects (Carvalho et al., 2018)	Phenolic acids, flavonoids & condensed tannins (Mir& Pedroso et al., 2019)
<i>Protium heptaphyllum</i> (Aubl.) Marchand	Cercaricidal (Frischkorn et al., 1978); non-opioid analgesic (Susunaga, 1996); anti-inflammatory-related (Siani et al., 1999); gastroprotective (Oliveira et al., 2004a; Araujo et al., 2011); possible antipruritic (Oliveira et al., 2004b); hepatoprotective (Oliveira et al., 2005); anti-nociceptive (Lima-Júnior et al., 2006); anti-microbial, antioxidant (B&eira et al., 2006; Violante et al., 2012); anti-inflammatory (Hol& Pinto et al., 2008; Melo et al., 2011); anti-hyperglycaemic, hypolipidaemic (Santos et al., 2012b; Carvalho et al., 2017; de Melo et al., 2019); anti-mutagenic (de Lima et al., 2016), & vasorelaxant effects (Mobin et al., 2017)	Terpenes (Zoghbi et al., 1995; Susunaga, 1996; Maia et al., 2000; Susunaga et al., 2001; Oliveira et al., 2004a; Oliveira et al., 2005; Vieira Júnior et al., 2005; B&eira et al., 2006; Marques et al., 2010; Santos et al., 2012b; de Lima et al., 2016; Mobin et al., 2017)
<i>Kielmeyera coriacea</i> Mart. & Zucc.	Anti-ulcerogenic, anti-protozoal, anti-fungal (Garcia Cortez et al., 1998); antibacterial (Cortez et al., 2002); & anxiolytic effects (Martins et al., 2004; Biesdorf, et al., 2012); stimulation of oxygen consumption, inhibition of gluconeogenesis & stimulation of glycogenolysis & glycolysis (Zagoto et al., 2006); schistosomicidal (Zagoto et al., 2006); anti-depressant (Sela et al., 2010; de Mesquita et al., 2011); cytotoxic (de Mesquita et al., 2011), & panicolytic effects (Biesdorf, et al., 2012)	Xanthones (Mesquita et al., 1987; Garcia Cortez et al., 1998; Cortez et al., 2002; Martins et al., 2006; Zagoto et al., 2006) & triterpenes (Biesdorf, et al., 2012)
<i>Caryocar brasiliense</i> Cambess.	Anti-fungal (Passos et al., 2002); antioxidant (Roesler et al., 2008; Rocha et al., 2015; Torres et al., 2018); exercise-induced inflammatory markers & blood pressure reduction (Mir&Vilela et al., 2009); cytotoxic (Braga et al., 2017); peritoneal toxicity (Fonseca et al., 2018); endothelial vasorelaxation (Oliveira et al., 2018) & anti-microbial effects (Moreira et al., 2019)	Phenolic acids (Mir&Vilela et al., 2009; Rocha et al., 2015); fatty acids & carotenoids (Moreira et al., 2019)
<i>Plenckia populnea</i> Reissek	Anti-microbial effects (Gonçalves de Lima et al., 1972)	Triterpenes (de Souza et al., 1990; Espindola et al., 2018)
<i>Terminalia argentea</i> Mart.	Non-cytotoxic & anti-genotoxic effects (Beserra et al., 2018)	Triterpenoids, lignan, flavonoids (Garcez et al., 2003); flavonoids, saponins, & phytosterols (Beserra et al., 2018)
<i>Connarus suberosus</i> Planch.	Leishmanicidal, anti-fungal (Costa et al., 2014) & anti-protozoal effects (Charneau et al., 2016)	Benzoquinones (Costa et al., 2014)
<i>Rourea induta</i> Planch.	Haemolytical (Kalegari et al., 2011); antibacterial, antioxidant, allelopathic (Kalegari et al., 2012); antioxidant, potential hepatoprotective (Kalegari et al., 2014a) & anti-nociceptive effects (Kalegari et al., 2014b)	Flavonoids (Kalegari et al., 2011; Kalegari et al., 2014b)
<i>Cayaponia espelina</i> (Silva Manso) Cogn.	No reports	No reports
<i>Curatella americana</i> L.	Anti-inflammatory, peripheral analgesic (Alex&re-Moreira et al., 1999; Guevara et al., 2011); gastroprotective, healing (Hiruma-Lima et al., 2009); genotoxic (Vilar et al., 2009); anti-fungal (Toledo et al., 2015); antioxidant, hypolipidaemic (Lopes et al., 2016) & antioxidant effects (Fujishima et al., 2018; Nunes et al., 2018)	Phenolic compounds (El-Azizi et al., 1980; Lopes et al., 2016); flavonoids, saponins, terpenes, tannins (Costa et al., 2008) & proanthocyanidins (Hiruma-Lima et al., 2009)
<i>Davilla elliptica</i> A.St.-Hil.	Modulatory (Carlos et al., 2005); anti-microbial (Michelin et al., 2005); anti-mycobacterial (Lopes et al., 2007); anti-nociceptive, anti-dematogenic, gastroprotective (Azevedo et al., 2007; Campos et al., 2013; Kushima et al., 2009); immunomodulatory, anti- <i>Helicobacter pylori</i> (Kushima et al., 2009); anti-tumour (Carli et al., 2009) & mutagenic effects (Biso et al., 2010)	Flavonic, saponin heteroside compounds, steroids, coumarins, tannins, steroids, triterpenes (Michelin et al., 2005; Soares et al., 2005; Biso et al., 2010); flavonoids (Carlos et al., 2005; Michelin et al., 2005; Biso et al., 2010) & derivatives of phenolic acids (Biso et al., 2010)
<i>Diospyros hispida</i> Warm.	Anti-microbial & anti-fungal effects (Gu et al., 2004; Albernaz et al., 2010)	Terpenes (Ganapaty et al., 2005) & alkaloids (Aynilian et al., 1974; Pereira et al., 2015b)
<i>Erythroxylum campestre</i> A.St.-Hil.	Anti-tumour effects (Pereira et al., 2015a)	Flavonoids (Bohm et al., 1988)
<i>Erythroxylum suberosum</i> A.St.-Hil.	Lethality against <i>Artemia salina</i> (do Nascimento et al., 2012a); anti-microbial, antioxidant, cytotoxic (Violante et al., 2012); anti-rheumatic & anti-inflammatory effects (de Oliveira et al., 2015)	Phenolic compounds, alkaloids (Bohm et al., 1988); diterpenes, flavonoids (Rodrigues et al., 2015); flavonoids, tannins, coumarins, saponins (Rodrigues et al., 2015); triterpenes, alkaloids, anthocyanins, coumarins, flavonoids & condensed tannins (de Oliveira et al., 2015)
<i>Erythroxylum tortuosum</i> Mart.	Anti-inflammatory, anti-bronchitis & anti-asthma effects (Cano & Volpato, 2004; Gonzáles-Guevara et al., 2006)	Tannins (Ishino et al., 2012)
<i>Mabea fistulifera</i> Mart.	Antioxidant & anti-inflammatory effects (Coqueiro, 2006)	Flavonoids (Kinghorn, 2001) & flavanone glycosides (Coqueiro et al., 2007)
<i>Sapium obovatum</i> Klotzsch ex Müll.Arg.	No reports	No reports

<i>Acosmium subelegans</i> (Mohlenbr.) Yakovlev	Anti-convulsant effects (Sousa et al., 2009)	Alkaloids (Oliveira et al., 1994)
<i>Anadenanthera peregrina</i> (L.) Speg.	No reports	Phenolic compounds (Carneiro et al., 2012; Sartori et al., 2014; Mota et al., 2017)
<i>Andira humilis</i> Mart. ex Benth.	No reports	Phenolic compounds (Garcez et al., 2010)
<i>Bauhinia rufa</i> (Bong.) Steud.	Proteinase inhibitory (Nakahata et al., 2001; Vilela & Sampaio, 2008); anti-fungal (Duarte-Almeida et al., 2004; Correia et al., 2016) & thrombolytic effects (Silveira et al., 2016)	Terpenes (Duarte-Almeida et al., 2004)
<i>Bowdichia virgiloides</i> Kunth	Cytotoxic (Torrenergia et al., 1989); anti-malarial (Deharo et al., 2001); anti-microbial (Almeida et al., 2006; Agra et al., 2013); anti-nociceptive, anti-inflammatory (Barros et al., 2010; Thomazzi et al., 2010; Silva et al., 2010b); antibacterial (Leite et al., 2014a); muscular damage & oxidative stress protective (dos Santos et al., 2014); larvicidal (Bezerra-Silva et al., 2015) & anti-hyperglycaemic effects (Silva et al., 2015)	Terpenes (Arriaga et al., 1998; Cordero et al., 2004); tannins, flavonoids (Arriaga et al., 2000; Leite et al., 2014a) & alkaloids (Torrenergia et al., 1989; Barbosa-Filho et al., 2004b)
<i>Copaifera langsdorffii</i> Desf.	Gastroprotective (Paiva et al., 2004, Motta et al., 2018); ischaemia/reperfusion of intestinal tissue protective (Paiva et al., 2004); anti-fungal (Amorim et al., 2004; Zimmermam-Franco et al., 2013); larvicidal (Mendonça et al., 2005); immunomodulatory (Rosario et al., 2008); antibacterial (Souza et al., 2011); anti-inflammatory (Gelmini et al., 2013); chemopreventive (Senedese et al., 2013); anti-psychotic (Gelmini et al., 2013); antioxidant (Gelmini et al., 2013; Batista et al., 2016); antibacterial (Bonan et al., 2015); apoptotic (Cardoso et al., 2017) & colon carcinogenesis protective effects (Cardoso et al., 2017; Tobouti et al., 2017)	Terpenes, xyloglucans & phenolic compounds (Rosario et al., 2008; do Nascimento et al., 2012b; Gelmini et al., 2013; Senedese et al., 2013; Baldissera et al., 2014; Nogueira et al., 2015)
<i>Dalbergia miscolobium</i> Benth.	No reports	Phenolic compounds (Gregson et al., 1978; Vasudeva et al., 2009; Kite et al., 2010) & triterpenoids (Salatino et al., 2020)
<i>Dimorphandra mollis</i> Benth.	Anti-dematogenic (Mello et al., 2006); anti-toxic (Feres et al., 2006); antioxidant (Petacci et al., 2010) & anti-triptic effects (Mendes et al., 2013)	Flavonoids (Feres et al., 2006) & tanins (Mendes et al., 2013)
<i>Dipteryx alata</i> Vogel	Anti-fungal (Nazato et al., 2010; Puebla et al., 2010; Ferraz et al., 2012; Yoshida et al., 2015); non-mutagenic (Esteves-Pedro et al., 2012; Yoshida et al., 2015); antioxidant, hypolipidaemic (Bento et al., 2014; Fern&es et al., 2015a); leishmanicidal effects (Ribeiro et al., 2014); reduction in abdominal adiposity & increase in HDL (de Souza et al., 2018)	Phenolic compounds & terpenoids (Puebla et al., 2010; Marques et al., 2015)
<i>Diptychandra aurantiaca</i> Tul.	No reports	No reports
<i>Pterodon pubescens</i> (Benth.)	Non-cytotoxic, non-toxic, non-mutagenic, anti-proliferative (Pinto Coelho et al., 2001; Vieira et al., 2008); anti-nociceptive (Nucci et al., 2012; Nucci-Martins et al., 2015); & potential anti-inflammatory effects (da Silva Santos et al., 2016; Hoscheid et al., 2017)	Terpenes (Hoscheid et al., 2012; Nucci-Martins et al., 2015)
<i>Stryphnodendron adstringens</i> (Mart.) Coville	Anti-inflammatory (Lima et al., 1998); antioxidant (Lima et al., 1998; Souza et al., 2007; Santos Filho et al., 2011); antibacterial (Lima et al., 1998; Souza et al., 2007; Hasenack et al., 2008; Soares et al., 2008); anti-ulcerogenic (Audi et al., 1999); trypanocidal (Herzog-Soares et al., 2002, 2006); anti-mutagenic (Costa et al., 2010); anti-genic (Santos Filho et al., 2011) & anti-fungal effects (de Freitas et al., 2018)	Proanthocyanidins, phenolic compounds (Palazzo de Mello et al., 1996a; Palazzo de Mello et al., 1999; Costa et al., 2010); prorobinetinidines (Palazzo de Mello et al., 1996b) & tannins (Santos et al., 2002)
<i>Vatairea macrocarpa</i> (Benth.) Ducke	Edematogenic (Alencar et al., 2003) & anti-hyperglycaemic effects (Oliveira et al., 2008)	No reports
<i>Aiouea trinervis</i> Meisn.	Anti-proliferative (Garcez et al., 2005a) & trypanocidal effects (Maier, 2016)	Lignans (Garcez et al., 2005a) & butanolide (Tsai et al., 2002)
<i>Ocotea minarum</i> (Nees & Mart.) Mez	Antioxidant, anti-microbial (Rodrigues et al., 2019) & anti-fungal effects (Rodrigues et al., 2014)	Indole alkaloids (Vecchietti et al., 1979), phenolic compounds & terpenes (Garcez et al., 2005b)
<i>Strychnos pseudoquina</i> A.St.-Hil.	Anti-ulcerogenic (Silva et al., 2005); mutagenic (Santos et al., 2006); hypoglycaemic, cicatrizative (Honório-França et al., 2008); antibacterial (Bonamin et al., 2011); anti-leishmanial (Lage et al., 2013); anti-HSV, anti-inflammatory (Boff et al., 2016); healing (Sar&y et al., 2018); anti-hyperglycaemic & anti-hyperlipidaemic effects (Cosenza et al., 2019)	Alkaloids (Monache et al., 1969; &rade-Neto et al., 2003; Silva et al., 2005; Bonamin et al., 2011); flavonoids (Lage et al., 2013); alkaloids, flavonoids, polyphenols & tannins (Cosenza et al., 2019)

<i>Lycopodium clavatum</i> L.	Acetylcholinesterase inhibitory (Orhan et al., 2003; Rollinger et al., 2005); anti-inflammatory (Orhan et al., 2007a); antibacterial, anti-fungal (Orhan et al., 2007b); hepatoprotective (Pathak et al., 2009); HeLa cell growth inhibitory (M&al et al., 2010); human keratinocyte, skin tissue protective effects (Das et al., 2013) & reduction in the pathogenic progression of Chagas disease (Brustolin Aleixo et al., 2017)	Alkaloids (Orhan et al., 2003, 2007a); terpenoids (Rollinger et al., 2005) & flavonoids (Das et al., 2013)
<i>Lafoensia pacari</i> A.St.-Hil.	Cytotoxic, apoptogenic (da Silva Marcondes et al., 2014); anti-inflammatory, anti-allergic, analgesic, anti-depressant, microbicidal, antiviral, antioxidant, sedative & anti-depressant-like, chemopreventive, angiogenic & anti-diabetic (Carneiro et al., 2016); antibacterial, antiviral, anti-inflammatory, analgesic, anti-ulcerogenic & anti-depressant effects (Pereira et al., 2018)	Polyphenols (Pereira et al., 2018)
<i>Magnolia ovata</i> (A.St.-Hil.) Spreng.	Anti-pyretic (Kassuya et al., 2009); anti-inflammatory (Kassuya et al., 2009; Mori et al., 2011) & analgesic effects (Mori et al., 2011)	Neolignans, terpenes, alkaloids, steroids, tannins & saponins (Kassuya et al., 2009)
<i>Byrsonima basiloba</i> A. Juss.	Antidiarrhoeal (Figueiredo et al., 2005); anti-mutagenic (Lira et al., 2008); antibacterial, anti-fungal (Michelin et al., 2008) & antioxidant effects (Bonacorsi et al., 2013)	Flavonoids (Figueiredo et al., 2005; Lira et al., 2008)
<i>Byrsonima coccolobifolia</i> Kunth	Mutagenic (Espanha et al., 2014); leishmanicidal (Souza et al., 2014) & antioxidant effects (Pereira et al., 2015b)	Flavonoids (Pereira et al., 2015b)
<i>Byrsonima intermedia</i> A. Juss.	Anti-microbial, anti-haemorrhagic, antidiarrhoeal, anti-inflammatory (Corrêa, 1984; Pinto & Bertolucci, 2002; Moreira et al., 2011); anti-microbial (Michelin et al., 2008); anti-inflammatory, anti-nociceptive (Orl&i et al., 2011); mutagenic (Sannomiya et al., 2007), anti-ulcer, anti-microbial, antidiarrhoeal (Santos et al., 2012c); antioxidant, anti-inflammatory & anti-peptic ulcer effects (Santos et al., 2019)	Phenolic compounds (Sannomiya et al., 2007; Santos et al., 2012c) & tannins (Orl&i et al., 2011)
<i>Diplopterys pubipetala</i> (A.Juss.) W.R. Anderson & C.C. Davis	No reports	No reports
<i>Eriotheca gracilipes</i> (K.Schum.) A.Robyns	No reports	Fatty acids (Mayworm & Salatino, 1996)
<i>Luehea divaricata</i> Mart. & Zucc.	Diuretic, hypotensive, anti-fungal, antioxidant, neuroprotective, anti-inflammatory, analgesic, immunostimulatory & anti-cholinesterase effects (Tirloni et al., 2018)	Phenolic compounds, triterpenoids & phytosterols (Tirloni et al., 2018)
<i>Miconia albicans</i> (Sw.) Triana	Anti-microbial (Alves et al., 2000); analgesic (Vasconcelos et al., 2003); anti-inflammatory (Vasconcelos et al., 2006); DNA protective (Serpeloni et al., 2011); antioxidant (Pieroni et al., 2011); anti-diabetic (Ortiz-Martinez et al., 2016; Lima et al., 2018); anti-microbial (Tomé et al., 2019) & antioxidant effects (Pasta et al., 2019)	Terpenes (Macari et al., 1990; Crevelin et al., 2006), phenolic compounds (Pieroni et al., 2011; Lima et al., 2018; Pasta et al., 2019); coumarins, triterpenes, tannins, flavonoids & saponins (Tomé et al., 2019)
<i>Brosimum gaudichaudii</i> Trécul	Potential mutagenic (Var&a et al., 2002; Araujo et al., 2015); anti-microbial effects (Borges et al., 2017); stimulation of migration & pigmentation of melanocytes (Quintão et al., 2019) & antioxidant effects (Ferreira et al., 2019)	Coumarins (Gottlieb et al., 1972; de Moraes et al., 2018; Quintão et al., 2019); condensed tannins (Monteiro et al., 2014) & flavonoids (Araujo et al., 2015)
<i>Campomanesia adamantium</i> (Cambess.) O. Berg	Antioxidant, anti-hyperlipidaemic (Ramos et al., 2007; Espindola et al., 2016); antioxidant (Vallilo et al., 2006; Coutinho et al., 2009; Pascoal et al., 2011); anti-microbial (Coutinho et al., 2009; Pavan et al., 2009; Cardoso et al., 2010; Moura-Costa et al., 2012; Breda et al., 2016); anti-nociceptive (Ferreira et al., 2013); anti-proliferative (Pascoal et al., 2014; Campos et al., 2017; Ferreira et al., 2013; Fern&es et al., 2015b; Lima e Silva et al., 2018); anti-inflammatory (Viscardi et al., 2017) & anti-depressant effects (Souza et al., 2014)	Phenolic compounds (Pavan et al., 2009; Coutinho et al., 2009; Pascoal et al., 2011, 2014; Espindola et al., 2016)
<i>Eugenia aurata</i> O. Berg	Anti-inflammatory effects (Costa et al., 2016)	No reports
<i>Eugenia dysenterica</i> (Mart.) DC.	Anti-fungal (Costa et al., 2000); molluscicidal (Bezerra et al., 2002); laxative (Lima et al., 2010); diarrhoeal (Lima et al., 2011; Galheigo et al., 2016); antiviral (Cecilio et al., 2012); tyrosinase inhibitory (Souza et al., 2012); gastroprotective (Prado et al., 2014); obesity preventive (Donado-Pestana, 2015); anti-proliferative, acetylcholinesterase inhibitory (Gasca et al., 2017); antioxidant (Daniel Daza et al., 2017; Ferreira-Nunes et al., 2018); neuroprotective (Thomaz et al., 2018); wound healing (Silva et al., 2018); hypotensive (Fidelis-de-Oliveira et al., 2020); angiogenic & antibacterial effects (Silva et al., 2020)	Terpenes (Costa et al., 2000; Duarte et al., 2009; Galheigo et al., 2016; Silva et al., 2018); saponins (Cecilio et al., 2012); tannins (Prado et al., 2014) & flavonoids (Donado-Pestana, 2015; Silva et al., 2020)
<i>Eugenia pitanga</i> (O. Berg) Kiaersk.	No reports	No reports

<i>Eugenia punicifolia</i> (Kunth) DC.	Anti-diabetic effects (Brunetti et al., 2006; Sales et al., 2014); recovery of the action of competitive nicotinic antagonists at the neuromuscular junction of the diaphragm of rats (Grangeiro et al., 2006); anti-inflammatory (Leite et al., 2010; Basting et al., 2014; Leite et al., 2014b; Costa et al., 2016); anti-nociceptive & gastroprotective effects (Basting et al., 2014); increases the exocytotic release of catecholamines from bovine adrenal chromaffin cells stimulated with ACh or K ⁺ (Pascual et al., 2011); cytostatic effects & activation of skeletal muscle remodelling (Leite et al., 2014b); antioxidation & inhibition of enzymes related to metabolic syndrome (Lopes et al., 2014)	Flavonoids (Basting et al., 2014; Sales et al., 2014), phenolic compounds & tannins (Brunetti et al., 2006; Costa et al., 2016)
<i>Myrcia bella</i> Cambess.	Anti-mutagenic, antioxidant & hypoglycaemic effects (Saldanha et al., 2013; Vareda et al., 2014)	Phenolic compounds (Saldanha et al., 2013; dos Santos et al., 2018)
<i>Myrcia guianensis</i> (Aubl.) DC.	Anti-proliferative, anti-microbial & antioxidant effects (dos Santos et al., 2018)	Polyphenolic compounds (dos Santos et al., 2018)
<i>Ouratea spectabilis</i> (Mart.) Engl.	Antioxidant effects (Felicio et al., 1995; Patel et al., 2012)	Phenolic compounds (Felicio et al., 1995; Patel et al., 2012; Mecina et al., 2014)
<i>Myrsine umbellata</i> Mart.	No reports	No reports
<i>Roupala montana</i> Aubl.	Schistosomicidal & anti-genotoxic effects (Cunha et al., 2012)	Terpenes (Cunha et al., 2012); flavonoids, carotenoids & saponins (Francielli et al., 2014; Kuster & Vale, 2016)
<i>Alibertia edulis</i> (Rich.) A. Rich.	Anti-microbial (Cândida da Silva et al., 2008); diuretic, hypotensive & anti-hypertensive effects (De Santana Aquino et al., 2017)	Flavonoids, terpenoids & saponin (Brochini et al., 1994); tannins, alkaloids & carotenoids (Soto-Sobenis et al., 2001; Cândida da Silva et al., 2008; Menegati et al., 2016)
<i>Cordia sessilis</i> (Vell.) Kuntze	Antioxidant & anti-microbial effects (Aquino et al., 2013b)	Terpenes, phenolic compounds & saponins (Aquino et al., 2013b)
<i>Guettarda viburnoides</i> Cham. & Schltdl.	Anti-inflammatory & antioxidant effects (Naressi, et al. 2015)	Iridoids (Naressi, et al. 2015)
<i>Palicourea coriacea</i> (Cham.) K. Schum.	Anti-genotoxic (Nunes et al., 2003) & diuretic effects (Freitas et al., 2011)	Triterpenes (Somova et al., 2003); alkaloids (Nascimento et al., 2007; do Nascimento et al., 2008); saponins, tannins & cumarins (da Silva et al., 2008b)
<i>Psychotria poeppigiana</i> Müll. Arg.	Vasoactive effects (Coe & erson, 1996)	Flavonoids, alkaloids, steroids, triterpenes & coumarins (Pino-Benitez, 2006; Villasmil et al., 2006; Silva et al., 2013)
<i>Tocoyena brasiliensis</i> Mart.	No reports	Terpenoids, saponins & flavonoids (Hamerski et al., 2005)
<i>Tocoyena formosa</i> (Cham. & Schltdl.) K. Schum.	Anti-fungal (Bolzani et al., 1996); antioxidant (David et al., 2007); anti-nociceptive (Cesário et al., 2018) & anti-inflammatory effects (Cesário et al., 2019)	Iridoids, ethyl esters (Bolzani et al., 1996; Bolzani et al., 1997; Hamerski et al., 2005); polyphenolic flavonoids (Cesário et al., 2018); phenolic compounds, terpenoids & saponins (Cesário et al., 2019)
<i>Casearia sylvestris</i> Sw.	Anti-ulcerogenic (Basile et al., 1990; Sertié et al., 2000; de Mattos et al., 2007; Ferreira et al., 2011); anti-tumour (Itokawa et al., 1990; da Silva et al., 2008a; dos Santos et al., 2010; Felipe et al., 2014; Ferreira et al., 2016); anti-haemorrhagic & anti-coagulant (Borges et al., 2001); anti-parasitic (Oberlies et al., 2002; Espindola et al., 2004; Antinarelli et al., 2015); genotoxic (Maistro et al., 2004); anti-inflammatory (Esteves et al., 2005; Ferreira et al., 2016; Pierri et al., 2017); anti-microbial (Schneider & Fern&es, 2006); anti-nociceptive (de Mattos et al., 2007); cytotoxic, anti-hyperlipidaemic (Schoenfelder et al., 2008); allelopathic (Capobianco et al., 2009); phospholipase A2 inhibitory (Ferreira et al., 2011); antioxidant (Albano et al., 2013); anti-nociceptive & lipid-lowering effects (Brant et al., 2014)	Flavonoids (Bueno et al., 2016; Vieira Júnior et al., 2017) & terpenes (Basile et al., 1990; Oberlies et al., 2002; Espindola et al., 2004; Santos et al., 2007)
<i>Allophylus edulis</i> (A.St.-Hil. et al.) Hieron.	Inhibition of angiotensin converting enzyme (ACE) & β -glucuronidase, cytotoxicity to KB cells (Arisawa et al., 1989); anti-hepatotoxic effects (Hoffmann-Bohm et al., 1992); negative ionotropic effects (Matsunaga et al., 1997); antioxidant, anti-microbial, low toxic effects (Tirloni et al., 2015); antioxidant, anti-microbial & anti-inflammatory effects (Trevizan et al., 2016)	Triterpenoids, alkaloids & anthocyanidins (B&oni et al., 1976); cyanolipid, triacylglycerol (Aichholz et al., 1997); phenolic compounds (Arisawa et al., 1989; Hoffmann-Bohm et al., 1992); L-quebrachitol (Díaz et al., 2008) & terpenes (Trevizan et al., 2016)
<i>Pouteria torta</i> (Mart.) Radlk.	Anti-mutagenic effects (Costa et al., 2014)	Flavonoids (Costa et al., 2014)
<i>Solanum lycocarpum</i> A.St.-Hil.	Anti-inflammatory (Vieira et al., 2003); anti-diabetogenic (Yoshikawa et al., 2007); anthelmintic (Costa et al., 2008); cytotoxic, genotoxic, anti-genotoxic (Munari et al., 2012); antioxidant (Schwarz et al., 2007) & immunomodulating effects (Mir&a et al., 2013)	Phenols, tannins, flavonoids, steroids, terpenes, saponins, alkaloids (Araújo et al., 2010; Munari et al., 2012; Torralbo et al., 2012) & pectin (Torralbo et al., 2012)
<i>Qualea grandiflora</i> Mart.	Anti-inflammatory, anti-ulcerogenic, gastric mucosal protection, analgesic, anti-convulsant, antiseptic, antibacterial, CNS depressant (Gaspi et al., 2006); mutagenic (Santos et al., 2011); antioxidant (Bonacorsi et al., 2013) & anti-microbial effects (Pires et al., 2018)	No reports

<i>Qualea multiflora</i> Mart.	Molluscicidal (de Souza et al., 1984); cytotoxic (Nasser et al., 2008) & mutagenic effects (Santos et al., 2011)	Terpenes, steroids (Santos et al., 2011) & ellagic acid derivatives (Nasser et al., 2008; Carnevale Neto et al., 2011)
<i>Qualea parviflora</i> Mart.	Antioxidant (Bonacorsi et al., 2013); <i>in vitro</i> mutagenic (Santos et al., 2011); gastroprotective, antidiarrhoeal, anti-haemorrhagic & mutagenic effects (Mazzolin et al., 2010)	No reports
<i>Vochysia tucanorum</i> Mart.	Gastroprotective effects (Gomes et al., 2009)	Polyphenols, flavonoids & condensed tannins (Franco et al., 2019)

3.2 Brazilian Government-Public Access to Herbal Medicines

In Brazil, the Unified Health System (SUS) is in place and consists of a public health system that covers everything from primary care to organ transplantation, guaranteeing full, universal and free access by the entire country's population. Among the existing projects of the SUS is the RENISUS (National List of Medicinal Plants of Interest to the SUS), which contains medicinal plants that have the potential to generate products of interest to the SUS. Among the listed species are 71 plants popularly used and scientifically confirmed. The purpose of the list is to guide studies and research that can support elaboration of the list of herbal medicines available for safe and effective use by the population to treat a certain disease (De Aquino et al., 2019).

Considering the relevance of the plant species found in the RENISUS list, we researched which were present in the studied area (Settlement 17 de Abril) and related them to their popular uses and associated scientific studies. Of the 89 species found in the April 17 settlement, only three are listed in the RENISUS: *Casearia sylvestris*, *Copaifera* spp * (*Copaifera langsdorffii*) and *Stryphnodendron adstringens*.

Casearia sylvestris, popularly known as “guaçatonga”, is used in folk medicine for purification and to treat diarrhoea, fever, rheumatism, skin disorders and snake bites (Table 1). Scientific studies report anti-ulcerogenic, anti-inflammatory, anti-tumour, anti-hyperlipidaemic, anti-coagulant, trypanocidal, leishmanicidal, anti-microbial, genotoxic, allelopathic, anti-hyperalgesic, antioxidant, phospholipase A2 inhibitory and anti-parasitic effects of leaves (Table 2). The bark demonstrated anti-tumour activity (Table 2). Phytochemical studies report the presence of flavonoids in the leaves and aerial parts and terpenes in the leaves of this species (Table 2).

Copaifera langsdorffii is popularly known as “copaiba”, and resin-extracted oil from its trunk is used by the population to treat inflammation, sore throat, urinary and pulmonary infections, and accelerate wound and ulcer healing (Table 1). Studies conducted on the leaves of this species report potential gastroprotective, anti-inflammatory and antifungal effects and significant genotoxicity (Table 2). Phytochemical studies reported the presence of galloquinquinic acids in the leaves. Oil extracted from the trunk, which is popularly used in folk medicine, has been shown in biological studies to induce cell cycle arrest and apoptosis, with a protective effect against colon carcinogenesis, cytotoxicity, embryotoxicity and bacteria (Table 2). The seeds present immunomodulatory activity and the presence of xyloglucans and galloquinquinic acids (Table 2). Another part of this species is the fruits, which present antioxidant activity (Table 2).

The barbed bark from *Stryphnodendron adstringens*, “barbatimão”, is widely used in two different ways: externally for the treatment of uterine conditions, vaginal conditions, urinary tract infections, skin lesions, ulcers, inflammation, infections and skin infections; and internally for diarrhoea, throat inflammation, bleeding, scurvy, pulmonary complications, and respiratory infections. Additionally, internal use can be used to treat diarrhoea, sore throat, bleeding, scurvy, pulmonary complications, and respiratory infections (Table 1). Scientific studies have validated the popular indications, highlighting some biological activities in the stem bark of this species. Studies report trypanocidal, anti-fungal, antibacterial, antioxidant, anti-ulcerogenic, antigenic, anti-inflammatory and anti-mutagenic effects, as well as the presence of proanthocyanidins, flavonoids, proribinetinidines and tannins (Table 2).

The presence of these species demonstrates the importance of further scientific studies to prove their ethnopharmacological action against diseases, as well as ensuring secure access to and the rational use of medicinal and herbal plants, the development of technologies and innovations, the strengthening of chains and productive arrangements, the sustainable use of Brazilian biodiversity and the development of the Health Productive Complex.

4. Conclusion

This study provides 89 medicinal plants belonging to 39 families documented from the study area (reserve area of the settlement “17 April”, MS, Brazil) for the first time. The most widespread traditional use, involves the

treatment of gastro-intestinal system diseases (41 spp) and the most utilized parts were leaves (41%), justifying the conservation of biodiversity. Thus, future studies should be focused to establish the links between the traditional uses, active compounds and reported pharmacological activities. Additionally, three species are listed in the National Program for Medicinal and Phototherapeutic Plants (*Casearia sylvestris*, *Copaifera langsdorffii* and *Stryphnodendron adstringens*).

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Abbreviations

CSD, Cardiovascular System Diseases; DDMS, Protocol number specimen; DSD, Gastro-intestinal System Diseases; ENM, Endocrine System Diseases; ID, others Inflammatory Diseases; IPD, Infectious Diseases; GUS, Obstetrics, Gynecology and Urinary-tract Diseases; MCT, Musculoskeletal and Joint Diseases; MS, Mato Grosso do Sul; NEP, Malignant Diseases; NSD, Central Nervous System Diseases; OD, Others Diseases; RENISUS, National list of medicinal plants of interest to the SUS; RSD, Respiratory System Diseases; SUS, Unified health system; SST, Skin, Eye, Ear, Nose and Oropharynx Diseases; WHO, World Health Organization.

Supplementary Files

References listed in Tables 1 and 2 can be retrieved from <http://admin.ccsenet.org/press/index.php/galley/download/article/43938/id/46206>

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