Survey of Medicinal Plants Used as Hypotensives in Brazil: A Critical Review of Ethnopharmacological and Pharmacological Data

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Abstract

Systemic Arterial Hypertension (SAH) affects about 30% of adults and 60% of those aged 65 or older in Brazil, and medicinal plants are widely used as hypotensives. This review asked whether the hypotensive effects popularly attributed to plants used in Brazil are corroborated, contradicted, or simply unstudied in the pharmacological literature for the same species, and characterised their patterns of use. A narrative review with a structured literature search was conducted in ScienceDirect, PubMed/MEDLINE, SciELO, Springer Link, Wiley and Google Scholar (1985–2024), using English and Portuguese search terms, followed by a species-directed search for pharmacological evidence. A total of 114 species in 46 families were identified from 44 ethnobotanical/ethnopharmacological surveys, with pharmacological data drawn from 95 studies. The most cited species were *Cymbopogon citratus* (14), *Lippia alba* (11) and *Sechium edule* (10); the most cited families were Lamiaceae, Poaceae and Asteraceae. Leaves (76.3%) and infusion (59.6%) predominated. Evidence was graded by category and level. No species (0%) showed pharmacological evidence contradicting its popular hypotensive use; 39 species (34.2%) had no blood-pressure study identified (evidence gap); and 75 (65.8%) had supporting evidence, although only 49 (43.0% of all species) rested on direct in vivo or human blood-pressure data, the remainder being indirect/mechanistic. Thus the apparent "divergence" reflects evidence gaps rather than disagreement. Most popular uses are plausible, but the largely preclinical evidence base warrants caution before clinical recommendation and supports further validation within Primary Health Care.

Introduction

Use of medicinal plants

The use of plants *in natura* for therapeutic purposes by populations worldwide has been increasingly integrated into health care, particularly when allied with conventional therapy (Barroso et al. 2021). Since the Alma-Ata Declaration in 1978, the World Health Organization has emphasized the importance of integrating medicinal plants into public health, given that approximately 80% of the world population uses plants found in their regions and/or their preparations for health maintenance, owing to their lower financial cost (Brasil 2018). Such practices are often described as less aggressive to the organism (Hirota et al. 2014), with fewer side effects (Malachias et al. 2016); nevertheless, some plants regarded as medicinal have shown toxicity (Brasil 2022). The role of developing countries is also relevant, since they harbour a large share of the world's plant species (Rang et al. 2020; Sociedade Brasileira de Cardiologia [SBC] 2020).

Brazil represents a territory rich in biodiversity and cultural diversity, including indigenous, quilombola, and other traditional communities derived from more recent migratory waves. This composition results in an environment rich in knowledge regarding medicine based on medicinal plants (Silveira et al. 2008). In Brazil, knowledge about the use of medicinal plants is and has been derived mainly from indigenous peoples (Silveira et al. 2008; Lorenzi and Matos 2002), with more recent African and European influences (Silveira et al. 2008).

In this context, several public-incentive policies have been implemented in Brazil since the 1988 Constitution, including the National Policy on Medicinal Plants and Phytotherapy in 2005, which culminated in the National Policy on Integrative and Complementary Practices, with a chapter dedicated to medicinal plants and phytotherapy. This policy supports the implementation of state and municipal actions in Primary Health Care throughout the country, such as "green pharmacies" and medicinal gardens (Brasil 2018).

For part of the population, the use of plants is the only therapeutic resource accessible to those in socioeconomic vulnerability, based on traditional knowledge passed down through generations from native peoples, occurring mainly in rural communities (IBGE 2020), where access to medicines, even from the public sector, is often scarce (Kasper et al. 2020).

However, the use of medicinal plants and herbal products by the population is far from ideal (Brasil 2023). From their commercialization—predominantly in open-air markets, herbalist shops, and popular markets, often without guarantee of correct plant identification, with inadequate storage and indiscriminate selling—to their use without consideration of plants that present toxicity associated with hepatic and renal dysfunctions, interactions with allopathic medications, and the fact that some plants are contraindicated for children, pregnant women, and the elderly (SBC 2020; Brasil 2023).

Furthermore, despite governmental encouragement and several solid examples of phytotherapy and medicinal-plant access projects in Primary Health Care, few health professionals, including physicians, have evidence-based knowledge about the use of such complementary therapy, which hinders the monitoring and counselling of the population that uses and needs this practice (SBC 2020; Brasil 2023). Health professionals, particularly physicians, play a crucial role in advising on the use of medicinal plants and herbal products in primary care, since they can become guides of conduct, being closer to the population and able to provide informed prescription of such medications (Brasil 2023; Lobo et al. 2017).

Ethnopharmacology

Ethnobotanical and ethnopharmacological studies form the scientific database for acquiring knowledge about medicinal plants, preserving the ecosystem that contains them, and directing the search for natural substances of therapeutic action (Etkin 2001; Albuquerque and Hanazaki 2006). These data can be used by health professionals for population treatment, especially in Brazil, where the economically vulnerable population depends on the action of Primary Health Care units (Brasil 2023; Boing et al. 2013; Eisenberg et al. 1993).

Ethnopharmacology denominates a field of knowledge, intersecting with ethnobotany, that addresses the relationships among peoples, ethnic and traditional communities, and knowledge about the use of plants, animals, fungi, and minerals considered medicinal in their health care actions (Etkin 2001). This process has been consolidated in academia as one of the main mechanisms for screening potential medicinal plants and possible new drugs (Silveira et al. 2008; Albuquerque and Hanazaki 2006).

Ethnodirected pharmacological studies aim, mainly within ethnopharmacology, at bioprospecting and the advancement of pharmaceutical science, with the discovery of new drugs and their inclusion in the biomedical pharmacopoeia; the conservation and preservation of biodiversity; the promotion of local plant use in combination with already known drugs and other biomedical technologies; and the use of local community knowledge while respecting their intellectual property (Etkin 2001).

Recent studies of plants used for mental and neurological complaints have shown considerable discrepancy between ethnopharmacological surveys and data from scientific phytochemical and pharmacological studies (Cavalcante e Costa et al. 2018; Aversi-Ferreira et al. 2013), demonstrating the need for research that examines the appropriate use of medicinal plants and the comparison of data between these areas to support safe use.

Systemic Arterial Hypertension (SAH)

Systemic Arterial Hypertension (SAH) is conceptualized as a multifactorial condition with polygenic, epigenetic, and environmental influences, characterized by sustained maintenance of systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg, frequently associated with diabetes mellitus, dyslipidaemias, and nephropathies (Basile 2020; Barroso et al. 2021; Malachias et al. 2016).

In Brazil, SAH is estimated to affect approximately 30% of adults and more than 60% of the elderly, accounting directly or indirectly for approximately 50% of deaths from cardiovascular diseases, in addition to being one of the main causes of hospitalization, with high socioeconomic impact (Malachias et al. 2016; Brasil 2023). Data from VIGITEL 2023 (Brasil 2023) reveal that the prevalence of self-reported medical diagnosis of SAH in Brazil is approximately 26%, being higher in women (28%) than in men (23%), with a progressive increase with age, reaching more than 65% in those older than 65 years; the two figures are compatible, the lower value reflecting self-reported diagnosis and the higher value measured or overall prevalence. The disease is also more prevalent in individuals with lower educational level, reinforcing its socioeconomic component (Brasil 2023; Lobo et al. 2017).

The main risk factors include advanced age, male sex, Black ethnicity, overweight, sedentary lifestyle, high sodium intake, alcohol consumption, smoking, family history, diabetes, and dyslipidaemia (Barroso et al. 2021; Malachias et al. 2016).

Antihypertensive drugs in SAH treatment

The pharmacological treatment of SAH includes multiple drug classes, each with distinct mechanisms and sites of action—kidneys, autonomic nervous system, vasculature, and heart. The main classes recommended by the Brazilian Hypertension Guidelines are diuretics, beta-blockers, calcium channel blockers, angiotensin-converting enzyme inhibitors (ACEi), angiotensin II receptor blockers (ARB), centrally acting agents, alpha-blockers, and direct renin inhibitors (Barroso et al. 2021; Malachias et al. 2016). When the pressure target is not achieved with monotherapy, the combination of synergistic and complementary agents is recommended, typically a thiazide diuretic plus ACEi or ARB or a calcium channel blocker plus ACEi/ARB; in refractory cases spironolactone may be added as a fourth drug, in addition to investigating secondary causes (Whelton et al. 2018; Barroso et al. 2021).

The integration of phytotherapeutics into this regimen, a frequent practice in the Brazilian population and recognized by the National Policy on Integrative and Complementary Practices (PNPIC), requires knowledge of the mechanisms of action of plants, possible pharmacodynamic and pharmacokinetic interactions with allopathic drugs, and monitoring through a structured pharmacovigilance programme (Brasil 2018; Brasil 2022; Garlet and Irgang 2001). A detailed understanding of these mechanisms is fundamental not only for individualized therapeutic choice but also to support the safe integration of phytotherapeutics and medicinal plants into the antihypertensive regimen, requiring studies that isolate and identify active principles, pharmacological interactions, and adequate therapeutic windows (Brasil 2018; Silveira et al. 2008; Garlet and Irgang 2001).

Therefore, the objective of the present article is to verify whether the effects of plants used popularly as medicinal for the reduction of blood pressure in SAH are corroborated, contradicted, or left unstudied by pharmacological studies of the same species, and to characterize their patterns of use across Brazilian regions and communities.

Material and Methods

Study design and terminology

This work is a narrative review supported by a structured literature search. It does not constitute a systematic review: no protocol was registered, screening was not performed in duplicate by independent reviewers, and a formal risk-of-bias instrument was not applied. We therefore use the term “structured literature search” throughout and grade the retrieved evidence qualitatively (see Evidence appraisal framework).

Search strategy and sources

Two sequential retrieval stages were used. In Stage 1, Brazilian ethnobotanical/ethnopharmacological surveys reporting plants of popular hypotensive use were identified. In Stage 2, a species-directed search retrieved phytochemical and pharmacological studies for each species identified in Stage 1. Searches were run in ScienceDirect (Elsevier), PubMed/MEDLINE, SciELO, Springer Link, Wiley Online Library and Google Scholar, for material preferably published between 1985 and 2024; the lower bound of 1985 was adopted because indexed Brazilian ethnobotanical surveys of medicinal plants become consistently retrievable from the mid-1980s.

Search terms were applied in English and Portuguese. Stage-1 strings (illustrative): (“medicinal plants” OR “ethnobotany” OR “ethnopharmacology”) AND (“arterial hypertension” OR “high blood pressure” OR hypotensive OR antihypertensive) AND Brazil; and (“plantas medicinais” OR “etnobotânica” OR “etnofarmacologia”) AND (“hipertensão arterial” OR “pressão alta” OR “anti-hipertensivo” OR “diurético”) AND Brasil. Stage-2 strings (per species): “Genus species” AND (antihypertensive OR hypotensive OR vasorelaxant OR vasodilator OR diuretic OR “ACE inhibition” OR “blood pressure”). The complete strings per database and the full record counts are provided as Online Resource 1 (PRISMA-style flow diagram).

Eligibility criteria

Inclusion: Brazilian ethnobotanical/ethnopharmacological surveys (review and field studies) reporting plants used for blood-pressure-related indications; pharmacological/phytochemical studies of the same species; and contextual literature on SAH and antihypertensive drug classes. Exclusion: surveys of non-medicinal plants; surveys for ailments unrelated to arterial hypertension; surveys not linking the plant to the cited ailment; and veterinary uses.

Definition of popular hypotensive use. A plant was considered of popular hypotensive use when the source survey reported it for an explicit blood-pressure-related indication (“pressure”, “hypotensive”, “antihypertensive”, “hypertension”, “for high blood pressure”, “to regulate blood pressure”). Plants reported only as “diuretic” without any blood-pressure indication are tabulated as a separate, clearly labelled subset rather than counted as hypotensive use, because a popular diuretic use (for urinary complaints or oedema) is not equivalent to a blood-pressure indication; this prevents the circularity of admitting a plant on a diuretic use and then “confirming” it with a diuretic pharmacological study.

Record management and deduplication

Records from all sources were combined and deduplicated by title, authors, year and DOI; Google Scholar was used to capture grey literature and regional Brazilian journals not indexed elsewhere, and its records overlapping with PubMed/ScienceDirect were removed at this step. After deduplication, 172 unique references were retained: 139 used to build Table 1 (44 ethnobotanical/ethnopharmacological sources— 38 articles, 3 master’s dissertations, 2 undergraduate theses, 1 monograph— and 95 pharmacological studies) and 33 contextual references. The flow of identification, screening, exclusion and inclusion is summarised in Online Resource 1.

Table 1

Medicinal plants used as hypotensives in Brazil: traditional use and graded pharmacological evidence Evidence category: A = evidence gap (no blood-pressu = divergence (study reported null/negative/contradictory blood-pressure findings); C = concordance (supporting evidence). Highest level of evidence: 0 = none mechanistic; II = in vivo animal; III = human/clinical; IV = systematic review or meta-analysis. Direction vs. BP: whether the evidence shows direct blood-pre vivo/human) or only an indirect/mechanistic effect. The original source citations for each species are retained in the descriptive columns. In total were s 114 Category A (evidence gap) 39 (34.2%): 36 with no pharmacological study (A1) and 3 with non-hypotensive activities only (A2). Category B (divergence) 0 ((concordance) 75 (65.8%); within C, 49 species (43.0% of all) with direct in vivo/human evidence and 26 (22.8%) with indirect/mechanistic evidence only; 7 sp diuretic study alone.

Scientific name	Popular / Common name	Family	Popular indication	Preparation method	Parts used	Pharmacological properties	Evi dire
Abelmoschus esculentus	Quiabo (PT) — Okra (EN)	Malvaceae	High blood pressure and diabetes (Martins 2016)	Fresh (in natura) (Martins 2016)	Fruit (Martins 2016)	Antihypertensive; antihyperlipidemic; diuretic (Mondal et al. 2019; Esmaeilzadeh et al. 2020)	II; D vivo
Acanthospermum hispidum	Cabeça-chata (PT) — Bristly starbur (EN)	Asteraceae	Gallbladder stones, pneumonia, hypertension, fever (Oliveira et al. 2010)	Decoction; infusion (Oliveira et al. 2010)	Leaf (Oliveira et al. 2010)	Natriuretic, diuretic, vasodilator (Palozi et al. 2017)	I; In vitro
Achillea millefolium	Mil em ramas (PT) — Yarrow (EN)	Asteraceae	Analgesic, anti-inflammatory, back pain, blood pressure (Leite and Oliveira 2013)	Infusion; decoction (Oliveira et al. 2010)	Leaf (Oliveira et al. 2010)	Hypotensive, diuretic, vasodilator (De Souza et al. 2011)	II; D vivo
Achyrocline satureioides	Marcela (PT) — Brazilian everlasting (EN)	Asteraceae	Flu, stomach, hypertension, vomiting, diarrhoea, infections, blood cleansing (Lobler et al. 2014)	Boiling; infusion (Lobler et al. 2014)	Flower (Lobler et al. 2014)	No evidence of antihypertensive, hypotensive or diuretic effect in the literature reviewed. Documented activities: antioxidant, anti-inflammatory, antispasmodic (Bianchi et al. 2023)	I/II;
Adiantum capillus	Avenca (PT) — Maidenhair fern (EN)	Pteridaceae	High blood pressure (Siqueira 2014)	Infusion (Siqueira 2014)	Leaf (Siqueira 2014)	Diuretic (Dizaye and Mahwi 2011)	I; In (diu
Aeollanthus suaveolens	Macaçá / Catinga-de-mulata (PT)	Lamiaceae	Colic, earache, hypertension, fever, sore throat, heart (Brito et al. 2015)	Infusion; decoction (Brito et al. 2015)	Leaf (Brito et al. 2015)	—	0; –
Ageratum conyzoides	Maria preta (PT) — Goatweed (EN)	Asteraceae	Antitussive, anti-flu, hypotensive, wound-healing (Borges and Bautista 2018)	Syrup; infusion (Borges and Bautista 2018)	Leaf (Borges and Bautista 2018)	Hypotensive; anti-inflammatory; antidiabetic (Achola et al. 1994; Kamboj and Saluja 2008)	I; In vitro
Allium sativum	Alho (PT) — Garlic (EN)	Amaryllidaceae	Flu, sore throat, high blood pressure, colics, weight loss, headache, fever, cancer (Ribeiro et al. 2014); flu, hypertension (Baptistel et al. 2014); hypertension (Teixeira et al. 2014)	Decoction; lambedor (syrup); infusion (Ribeiro et al. 2014; Baptistel et al. 2014; Teixeira et al. 2014)	Fruit (Ribeiro et al. 2014); bulb (Baptistel et al. 2014); seed (Teixeira et al. 2014)	Antihypertensive; vasodilator; ACE inhibitor (via H_2S and endothelial NO) (Ried and Fakler 2014; Xiong et al. 2015)	IV; (hu
Alpinia speciosa	Colônia, mãe boa (PT) — Shellflower (EN)	Zingiberaceae	Hypertension, sedative (Nunes et al. 2015); hypertension, fever, flu, general pain and nervous problems (Barbosa 2011)	Decoction (Nunes et al. 2015); infusion (Barbosa 2011)	Leaf (Nunes et al. 2015); leaf, flower (Barbosa 2011)	Antihypertensive (Vargas and Carvalho 2010)	II; D vivo
Alpinia zerumbet	Colônia (PT) — Shellflower (EN)	Zingiberaceae	Arterial hypertension, calming, cardiovascular diseases (Brito et al. 2015; Nunes et al. 2015)	Infusion; decoction; bath (Brito et al. 2015)	Leaf, flower (Brito et al. 2015)	Antihypertensive (Barcelos et al. 2010; Pinto et al. 2009; Cunha et al. 2013)	II; D vivo

Scientific name	Popular / Common name	Family	Popular indication	Preparation method	Parts used	Pharmacological properties	Evi dire
Amburana cearensis	Umburana de cheiro (PT) — Brazilian Cumaru (EN)	Fabaceae (Papilionoideae)	Sinusitis, flu, pneumonia, gastritis, poor digestion, anti-inflammatory, analgesic (headache and stomach pain), diarrhoea, hypertension, cough, antiseptic, swollen abdomen, anticoagulant, antibiotic, snakebite (Albergaria et al. 2019)	Tea; tincture; maceration; bath; lambedor (syrup) (Albergaria et al. 2019)	Stem bark + root; inner bark; seed (Albergaria et al. 2019)	Documented activities: anti-inflammatory, antinociceptive, antimicrobial (Castro e Silva et al. 2020)	I/II;
Anethum graveolens	Endro (PT) — Dill (EN)	Apiaceae	Stomach upset, high blood pressure, calming (Ribeiro et al. 2014); treatment and blood pressure control (Oliveira and Santos 2016)	Decoction (Ribeiro et al. 2014)	Seed (Ribeiro et al. 2014)	Antihypertensive; diuretic; hypolipidemic (Goodarzi et al. 2018; Yazdanparast and Bahramikia 2008)	II; D vivo
Cinnamomum zeylanicum	Canela (PT) — Cinnamon (EN)	Lauraceae	Calming, menstrual cramps, hypertension (Leme et al. 2010); calming, high blood pressure (Ribeiro et al. 2014)	Infusion; decoction; seasoning/condiment (Leme et al. 2010)	Leaves, stem (Leme et al. 2010); stem bark (Ribeiro et al. 2014)	Antihypertensive (Hadi et al. 2020; Rao and Gan 2014)	IV; (hu
Annona coriacea	Araticum (PT) — Marolo (EN)	Annonaceae	High blood pressure, snakebite (Macêdo et al. 2015)	Decoction (Macêdo et al. 2015)	Leaf (Macêdo et al. 2015)	—	0; –
Annona muricata	Graviola (PT) — Soursop (EN)	Annonaceae	High blood pressure, weight loss, fever (Ribeiro et al. 2014); hypotensive (Borges and Bautista 2018)	Decoction (Ribeiro et al. 2014); infusion; juice (Borges and Bautista 2018)	Leaf (Ribeiro et al. 2014); leaf, fruit (Borges and Bautista 2018)	Antihypertensive (Patel and Patel 2016)	II; D vivo
Annona squamosa	Pinha (PT) — Sugar apple (EN)	Annonaceae	Improves renal function, lowers blood pressure (Oliveira et al. 2012)	Infusion (Oliveira et al. 2012)	Leaf; fruit; seed (Oliveira et al. 2012)	Antihypertensive; vasorelaxant; bradycardic (Pandey and Barve 2011)	II; D vivo
Argemone mexicana	Cardo santo (PT) — Mexican poppy (EN)	Papaveraceae	Nervous system disorders, anaemia, parasitic conditions, hypertension, diarrhoea, indigestion, abdominal pain or colics (Bandeira 2014)	Decoction; infusion (Bandeira 2014)	Leaf; stem; root; seed (Bandeira 2014)	—	0; –
Aristolochia triangularis	Cipó-mil-homens (PT) — Triangular dutchmanspipe (EN)	Aristolochiaceae	Infection, inflammation, digestive and hepatic problems, cardiac problem, prostate diseases, hypertension (Frigotto and Portella 2012)	Decoction (Frigotto and Portella 2012)	Root + branches (Frigotto and Portella 2012)	—	0; –
Artemisia verlotiorum	Incenso da horta (PT) — Chinese mugwort (EN)	Asteraceae	Vomiting, liver, abdominal and stomach pain, hypertension (Spisla 2017)	Infusion; decoction (Spisla 2017)	Leaf; aerial parts (Spisla 2017)	—	0; –
Artemisia vulgaris	Anador asteraceae (PT) — Common mugwort (EN)	Asteraceae	Hypertension (Nunes et al. 2015)	Infusion; decoction (Nunes et al. 2015)	Leaf; aerial parts (Nunes et al. 2015)	Antihypertensive; vasorelaxant (Tigno et al. 2000)	II; D vivo
Averrhoa bilimbi	Biribiri (PT) — Bilimbi (EN)	Oxalidaceae	Antidiabetic, hypotensive, anticholesterolemic	Fresh (in natura) (Borges and Bautista 2018)	Fruit (Borges and	Antihypertensive (Lestari et al. 2018; Yulia et al. 2017)	II; D vivo

Scientific name	Popular / Common name	Family	Popular indication	Preparation method	Parts used	Pharmacological properties	Evi dire
			(Borges and Bautista 2018)		Bautista 2018)		
Averrhoa carambola	Carambola (PT) — Star fruit (EN)	Oxalidaceae	Hypotensive (Borges and Bautista 2018)	Infusion; juice (Borges and Bautista 2018)	Leaf; fruit (Borges and Bautista 2018)	Antihypertensive (Saghir et al. 2013)	II; D viv
Baccharis trimera	Carqueja (PT) — Carqueja (EN)	Asteraceae	High blood pressure (Rogério 2014)	Infusion; decoction (Rogério 2014)	Aerial parts; leaf (Rogério 2014)	Hypotensive, vasodilator (Gómez et al. 2016)	I; In vitr
Bauhinia cheilantha	Mororó (PT) — Cow's hoof (EN)	Fabaceae	Wound-healing, anticoagulant, diabetes, improves renal function, improves blood circulation, cholesterol, antiseptic, antitumour, anti-inflammatory (sore throat) and hypertension (Albergaria et al. 2019); diabetes, flu, nerves, high blood pressure, kidney pain, urinary tract infection, inflammation (Ribeiro et al. 2014)	Tea; tincture; maceration; lambedor; fresh (in natura); decoction; infusion (Baptistel et al. 2014; Albergaria et al. 2019)	Stem bark; inner bark; leaf; bark; flower (Baptistel et al. 2014; Albergaria et al. 2019)	—	0; –
Bauhinia forficata	Mororó / pata-de-vaca (PT) — Cow's hoof (EN)	Fabaceae	Bladder, kidneys, diabetes, arterial hypertension (Pasa et al. 2015); diuretic (Lorenzi and Matos 2002)	Decoction; infusion; tea (Lorenzi and Matos 2002)	Leaf; stem bark (Lorenzi and Matos 2002)	Antihypertensive (De Souza et al. 2017; Anjos et al. 2013)	II; D viv
Blepharocalyx salicifolius	Murta (PT) — Murta / Anhuera (EN)	Myrtaceae	Hypertension (Silva et al. 2022)	Infusion; decoction (Silva et al. 2022)	Leaf (Silva et al. 2022)	Cardiac positive inotropic effect (Hernández et al. 2018)	I; In BP)
Bixa orellana	Urucum (PT) — Annatto (EN)	Bixaceae	High blood pressure (Martins 2016); anaemia, high blood pressure and triglycerides (Pimenta et al. 2009); antidiabetic, hypotensive (Borges and Bautista 2018)	Maceration (Martins 2016); decoction (Borges and Bautista 2018)	Seed (Martins 2016; Borges and Bautista 2018)	Hypotensive; hypolipidemic; antidiabetic (Fleischer et al. 2003)	II; D viv
Caesalpinia bracteosa	Pau de rato (PT) — Catingueira (EN)	Fabaceae (Caesalpinioideae)	Renal infection, liver, gastritis, hypertension, diarrhoea, intestinal infection in adult and child, intestinal colic, poor digestion, aids in tooth eruption in children (Baptistel et al. 2014)	Decoction; maceration (Baptistel et al. 2014)	Fruit + bark (Baptistel et al. 2014)	—	0; –
Capsicum frutescens	Pimenta malagueta (PT) — Bird's eye chili (EN)	Solanaceae	Circulation problems, hypertension (Oliveira et al. 2010)	Decoction; maceration (Oliveira et al. 2010)	Fruit (Oliveira et al. 2010)	Antihypertensive; vasorelaxant (TRPV1 activation) (Yang et al. 2010)	I; In vitr
Carica papaya	Mamão-macho (PT) — Papaya (EN)	Caricaceae	High blood pressure (Pereira et al. 2011)	Decoction; infusion (Pereira et al. 2011)	Flower (Pereira et al. 2011)	Antihypertensive (Hasimun et al. 2020; Eno et al. 2000)	II; D viv
Casearia sylvestris	Tiuzinho (PT) — Guaçatonga (EN)	Salicaceae	Hypertension (Fagundes et al. 2017)	Maceration (Fagundes et al. 2017)	Root (Fagundes et al. 2017)	Antihypertensive, cardioprotective (Frediani Brant et al. 2014)	II; D viv
Cecropia pachystachya	Embaúba (PT) — Trumpet tree (EN)	Urticaceae	Antihypertensive (Silva et al. 2016)	Infusion; decoction (Silva et al. 2016)	Leaf (Silva et al. 2016)	Smooth muscle relaxant (Consolini et al. 2005)	I; In vitr

Scientific name	Popular / Common name	Family	Popular indication	Preparation method	Parts used	Pharmacological properties	Evi dire
Cissus sicyoides	Pucá (PT) — Princess vine (EN)	Vitaceae	High and low blood pressure, headache (Souza and Guarim Neto 2009)	Tea (Souza and Guarim Neto 2009)	Leaf + flower (Souza and Guarim Neto 2009)	—	0; –
Citrus aurantifolia	Lima (PT) — Key lime (EN)	Rutaceae	Antihypertensive, renal disorders (Gonçalves et al. 2017); tachycardia, calming, hypotension (Baptistel et al. 2014)	Infusion (Borges and Bautista 2018)	Fruit + leaf; leaf; bark (Borges and Bautista 2018)	Hypotensive (Enejoh et al. 2015)	II; D viv
Citrus aurantium	Laranja-da-terra amarga (PT) — Bitter orange (EN)	Rutaceae	Hypotensive, digestive, expectorant (Borges and Bautista 2018)	Infusion; fresh (in natura) (Borges and Bautista 2018)	Leaf; fruit (Borges and Bautista 2018)	Diuretic (Enejoh et al. 2015); hypotensive, cardiotonic, and sedative effects were also described for the leaves aqueous extract (Pacheco et al. 2014)	II; D viv
Citrus limon	Limoeiro / limão (PT) — Lemon (EN)	Rutaceae	Flu, high blood pressure (Silva et al. 2009)	Tea (Silva et al. 2009)	Leaf; fruit (Silva et al. 2009)	Antihypertensive (Oboh et al. 2015)	II; D viv
Citrus sinensis	Laranja-lima (PT) — Sweet orange (EN)	Rutaceae	Respiratory diseases, antitussive, antimicrobial, antihypertensive (Gonçalves et al. 2017); hypertension (Nunes et al. 2015)	Decoction; infusion (Baptistel et al. 2014; Gonçalves et al. 2017)	Leaf; fruit; fruit peel (Baptistel et al. 2014; Gonçalves et al. 2017)	Antihypertensive; vasorelaxant; ACE inhibitor (Testai and Calderone 2017)	I; In vitr
Cissus verticillata	Insulina (PT) — Possum grape vine (EN)	Vitaceae	Antidiabetic, antihypertensive (Gonçalves et al. 2017); hypoglycaemic, hypotensive (Borges and Bautista 2018); (Souza and Guarim Neto 2009)	Decoction; maceration; infusion (Souza and Guarim Neto 2009)	Leaf (Souza and Guarim Neto 2009)	—	0; –
Cocos nucifera	Coqueiro (PT) — Coconut palm (EN)	Arecaceae	Hydrating, anthelmintic, blood pressure control, helps overcome chemical dependence (Leite and Oliveira 2013)	Fresh (in natura); juice (Leite and Oliveira 2013)	Fruit; leaf; flower (Leite and Oliveira 2013)	Antihypertensive; vasorelaxant; diuretic (Mahmoud et al. 2019)	II; D viv
Coriandrum sativum	Coentro (PT) — Coriander (EN)	Apiaceae	Hypertension (Borges and Moreira 2016)	Decoction; infusion (Borges and Moreira 2016)	Leaf (Borges and Moreira 2016)	Antihypertensive (Hussain et al. 2018); diuretic (Aissaoui et al. 2008)	I; In vitr
Costus spicatus	Cana-do-brejo (PT) — Spiral ginger (EN)	Costaceae	Difficulty in urinating (diuretic) (Rodrigues et al. 2013)	Decoction (Rodrigues et al. 2013)	Leaf (Rodrigues et al. 2013)	Diuretic (Oliveira et al. 2006)	I; In (diu
Cucumis sativus	Pepino (PT) — Cucumber (EN)	Cucurbitaceae	Hypertension (Nunes et al. 2015)	Fresh (in natura); juice (Nunes et al. 2015)	Fruit (Nunes et al. 2015)	Antihypertensive; diuretic; ACE inhibitor (Pertami et al. 2017; Hendrayana et al. 2023)	I; In vitr
Cymbopogon citratus	Capim-cidrão / capim-santo (PT) — Lemongrass (EN)	Poaceae	Cardiac problems, anxiety, hypertension, cold (Lima 2011); calming, gastritis, hypertension, abortifacient (Oliveira et al. 2010); high blood pressure, calming (Silva et al. 2016); headache, flu, insomnia, high blood pressure (Silva et al. 2013); calming, flu, arterial hypertension (Silva et al. 2009); calming,	Tea (Lima 2011; Santos et al. 2019); mate (Oliveira et al. 2010; Borges and Bautista 2018; Silva et al. 2016); infusion + bath (Frigotto and Portella 2012); boiling + infusion (Lobler et al. 2014); decoction (Ribeiro et al. 2014)	Leaf (Oliveira et al. 2010; Brito et al. 2015; Borges and Bautista 2018; Ribeiro et al. 2014; Baptistel et al. 2014; Teixeira et al. 2014; Silva et al.	Antihypertensive (Moreira et al. 2010); diuretic (Ekpenyong et al. 2014)	III; I (hu

Scientific name	Popular / Common name	Family	Popular indication	Preparation method	Parts used	Pharmacological properties	Evi dire
			antihypertensive (Gonçalves et al. 2017); high blood pressure (Lemos and Araújo 2015; Silva and Faria 2014; Santos et al. 2019); calming, hypertension (Brito et al. 2015; Teixeira et al. 2014); hypotensive, diuretic, antispasmodic (Borges and Bautista 2018); nervousness, flu, calming, high blood pressure (Ribeiro et al. 2014); hypertension (Baptistel et al. 2014)		2009; Lima 2011; Silva et al. 2013; Silva and Faria 2014); leaf + industrial form (Lobler et al. 2014); whole plant (Santos et al. 2019)		
Cymbopogon densiflorus	Capim-santo (PT) — Lemongrass (dense-flowered) (EN)	Poaceae	Calming, colic, hypertension, insomnia (Teixeira et al. 2014)	Infusion; decoction (Teixeira et al. 2014)	Leaf (Teixeira et al. 2014)	—	0; –
Cynara scolymus	Alcachofra (PT) — Artichoke (EN)	Asteraceae	Hypertension as diuretic, stomach pain (Rodrigues et al. 2013); cholesterol, weight loss, stomach, liver, hypertension (Lobler et al. 2014)	Infusion (Lobler et al. 2014)	Leaf; industrial form (Lobler et al. 2014)	Diuretic (Noldin et al. 2003); antihypertensive (Roghani-Dehkordi et al. 2009; Villiger et al. 2015)	II; D vivo
Croton conduplicatus	Quebra-faca (PT) — Quebra-faca (EN)	Euphorbiaceae	Analgesic, heartburn, poor digestion, gastritis, anti-allergic, anti-inflammatory, diarrhoea, improves liver function, antipyretic, sinusitis, hypertension and diabetes (Albergaria et al. 2019)	Tea; tincture; bath; maceration (Albergaria et al. 2019)	Stem bark; inner bark; leaf + flower (Albergaria et al. 2019)	—	0; –
Croton heliotropiifolius	Velame (PT) — Velame (EN)	Euphorbiaceae	Skin problems, fungal infections, hypertension (Silva et al. 2016)	Infusion; decoction (Silva et al. 2016)	Leaf (Silva et al. 2016)	—	0; –
Cuphea calophylla	Sete-sangrias (PT) — Cuphea (EN)	Lythraceae	Hypocholesterolemic, antimicrobial, antihypertensive, gastrointestinal disorders, antiplatelet, refreshing, analgesic (Gonçalves et al. 2017)	Decoction; infusion (Gonçalves et al. 2017)	Leaf; whole plant (Gonçalves et al. 2017)	—	0; –
Cuphea carthagenensis	Sete-sangrias (PT) — Tarweed cuphea (EN)	Lythraceae	Hypertension, weight-loss diet, diuretic, heart (Spisla 2017); hypertension (Rodrigues et al. 2013); high blood pressure (Pereira et al. 2011)	Infusion; decoction (Gonçalves et al. 2017)	Root + leaf; leaf (Gonçalves et al. 2017)	Antioxidant, hypocholesterolemic, aortic vasodilatation (Spisla 2017); antihypertensive (Braga et al. 2000)	I; In vitr
Dendranthema grandiflora	Camomila / crisântemo (PT) — Florist's daisy (EN)	Asteraceae	High blood pressure (Guerra et al. 2016)	Infusion (Guerra et al. 2016)	Leaf; seed (Guerra et al. 2016)	—	0; –
Didymopanax morototonii	Sete-sangrias (PT) — Morototó (EN)	Araliaceae	Menstrual control, haemorrhoids, stroke, hypertension, decreases blood viscosity (Fagundes et al. 2017)	Tea; bath (Fagundes et al. 2017)	Root; leaf (Fagundes et al. 2017)	—	0; –
Dioclea violacea	Mangabeira (PT) — Velvet bean (EN)	Fabaceae	Hypertension (Sousa et al. 2017)	Decoction; infusion (Sousa et al. 2017)	Seed; leaf (Sousa et al. 2017)	—	0; –

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Eriobotrya japonica	Ameixa amarela (PT) — Loquat (EN)	Rosaceae	Antihypertensive, laxative, sitz bath (Gonçalves et al. 2017)	Decoction; infusion (Gonçalves et al. 2017)	Leaf (Gonçalves et al. 2017)	Antihypertensive; vasorelaxant (Wang et al. 2011)	II; D vivo
Eugenia dysenterica	Cagaita (PT) — Brazilian cherry (EN)	Myrtaceae	Hypertension, diarrhoea, gastritis, kidney and liver conditions, stomachic, calming (Fagundes et al. 2017)	Maceration; tea (Fagundes et al. 2017)	Leaf (Fagundes et al. 2017)	Antihypertensive (Fidelis-de-Oliveira et al. 2020)	II; D vivo
Equisetum giganteum	Cavalinha (PT) — Giant horsetail (EN)	Equisetaceae	Hypertension (Rodrigues et al. 2013)	Decoction (Rodrigues et al. 2013)	Aerial parts (Rodrigues et al. 2013)	Diuretic (Gutiérrez et al. 1985)	I; In (diu
Foeniculum vulgare	Erva-doce (PT) — Fennel (EN)	Apiaceae	Arterial hypertension, diuretic, oedema, urinary problems (Rodrigues et al. 2013)	Infusion; decoction (Rodrigues et al. 2013)	Leaf; seed; fruit (Rodrigues et al. 2013)	Diuretic (Bardai et al. 2001)	II; In (diu
Hancornia speciosa	Mangaba (PT) — Mangaba (EN)	Apocynaceae	Hypocholesterolemic, diabetes control, hypertension (Fagundes et al. 2017); back pain, gastritis, high blood pressure (Macêdo et al. 2015)	Maceration; tea (Fagundes et al. 2017); latex with water, infusion, decoction (Macêdo et al. 2015)	Latex; bark; root (Fagundes et al. 2017); latex, stem bark, leaf (Macêdo et al. 2015)	Antihypertensive (Silva et al. 2011)	II; D vivo
Heliotropium indicum	Fedegoso (PT) — Indian heliotrope (EN)	Boraginaceae	Phlegm in the chest, cough, flu, sore throat and hypertension (Barbosa 2011)	Decoction; infusion (Barbosa 2011)	Leaf; flower; root; branches (Barbosa 2011)	Antihypertensive (Adjagba et al. 2017)	II; D vivo
Hyptis sp.	Erva-cidreira da horta (PT) — Hyptis (EN)	Lamiaceae	High blood pressure (Ferreira et al. 2014)	Infusion; decoction (Ferreira et al. 2014)	Leaf (Ferreira et al. 2014)	—	0; –
Jatropha curcas	Pião branco (PT) — Physic nut (EN)	Euphorbiaceae	High blood pressure, sinusitis, headache, parasites, vomiting in dogs, cold (Bitencourt et al. 2014)	Infusion; decoction (Bitencourt et al. 2014)	Whole plant (except root) (Bitencourt et al. 2014)	Antihypertensive (Segura-Campos et al. 2013)	II; D vivo
Justicia pectoralis	Anador / tilo (PT)	Acanthaceae	Fever, headache, inflammation, high blood pressure, hypertension (Nunes et al. 2015)	Tea (Nunes et al. 2015)	Leaf (Nunes et al. 2015)	—	0; –
Lafoensia replicata	Mangabeira / Mirindiba (PT)	Lythraceae	Wounds, renal infection, urinary tract infection, diabetes, hypertension, liver, flu (Baptistel et al. 2014)	Decoction; infusion (Baptistel et al. 2014)	Leaf; bark; root (Baptistel et al. 2014)	—	0; –
Leonurus japonicus	Rubim / Mané Turé (PT) — Japanese motherwort (EN)	Lamiaceae	Liver, leg pain, hypertension, diuretic, pain, infection (Spisla 2017); high blood pressure (Rogério 2014)	Maceration (Spisla 2017)	Leaf (Spisla 2017)	Antihypertensive; vasorelaxant; diuretic (Yin et al. 2015)	II; D vivo
Lippia alba	Erva-cidreira / melissa (PT) — False-melissa (EN)	Verbenaceae	Headache, calming, hypertension (Leme et al. 2010); hypertension and calming (Moura et al. 2016); flu, calming, poor digestion, diarrhoea, insomnia (Lima et al. 2016); high blood pressure	Decoction; infusion; tea (Oliveira et al. 2010; Borges and Bautista 2018; Ribeiro et al. 2014; Baptistel et al. 2014)	Leaf; flower; stem; seed (Borges and Bautista 2018; Ribeiro et al. 2014; Baptistel	Vasodilation in rat aorta (Da Silva et al. 2018); vasodilation in rat mesenteric artery (Maynard et al. 2011); decrease in heart rate (Gazola et al. 2004)	I; In vitro

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			(Silva et al. 2013; Lemos and Araújo 2015; Santos et al. 2019); flu, hypertension, calming (Oliveira et al. 2010; Brito et al. 2015); calming, digestive, hypotensive, antispasmodic (Borges and Bautista 2018); calming, high blood pressure (Ribeiro et al. 2014; Baptistel et al. 2014)		et al. 2014; Silva et al. 2013)		
Luehea divaricata	Açoita-cavalo (PT)	Malvaceae	Tumours, poor circulation, diarrhoea, rheumatism, arthritis, osteoarthritis, high blood pressure, cholesterol, haemorrhage (Bitencourt et al. 2014)	Tea (Bitencourt et al. 2014)	Leaf; stem bark (Bitencourt et al. 2014)	Vasodilation (Tirloni et al. 2019); diuretic, hypotensive (Tirloni et al. 2018)	II; D vivo
Mangifera indica	Manga (PT) — Mango (EN)	Anacardiaceae	Hypertension (Spisla 2017)	Decoction; infusion (Spisla 2017)	Leaf; stem bark (Spisla 2017)	Antihypertensive (Ronchi et al. 2015)	II; D vivo
Malpighia emarginata	Acerola (PT) — Barbados cherry (EN)	Malpighiaceae	Flu, high blood pressure (Silva et al. 2013)	Tea (Silva et al. 2013)	Leaf (Silva et al. 2013)	Antihypertensive; ACE inhibitor (Ferreira et al. 2020)	I; In vitr
Mansoa alliacea	Alho-de-cura (PT) — Garlic vine (EN)	Bignoniaceae	Hypertension, parasites and flu (Oliveira et al. 2010); high blood pressure (Santos et al. 2019)	Infusion (Oliveira et al. 2010); tea (Santos et al. 2019)	Leaf + flower (Oliveira et al. 2010); leaf (Santos et al. 2019)	—	0; –
Matricaria chamomilla	Camomila (PT) — Chamomile (EN)	Asteraceae	Calming, sedative, anti-inflammatory, hypertension (Lobler et al. 2014; Frigotto and Portella 2012)	Infusion (Lobler et al. 2014)	Flower; leaf (Lobler et al. 2014)	Antihypertensive (Awaad et al. 2018)	III; I (hu
Matricaria recutita	Camomila (PT) — German chamomile (EN)	Asteraceae	Eye inflammation, hypertension, calming (Teixeira et al. 2014); treatment and blood pressure control (Oliveira and Santos 2016)	Infusion (Teixeira et al. 2014; Oliveira and Santos 2016)	Leaf; flower (Teixeira et al. 2014)	Hypotensive; vasorelaxant; anti-inflammatory (Calderone et al. 2000)	I; In vitr
Medicago sativa	Alfafa (PT) — Alfalfa (EN)	Fabaceae	Calming, general tonic, balances pressure, increases milk for nursing mothers (Leite and Oliveira 2013)	—	Leaf; flower (Leite and Oliveira 2013)	Antihypertensive (Martínez et al. 2016; Kapel et al. 2006)	II; D vivo
Melissa officinalis	Erva-cidreira / melissa (PT) — Lemon balm (EN)	Lamiaceae	Stomach pain, diarrhoea, flatulence, headache, hypertension (Silva et al. 2016); calming, colic, flu, high blood pressure (Pasa et al. 2015); calming, digestive, hypotensive, antispasmodic (Borges and Bautista 2018)	Infusion (Borges and Bautista 2018; Silva et al. 2016)	Leaves and flowers (Silva et al. 2016); leaf (Borges and Bautista 2018)	Reduction in heart rate (Gazola et al. 2004); vasodilation in thoracic aorta (Ersoy et al. 2008)	I; In vitr
Mentha arvensis	Hortelã / hortelã-pimenta (PT) — Wild mint (EN)	Lamiaceae	Anthelmintic, calming, respiratory diseases, gastrointestinal disorders, refreshing, sore throat, antitussive, antidepressant,	Infusion; decoction; juice; fresh (in natura) (Gonçalves et al. 2017)	Aerial parts; leaf (Gonçalves et al. 2017)	—	0; –

Scientific name	Popular / Common name	Family	Popular indication	Preparation method	Parts used	Pharmacological properties	Evi dire
			antihypertensive, insomnia, cardiovascular disorders, weight loss (Gonçalves et al. 2017)				
Mentha crispa	Hortelã (PT) — Spearmint (EN)	Lamiaceae	Fever, intestinal colic, body pain, flu, hypertension, calming (Baptistel et al. 2014)	Infusion; decoction (Baptistel et al. 2014)	Leaf (Baptistel et al. 2014)	—	0; –
Mentha piperita / Mentha sp.	Hortelã-de-alevante (PT) — Peppermint / Mint (EN)	Lamiaceae	Hypertension (Nunes et al. 2015; Guerra et al. 2016); high blood pressure (Silva et al. 2013); arterial hypertension, lower cholesterol, diabetes, headache, stomach pain, gas, bronchitis, flu (Silva et al. 2009)	Infusion (Guerra et al. 2016); tea (Silva et al. 2013); syrup (Silva et al. 2009)	Leaf (Silva et al. 2009; Silva et al. 2013; Guerra et al. 2016)	Hypotensive (Barbalho et al. 2011)	III; I (hu
Mentha villosa	Hortelã da folha pequena (PT) — Cuban mint (EN)	Lamiaceae	Cough, colic, headache, abdominal pain, diarrhoea, high blood pressure, flu (Lima et al. 2016)	Tea; lambedor (syrup) (Lima et al. 2016)	Leaf (Lima et al. 2016)	Hypotensive (Lahlou et al. 2002)	II; D viv
Mimosa velloziana	Malícia-de-boi (PT) — Mimosa (EN)	Fabaceae (Mimosoideae)	Fever, hypertension, ringworm (Oliveira et al. 2010)	Decoction; infusion; bath (Oliveira et al. 2010)	Root (Oliveira et al. 2010)	Diuretic; natriuretic (De Souza et al. 2017)	I; In (diu
Mikania glomerata	Guaco (PT) — Guaco (EN)	Asteraceae	High blood pressure, fever, asthma, cough, syphilis, gout, bronchitis, malaria (Bitencourt et al. 2014)	Tea (Bitencourt et al. 2014)	Leaf (Bitencourt et al. 2014)	—	0; –
Myristica fragrans	Noz-moscada (PT) — Nutmeg (EN)	Myristicaceae	High blood pressure, eye pain, headache, constipation, blocked nose (Silva et al. 2013)	Tea (Silva et al. 2013)	Seed (Silva et al. 2013)	Sedative; hypotensive (high-dose effect) (Grover et al. 2002)	II; D viv
Morinda citrifolia	Noni (PT) — Indian mulberry (EN)	Rubiaceae	Hypertension (Silva et al. 2022)	Juice (Silva et al. 2022)	Fruit (Silva et al. 2022)	Antihypertensive (Wigati et al. 2017)	II; D viv
Morus alba	Amoreira branca (PT) — White mulberry (EN)	Moraceae	Antihypertensive, throat infections (Silva et al. 2015)	Decoction; infusion (Silva et al. 2015)	Leaf (Silva et al. 2015)	Antihypertensive (Yang et al. 2012)	II; D viv
Momordica charantia	Melão-de-são-caetano (PT) — Bitter melon (EN)	Cucurbitaceae	Kidney stone, hypertension, ringworm, dengue, parasites, rheumatism (Oliveira et al. 2010)	Decoction (Oliveira et al. 2010)	Whole plant; leaf; root (Oliveira et al. 2010)	Antihypertensive (Ojewole et al. 2006)	II; D viv
Morus nigra	Amora (PT) — Black mulberry (EN)	Moraceae	Hypertension (Baptistel et al. 2014)	Decoction; infusion (Baptistel et al. 2014)	Leaf (Baptistel et al. 2014)	Vasorelaxant (Chen et al. 2016)	I; In vitr
Musa sapientum	Banana (PT) — Banana (EN)	Musaceae	Cough; bronchitis; haemorrhoids; parasitic conditions; renal conditions; hypertension; bleeding from wounds; tuberculosis; whooping cough (Siqueira 2014)	Fresh (in natura); juice (Siqueira 2014)	Fruit; leaf; flower (Siqueira 2014)	Antihypertensive (Perfumi et al. 1994)	II; D viv
Nothoscordum striatum	Alho bravo (PT) — Wild garlic (EN)	Alliaceae	Hypertension, flu (Baptistel et al. 2014)	Decoction; infusion (Baptistel et al. 2014)	Leaf; bulb (Baptistel et al. 2014)	—	0; –

Scientific name	Popular / Common name	Family	Popular indication	Preparation method	Parts used	Pharmacological properties	Evi dire
Ocimum basilicum	Alfavaca / manjericão (PT) — Basil (EN)	Lamiaceae	Hypertension, high cholesterol (Oliveira et al. 2012); cardiovascular, calming, blood pressure (Leite and Oliveira 2013)	Infusion (Leite and Oliveira 2013; Oliveira et al. 2012)	Leaf; seed (Leite and Oliveira 2013; Oliveira et al. 2012)	Antihypertensive (Umar et al. 2010)	II; D vivo
Ocimum carnosum	Anis (PT) — Hairy basil (EN)	Lamiaceae	Calming, antihypertensive, urinary disorders, gastrointestinal disorders, refreshing (Gonçalves et al. 2017)	Infusion (Gonçalves et al. 2017)	Leaf; seed (Gonçalves et al. 2017)	—	0; –
Palicourea sp.	Dom Bernardo / bugrinho (PT)	Rubiaceae	Kidney and liver conditions, cardiac murmur, hypertension, hypocholesterolemic, diuretic (Fagundes et al. 2017)	Infusion (Fagundes et al. 2017)	Leaf; root (Fagundes et al. 2017)	—	0; –
Parkinsonia aculeata	Xila (PT) — Jerusalem thorn (EN)	Fabaceae	Asthma; hypertension (Oliveira et al. 2010)	Infusion (Oliveira et al. 2010)	Seed; leaf (Oliveira et al. 2010)	—	0; –
Passiflora cincinnata	Maracujá-do-mato (PT) — Wild passion fruit (EN)	Passifloraceae	Nervousness, high blood pressure, dysuria, calming (Ribeiro et al. 2014); high blood pressure, nerves, calming (Macêdo et al. 2015)	Decoction (Ribeiro et al. 2014; Macêdo et al. 2015)	Leaf (Ribeiro et al. 2014; Macêdo et al. 2015)	Sedative; hypotensive (action on nervous system) (Ichimura et al. 2006)	II; D vivo
Passiflora edulis	Maracujá (PT) — Passion fruit (EN)	Passifloraceae	Hypotension, calming, insomnia (Baptistel et al. 2014); hypertension, calming (Lobler et al. 2014); sleep aid, blood pressure control, anxiety (Leite and Oliveira 2013); hypertension (Ribeiro et al. 2014; Nunes et al. 2015; Macêdo et al. 2015)	Infusion (Ribeiro et al. 2014; Macêdo et al. 2015)	Leaf; bark; flower; industrial form (Ribeiro et al. 2014; Macêdo et al. 2015)	Antihypertensive (Ichimura et al. 2006; Zibadi et al. 2007)	II; D vivo
Passiflora sp.	Maracujá (PT) — Passion flower (EN)	Passifloraceae	Dysentery, high blood pressure (Silva et al. 2013)	Tea; powder; juice (Silva et al. 2013)	Leaf; fruit; root (Silva et al. 2013)	Antihypertensive (Ichimura et al. 2006; Zibadi et al. 2007)	II; D vivo
Peperomia pellucida	Alfavaquinha-de-cobra (PT) — Pepper elder (EN)	Piperaceae	Hypotensive, diuretic, anti-snakebite (Borges and Bautista 2018)	Infusion (Borges and Bautista 2018)	Leaf (Borges and Bautista 2018)	Antihypertensive; vasorelaxant; ACE inhibitor; bradycardic (Nwokocha et al. 2012; Saputri et al. 2021)	I; In vitr
Persea americana	Abacateiro (PT) — Avocado (EN)	Lauraceae	Hypertension (diuretic) (Rodrigues et al. 2013); antihypertensive, renal disorders, wound-healing, anti-inflammatory (Gonçalves et al. 2017)	Decoction (Gonçalves et al. 2017; Rodrigues et al. 2013)	Leaf; leaf + seed (Gonçalves et al. 2017; Rodrigues et al. 2013)	Antihypertensive (Nwaefulu et al. 2009)	II; D vivo
Petroselinum crispum	Salsa (PT) — Parsley (EN)	Apiaceae	After childbirth, high and low blood pressure (Silva et al. 2013)	Tea; syrup (Silva et al. 2013)	Leaf; root (Silva et al. 2013)	Antihypertensive (Ajebli and Eddouks 2019)	II; D vivo
Pimpinella anisum	Erva-doce (PT) — Anise (EN)	Apiaceae	Calming, malaise, swollen abdomen, constipation, high blood pressure, anxiety, insomnia, colic, abdominal pain (Lima et al. 2016)	Tea (Lima et al. 2016)	Leaf; whole plant; seed (Lima et al. 2016)	Hypotensive (Pontes et al. 2019)	II; D vivo

Scientific name	Popular / Common name	Family	Popular indication	Preparation method	Parts used	Pharmacological properties	Evi dire
Pyrus communis	Pera (PT) — European pear (EN)	Rosaceae	Antihypertensive (Gonçalves et al. 2017)	Decoction (Gonçalves et al. 2017)	Leaf (Gonçalves et al. 2017)	—	0; –
Rosmarinus officinalis	Alecrim (PT) — Rosemary (EN)	Lamiaceae	Hypertension, infarction, thrombosis, stroke, hoarseness, sore throat (Barbosa 2011); calming, hypertension (Brito et al. 2015; Silva et al. 2009; Borges and Moreira 2016); treatment and blood pressure control (Oliveira and Santos 2016); calming, high blood pressure (Pereira et al. 2011)	Tea (Silva et al. 2009; Borges and Moreira 2016)	Leaf + flower; leaf; flower (Barbosa 2011; Silva et al. 2009; Borges and Moreira 2016)	Diuretic (Haloui et al. 2000)	I; In (diu
Rudgea viburnoides	Bugre (PT) — Congonha-de-bugre (EN)	Rubiaceae	Kidney conditions, sores/wounds, weight-loss, cardiotonic, hypertension, depurative (Fagundes et al. 2017)	Infusion; maceration (Fagundes et al. 2017)	Leaf (Fagundes et al. 2017)	Diuretic (Pucci et al. 2010)	I; In (diu
Sambucus australis	Sabugueiro (PT) — Brazilian elderberry (EN)	Adoxaceae	Cough, hypertension, phlegm, fever, chickenpox, heart (Brito et al. 2015)	Infusion; decoction (Brito et al. 2015)	Flower (Brito et al. 2015)	—	0; –
Saccharum hybrids	Cana-de-açúcar (PT) — Sugarcane hybrids (EN)	Poaceae	Lowers high blood pressure (Oliveira et al. 2012)	Infusion (Oliveira et al. 2012)	Leaf; culm/stem (Oliveira et al. 2012)	—	0; –
Saccharum officinarum	Cana-de-açúcar roxa (PT) — Sugarcane (EN)	Poaceae	High blood pressure, swelling, eye problems (Ribeiro et al. 2014); high blood pressure (Silva et al. 2009); calming, hypertension (Baptistel et al. 2014)	Decoction; tea (Ribeiro et al. 2014)	Leaf; stem (Ribeiro et al. 2014)	Vasorelaxant (Castaño et al. 2002)	I; In vitr
Salvia hispanica	Chia (PT) — Chia (EN)	Lamiaceae	Hypertension (Silva et al. 2022)	Flour	Seed	Antihypertensive; vasorelaxant; ACE inhibitor (Segura-Campos et al. 2013; Sánchez-Recillas et al. 2023)	I; In vitr
Sechium edule	Chuchu (PT) — Chayote (EN)	Cucurbitaceae	Hypertension (Martins 2016; Spisla 2017; Silva et al. 2022; Gonçalves et al. 2017; Silva et al. 2015); high blood pressure (Siqueira 2014; Oliveira and Santos 2016; Rogério 2014; Silva et al. 2013; Ferreira et al. 2014)	Infusion; decoction (Martins 2016; Siqueira 2014; Nunes et al. 2015; Silva et al. 2013)	Fruit + leaf; stem; fruit; leaf (Martins 2016; Siqueira 2014; Silva et al. 2013)	Antihypertensive, vasorelaxant (Lombardo-Earl et al. 2014)	I; In vitr
Solanum cernuum	Panacéia (PT) — Wild tomato (EN)	Solanaceae	Anti-inflammatory, diuretic, blood pressure control (Leite and Oliveira 2013)	Decoction; infusion (Leite and Oliveira 2013)	Leaf (Leite and Oliveira 2013)	—	0; –
Symplocos uniflora	Sete-sangues (PT) — Symplocos (EN)	Symplocaceae	Circulatory problems and hypertension (Lima 2011)	Boiling (Lima 2011)	Leaf (Lima 2011)	—	0; –
Symphytum officinale	Confrei (PT) — Comfrey (EN)	Boraginaceae	Wound-healing, gastritis, ulcer, blood pressure, muscle pain (Bitencourt et al. 2014); high blood pressure, pain,	Tea (Bitencourt et al. 2014; Lima et al. 2016)	Leaf; stem (Bitencourt et al. 2014; Lima et al. 2016)	—	0; –

Scientific name	Popular / Common name	Family	Popular indication	Preparation method	Parts used	Pharmacological properties	Evi dire
			inflammation (Lima et al. 2016)				
Syzygium cumini	Jamelão (PT) — Java plum (EN)	Myrtaceae	Antidiabetic, hypotensive (Borges and Bautista 2018)	Fresh (in natura) (Borges and Bautista 2018)	Fruit (Borges and Bautista 2018)	Antihypertensive (Ribeiro et al. 2014)	II; D vivo
Swartzia flaemingii var. psilonema	Jacarandá (PT) — Banha-de-galinha (EN)	Fabaceae	Rheumatism, kidney stone, inflammation, blood cleansing, cancer, hypertension (Oliveira et al. 2010)	Decoction (Oliveira et al. 2010)	Whole plant; root (Oliveira et al. 2010)	—	0; –
Turnera ulmifolia	Chanana (PT) — Yellow alder (EN)	Passifloraceae	Hypertension (Oliveira et al. 2010)	Decoction (Oliveira et al. 2010)	Root (Oliveira et al. 2010)	—	0; –
Vatairea macrocarpa	Angelim-amargoso (PT) — Bitter angelim (EN)	Fabaceae (Papilionoideae)	Blood cleansing, cancer, hypertension, cysts, myoma, high cholesterol (Oliveira et al. 2010)	Decoction; infusion; lambedor (Oliveira et al. 2010)	Bark; root; flower; whole plant (Oliveira et al. 2010)	Antioxidant; potential vascular protective effect (Rufino et al. 2010)	I/II;
Waltheria douradinha	Douradinha-do-campo (PT) — Sleepy morning (EN)	Malvaceae	Hypertension, depurative, calming, kidney and liver conditions (Fagundes et al. 2017)	Maceration; tea (Fagundes et al. 2017)	Leaf; whole plant (Fagundes et al. 2017)	—	0; –
Zea mays	Milho (PT) — Corn / Maize (EN)	Poaceae	Hypertension; rheumatism (Oliveira et al. 2010)	Infusion (Oliveira et al. 2010)	Flower (Oliveira et al. 2010)	Antihypertensive (Arroyo et al. 2008)	II; D vivo
Zingiber officinale	Gengibre (PT) — Ginger (EN)	Zingiberaceae	Sore throat, respiratory diseases, antitussive, weight loss, gastrointestinal disorders, migraine, analgesic, rheumatism, antihypertensive, detoxifying (Gonçalves et al. 2017)	Decoction; infusion; maceration; fresh (in natura) (Gonçalves et al. 2017)	Root (Gonçalves et al. 2017)	Antihypertensive (Sanghal et al. 2012)	II; D vivo

Evidence appraisal framework

Each species was classified along two axes. Concordance category: A = evidence gap (no pharmacological study on blood pressure identified; A1 = no pharmacological study at all; A2 = studies for other endpoints only); B = divergence (a study reported null, negative or contradictory blood-pressure findings); C = concordance (evidence supporting hypotensive/antihypertensive activity). Highest level of evidence: 0 = none; I = in vitro / ex vivo / mechanistic (e.g., isolated-vessel vasorelaxation, in vitro ACE inhibition, isolated heart); II = in vivo animal; III = human/clinical; IV = systematic review or meta-analysis. For Category C, we recorded whether the evidence demonstrated direct blood-pressure reduction (in vivo/human) or only an indirect/mechanistic effect. Corroboration was attributed only when there was reasonable matrix concordance between the traditional preparation and the cited study (species, plant part and, where reported, preparation/route); mismatches were flagged and not counted as direct support. This framework replaces the previous binary "divergence: yes/no" classification.

Data extracted

For each species: Brazilian region(s) of the source survey; community/habitation area; plant part(s) used; preparation method; most-cited species and families; and the concordance category, evidence level and direction defined above.

Results

A total of 44 scientific texts (38 articles, 3 master's dissertations, 2 undergraduate theses, and 1 monograph) on ethnobotanical or ethnopharmacological studies were analysed, containing 114 plants cited as medicinal with information on hypotensive effects, and 95 articles were used to verify the pharmacological properties of the cited plants (Table 1).

Plants cited per Brazilian region

Northeast: 53 species (46.5%); Southeast: 37 species (32.5%); South: 13 species (11.4%); Central-West: 8 species (7.0%); North: 8 species (7.0%) (Fig. 1). The total exceeds 100% because some plants were cited in studies conducted in more than one region; for the 114 species studied, 5 were cited in studies from more than one region.

Studies per area of population

Rural area: 15 studies (34.1%); Urban area: 9 studies (20.5%); Quilombola communities: 6 studies (13.6%); Health Care Units: 6 studies (13.6%); Urban + Rural: 3 studies (6.8%); Riverine communities: 2 studies (4.5%); Traditional communities: 2 studies (4.5%); Rural + Health Care Units: 2 studies (4.5%); and Others: 3 studies (6.8%) (Fig. 2). The total number of classifications (48) exceeds the total of 44 ethnobotanical studies because four studies were classified into more than one population area.

Plant parts used

Leaf: 87 (76.3%); Flower: 17 (14.9%); Fruit: 17 (14.9%); Seed: 16 (14.0%); Root: 15 (13.2%); Whole plant: 7 (6.1%); Stem: 7 (6.1%); Bark: 7 (6.1%); Stem bark: 7 (6.1%); Aerial parts: 5 (4.4%); Inner bark: 3 (2.6%); Industrial form: 2 (1.8%); Bulb: 2 (1.8%); and Leaves and Flowers, Leaf and Fruit, Fruit Peel, Latex, Branches, and Whole Plant (except root): 1 citation each (0.9% each) (Fig. 3). The total exceeds 100% because the same species may use multiple plant parts.

Preparation methods

Infusion: 68 (59.6%); Decoction: 62 (54.4%); Tea: 26 (22.8%); Maceration: 14 (12.3%); *In natura*: 9 (7.9%); Juice: 8 (7.0%); Lambedor (a syrup-like Brazilian preparation) and Bath: 5 citations each (4.4%); Syrup and Tincture: 3 citations each (2.6%); Boiling: 2 (1.8%); Mate (chimarrão), Seasoning/condiment, Latex with water, and Flour: 1 citation each (0.9%) (Fig. 4). The total exceeds 100% because the same species may be prepared by multiple methods.

Most cited species

Cymbopogon citratus (lemongrass): 14 citations; *Lippia alba* (false-melissa): 11 citations; *Sechium edule* (chayote): 10 citations; *Rosmarinus officinalis* (rosemary): 6 citations; *Passiflora edulis* (passion fruit): 6 citations; *Mentha piperita / Mentha sp.* (mint): 4 citations; *Allium sativum*, *Bixa orellana*, *Cissus verticillata*, *Cuphea carthagenensis*, *Melissa officinalis*, and *Saccharum officinarum*: 3 citations each; the remaining species each received two or fewer citations (Fig. 5).

Most cited families

Lamiaceae: 24 citations (12 species); Poaceae: 20 citations (5 species); Asteraceae: 15 citations (12 species); Fabaceae: 12 citations (10 species); Cucurbitaceae: 12 citations (3 species); Verbenaceae: 11 citations (1 species); Passifloraceae: 10 citations (4 species); Apiaceae: 6 citations (5 species); Rutaceae: 6 citations (4 species); Zingiberaceae: 5 citations (3 species); Lythraceae: 5 citations (3 species); Lauraceae: 4 citations (2 species); Annonaceae: 4 citations (3 species); Vitaceae: 4 citations (2 species); Malvaceae, Myrtaceae, Euphorbiaceae, and Rubiaceae: 3 citations each (3 species each); Boraginaceae: 3 citations (2 species); Amaryllidaceae and Bixaceae: 3 citations each (1 species each); Oxalidaceae, Solanaceae, Rosaceae, and Moraceae: 2 citations each (2 species each); Apocynaceae and Bignoniaceae: 2 citations each (1 species each); the remaining 22 families had 1 citation (1 species each) (Fig. 6).

Concordance, divergence and evidence gaps

Of the 114 species, no species (0%) showed pharmacological evidence contradicting its popular hypotensive use (Category B). Thirty-nine species (34.2%) had no blood-pressure study identified (Category A): 36 had no pharmacological study at all (A1) and 3 had pharmacological studies addressing only non-hypotensive endpoints (A2: *Achyrocline satureioides*, *Amburana cearensis*, *Vatairea macrocarpa*). Seventy-five species (65.8%) had supporting evidence (Category C). Within Category C, the highest level of evidence was a systematic review/meta-analysis (IV) for 2 species, human/clinical (III) for 3, in vivo animal (II) for 45, and in vitro/ex vivo/mechanistic (I) for 25. Critically, only 49 species (43.0% of all 114) were supported by direct in vivo or human blood-pressure data, whereas 26 (22.8%) rested on indirect/mechanistic evidence alone (ex vivo vasorelaxation, in vitro ACE inhibition, diuretic-only or sedative-only effects) (Table 1).

These figures replace a single “divergence” percentage. Classifying a species for which no supporting study was retrieved as “divergent” would conflate absence of evidence with evidence of absence, since not a single retrieved study contradicted a popular hypotensive use. The data therefore show that genuine ethnopharmacological–pharmacological divergence is essentially nil in this corpus, that about one third of species remain unstudied for blood pressure, and that, although two thirds are concordant, fewer than half of all species are backed by direct in vivo or human evidence.

Seven species are supported only by a diuretic study (*Adiantum capillus*, *Costus spicatus*, *Equisetum giganteum*, *Foeniculum vulgare*, *Mimosa velloziana*, *Rosmarinus officinalis*, *Rudgea viburnoides*) and are reported separately to expose how much concordance depends on the diuretic criterion; excluding this subset, concordance does not rely on diuretic evidence for the remaining species.

Discussion

The number of publications on ethnobotany and ethnopharmacology has provided contemporary populations with highly relevant information derived from the empirical knowledge of ancient peoples who, through trial and error, identified the effects of plants for medicinal, toxic, and ornamental activities (Brasil 2023).

Earlier comparisons between popular knowledge and pharmacological data reported marked discrepancies for plants used in mental and neurological complaints: Cavalcante e Costa et al. (2018) found that a substantial proportion of plants popularly used for neurological and psychiatric indications lacked confirmatory pharmacological evidence, and Aversi-Ferreira et al. (2013) reported similar gaps for herbal medicaments used in primary care. The present corpus, concerning a high-prevalence condition with frequent self-treatment, shows the opposite tendency—negligible contradiction and substantial concordance—consistent with a larger number of empirical trial-and-error cycles for common conditions (Brasil 2023; Aversi-Ferreira et al. 2013).

Strength and direction of the pharmacological evidence

Two implications follow from the appraisal. First, the popular hypotensive pharmacopoeia of Brazil is rarely contradicted by experimental data: divergence in the strict sense was not observed. Second, concordance is not the same as demonstrated efficacy. Much of the supporting evidence is preclinical and mechanistic: vasorelaxation of pre-contracted rat aortic rings, in vitro ACE inhibition, or reductions in heart rate in isolated preparations suggest plausible mechanisms but do not, by themselves, demonstrate that a leaf infusion lowers blood pressure in humans. Accordingly, species with only Level I evidence (e.g., *Lippia alba*, *Melissa officinalis*, *Morus nigra*, *Saccharum officinarum*) should be read as mechanistically plausible rather than clinically validated, whereas the few species with human or meta-analytic evidence (e.g., *Allium sativum*, *Cinnamomum zeylanicum*) stand on firmer ground.

Considering that the pharmacological treatment of SAH includes drugs acting on the kidneys, autonomic nervous system, vasculature, and heart, the supporting evidence for the concordant species can be grouped into overlapping mechanistic classes—diuretic/natriuretic, vasorelaxant/vasodilator, ACE inhibition, bradycardic/cardioprotective, and sedative—paralleling the main sites of action of allopathic agents; a given species may appear in more than one class, and the per-species assignment is given in Table 1. The label "antihypertensive/hypotensive" is used as the overall descriptor of a direct blood-pressure effect rather than as a distinct mechanism.

Concordance of matrix between traditional use and cited evidence

Corroboration requires that the experimental matrix correspond to the traditional one. For *Carica papaya*, the popular use recorded here is of the flower, whereas the cited evidence derives from fruit juice (Eno et al. 2000) and leaf preparations (Hasimun et al. 2020); because different parts of the same species differ in phytochemistry, such evidence supports a plausible species-level effect but cannot validate the specific traditional preparation. Part- and preparation-level mismatches were flagged in Table 1 and were not counted as direct support.

Why diuretic activity is treated cautiously

Although diuretics are a recognised antihypertensive drug class, a popular diuretic use is not a blood-pressure indication, and a diuretic pharmacological finding is only indirect evidence of hypotensive efficacy. Treating diuretic use as a defining inclusion criterion and diuretic activity as corroboration simultaneously would be circular; the diuretic-only species are therefore reported separately (Results).

Accessibility of concordant species

The potential of plant biodiversity in Brazil, combined with traditional knowledge, makes it possible to estimate how much investment in studies of this kind could improve the population's quality of life and health care (Silveira et al. 2008), while returning to the population the knowledge originally generated by it (Etkin 2001; Albuquerque and Hanazaki 2006). For example, the *Citrus* species listed in Table 1 show pharmacological evidence consistent with hypotensive effects in preclinical models and are easily accessible and affordable, as are other plants found readily in rural areas of Brazil at no cost.

Regional asymmetry: use or publication?

The concentration of surveys in the Northeast (46.5%) and Southeast (32.5%), with the North and Central-West contributing only 7.0% each, is difficult to reconcile with the exceptional biodiversity of the Amazon and the richness of traditional and Indigenous knowledge in those regions. The pattern more plausibly reflects the geography of scientific documentation—institutional density, funding, indexing and language of publication—than the geography of medicinal-plant use itself. Consequently, the regional frequencies, and by extension the most-cited species and families, should be read as patterns of where ethnobotanical research is published rather than where these plants are necessarily most used; traditional knowledge in under-published regions is likely underestimated here. In the same vein, although the use of medicinal plants is more prevalent in rural areas (IBGE 2020) and most analysed studies were conducted in rural settings (34.1%), urban communities have easier physical and cultural access for researchers than rural, quilombola, indigenous, and riverine communities (Silveira et al. 2008; Rezende and Cocco 2002).

Only 13.6% of the studies were carried out within Unified Health System (SUS) facilities. Since primary health care is intended to be the main gateway providing comprehensive assistance, this scenario underscores the need to continue this kind of study and to return scientific evidence to the population, improving the guided use of medicinal plants—already a focus of the PNPIC, which emphasizes continuous, humanized, and integral care, and expanded access, quality, efficacy, efficiency, and safety (Brasil 2018). These actions favour social control and participation, which is important to value and preserve traditional knowledge.

Patterns of use and comorbidity

The most cited plant was *Cymbopogon citratus* (14 citations), followed by *Lippia alba* (11) and *Sechium edule* (10); leaves were the most used part, followed by fruits and seeds, and infusion the most reported preparation (59.6%), followed by decoction (54.4%) and tea (22.8%). SAH is frequently associated with diabetes mellitus, dyslipidaemias, and nephropathies (Barroso et al. 2021; Malachias et al. 2016); accordingly, 12 surveys associated diabetes with hypertension for the same plants, especially *Ageratum conyzoides* and *Bixa orellana*, whose dual pharmacological properties have been described in preclinical models (Table 1). This matters because SAH affects approximately 30% of Brazilian adults—reaching 61.5% among men and 68.0% among women aged 65 years or older (Migowski and Costa 2024)—whereas diabetes affects 10.2% of adults, reaching 30.4% among those over 65 (Brasil 2023). The indication of multi-target medicinal plants should therefore be guided by qualified professionals, particularly for socioeconomically vulnerable populations.

Safety, toxicity and herb–drug interactions

Because this review concerns use within Primary Health Care, safety deserves explicit treatment, and concordance with a hypotensive effect does not establish a favourable safety profile. Some species carry recognised hazards: *Annona coriacea* has reported hepatotoxicity (Nascimento et al. 2012); *Allium* and other antiplatelet plants should be avoided before surgery owing to bleeding risk (Ang-Lee et al. 2001); and the Aristolochiaceae (*Aristolochia triangularis*) are associated with nephrotoxicity and should not be recommended. Pharmacodynamic and pharmacokinetic interactions with conventional antihypertensives—additive hypotension, electrolyte disturbance with diuretic plants, and CYP-mediated interactions—are plausible but poorly characterised for most species (Oparil et al. 2018). A systematic toxicity appraisal was not performed, and dosing, contraindications and adverse-effect profiles were unavailable for most plants; the toxic potential of medicinal plants must therefore be investigated together with confirmation of their pharmacological effects, under chemical and toxicological standardization. These gaps reinforce the cautionary framing of our conclusions and monitoring through a structured pharmacovigilance programme (Brasil 2018; Brasil 2022; Garlet and Irgang 2001).

Limitations

Several limitations bear directly on the figures reported and were incorporated into the analysis rather than appended as caveats. (i) The evidence base is heterogeneous and largely preclinical; this was addressed by grading evidence by level and direction and by reporting the proportion of species with direct in vivo/human support. (ii) Because the Stage-2 pharmacological search was species-directed and its depth per species was not standardised, a species classified as an evidence gap (Category A) cannot be distinguished with certainty from one searched less exhaustively; the gap proportion should be read as an upper bound. (iii) Publication bias is expected to inflate concordance, as positive pharmacological results are more likely to be published. (iv) Extrapolating from isolated compounds or single plant parts to whole-plant traditional preparations risks an ecological fallacy, and pharmacological studies frequently use extracts or doses far exceeding traditional preparations. (v) The regional distribution reflects publication geography (above). For these reasons the review should be read as a graded synthesis of the available evidence, not as a basis for direct clinical recommendation; contrasting ethnopharmacological and pharmacological data is the objective of this work and has been carried out here through the appraisal framework, what remains for future work being the generation of clinical evidence for the concordant species rather than the contrast itself.

Conclusions

This review identified 114 medicinal plants used by the Brazilian population for Systemic Arterial Hypertension, across 46 families, with *Cymbopogon citratus*, *Lippia alba* and *Sechium edule* the most cited species and Lamiaceae, Poaceae and Asteraceae the most cited families; leaves and infusion predominated. Applying a graded appraisal, no species showed pharmacological evidence contradicting its popular hypotensive use, 34.2% of species had no blood-pressure study identified, and 65.8% had supporting evidence—although direct in vivo or human evidence underpinned only 43.0% of species, the remainder being indirect/mechanistic. Twelve surveys associated diabetes with hypertension for the same plants, but only *Ageratum conyzoides* and *Bixa orellana* had a dual effect described pharmacologically. These findings indicate that popular hypotensive use in Brazil is seldom contradicted by experimental data but is, for most species, insufficiently validated by direct evidence. They reinforce the need for caution in clinical recommendation, for pharmacovigilance within Primary Health Care, and for the continuity of pharmacological, toxicological and ultimately clinical studies of the concordant species, especially among socioeconomically vulnerable groups.

Statements and Declarations

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Competing interests

The authors declare no competing financial or non-financial interests directly or indirectly related to the work submitted for publication.

Ethics approval

Ethics committee approval was not required, as this study analysed only previously published literature and did not involve any new collection of data from human or animal subjects.

Authors' contributions

MPB: data acquisition, data analysis and interpretation, manuscript drafting. GFC: data acquisition, data analysis and interpretation. ACS: data analysis and interpretation, critical revision. MTMA: data analysis and interpretation, manuscript drafting, critical revision. TAA-F: conception and design of the research, data analysis and interpretation, critical revision of the manuscript for important intellectual content, supervision. All authors read and approved the final version of the manuscript.

Use of artificial intelligence

AI tools were used only for language editing and formatting; all intellectual content, data interpretation and conclusions are the authors' responsibility.

Data availability

All data analysed during this review are derived from previously published studies, which are listed in the reference section.

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Figures

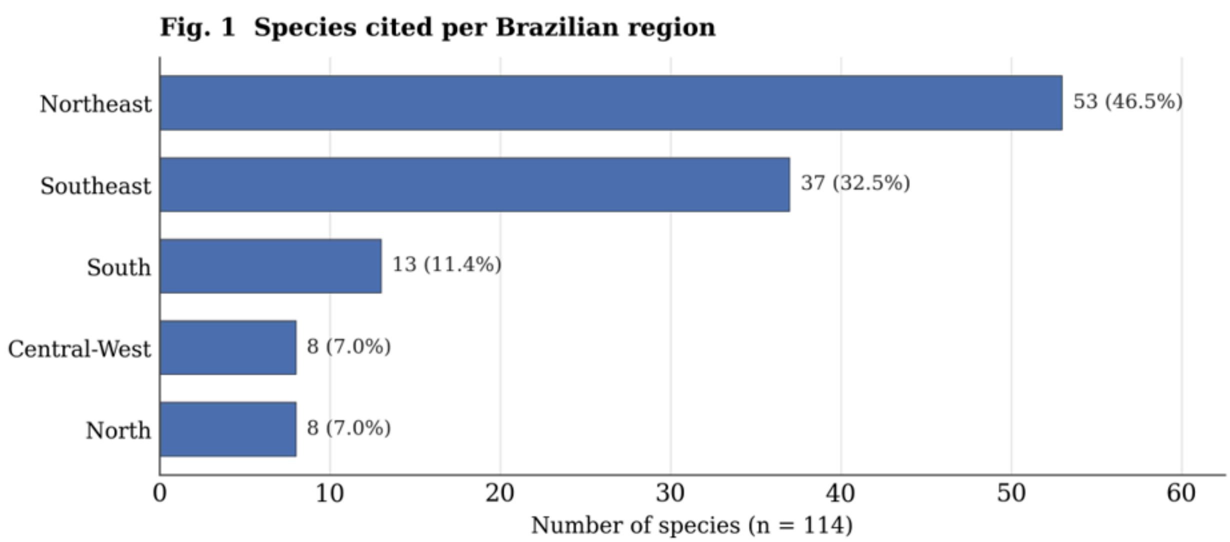

Figure 1

Percentage of plants cited per Brazilian region (n = 114 species). The total exceeds 100% because some plants were cited in studies conducted in more than one region.

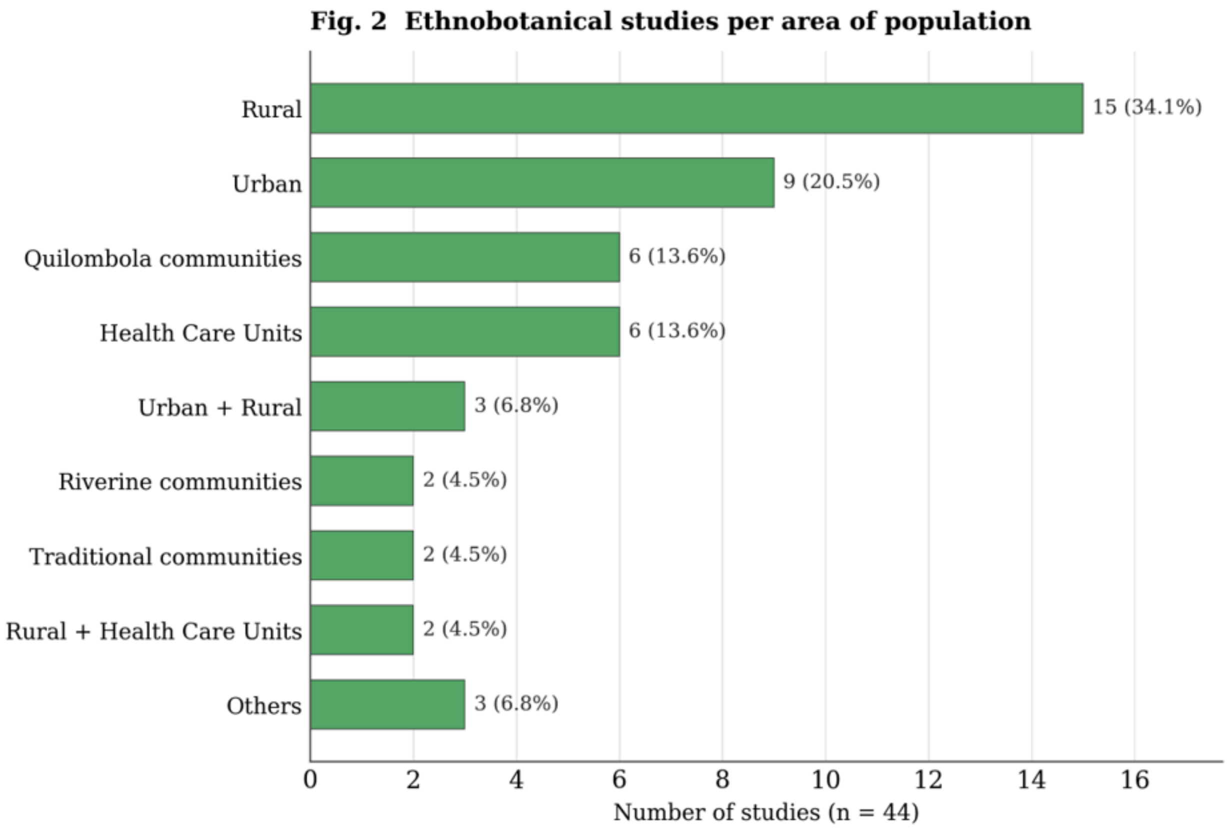

Figure 2

Distribution of ethnobotanical studies per area of population (n = 44 studies). The total number of classifications (48) exceeds 44 because four studies were classified into more than one population area.

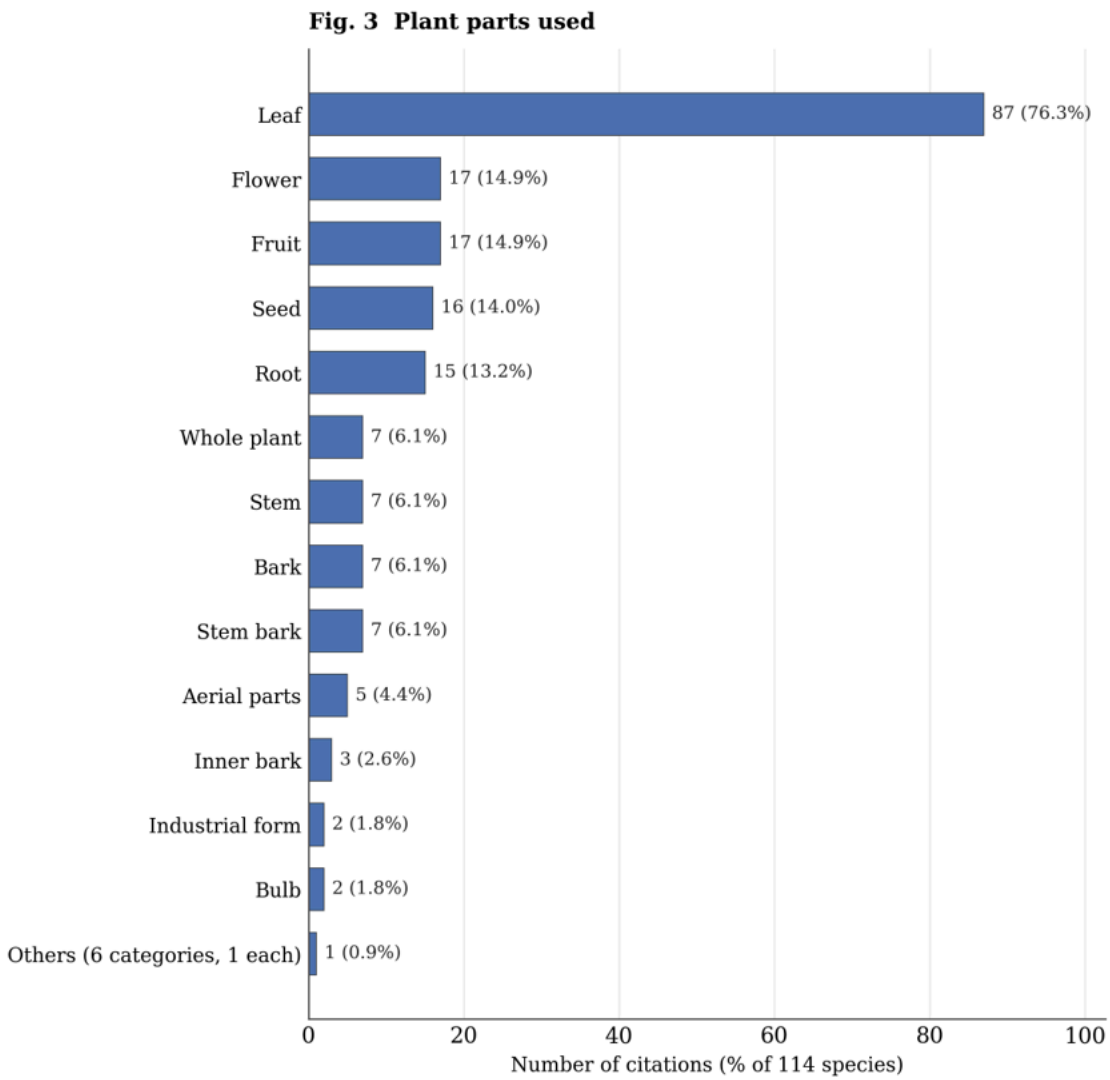

Figure 3

Plant parts cited for the studied species (n = 114). The total exceeds 100% because the same species may use multiple plant parts.

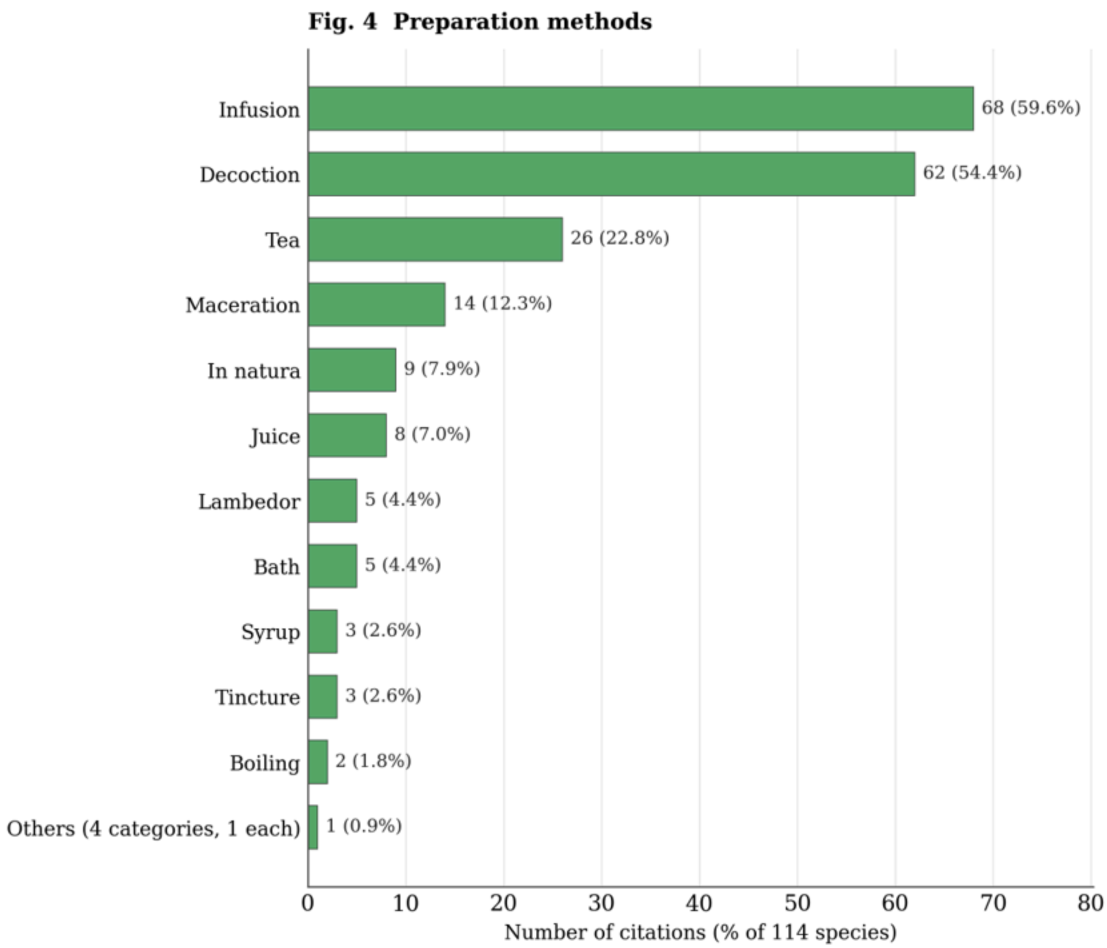

Figure 4

Preparation methods cited for the studied species (n = 114). The total exceeds 100% because the same species may be prepared by multiple methods.

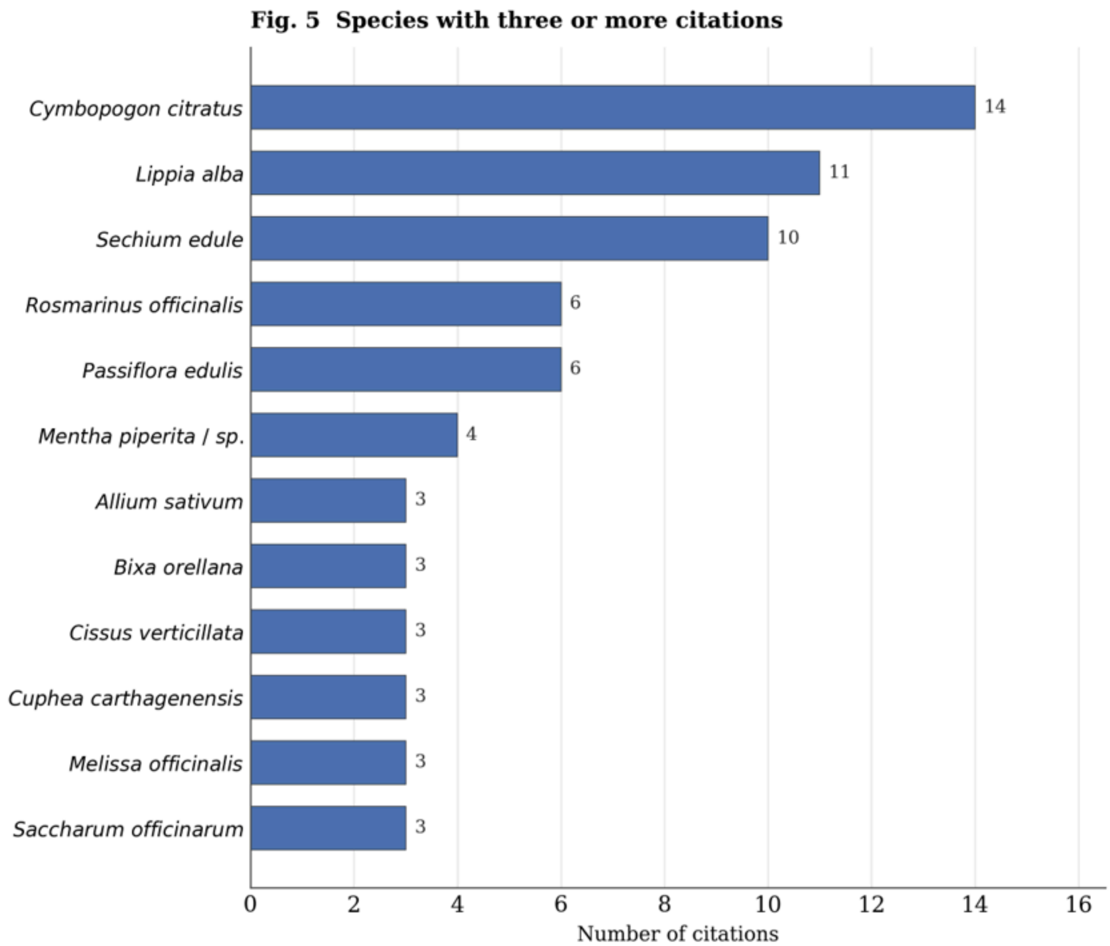

Figure 5

Species with two or more citations in the hypotensive category.

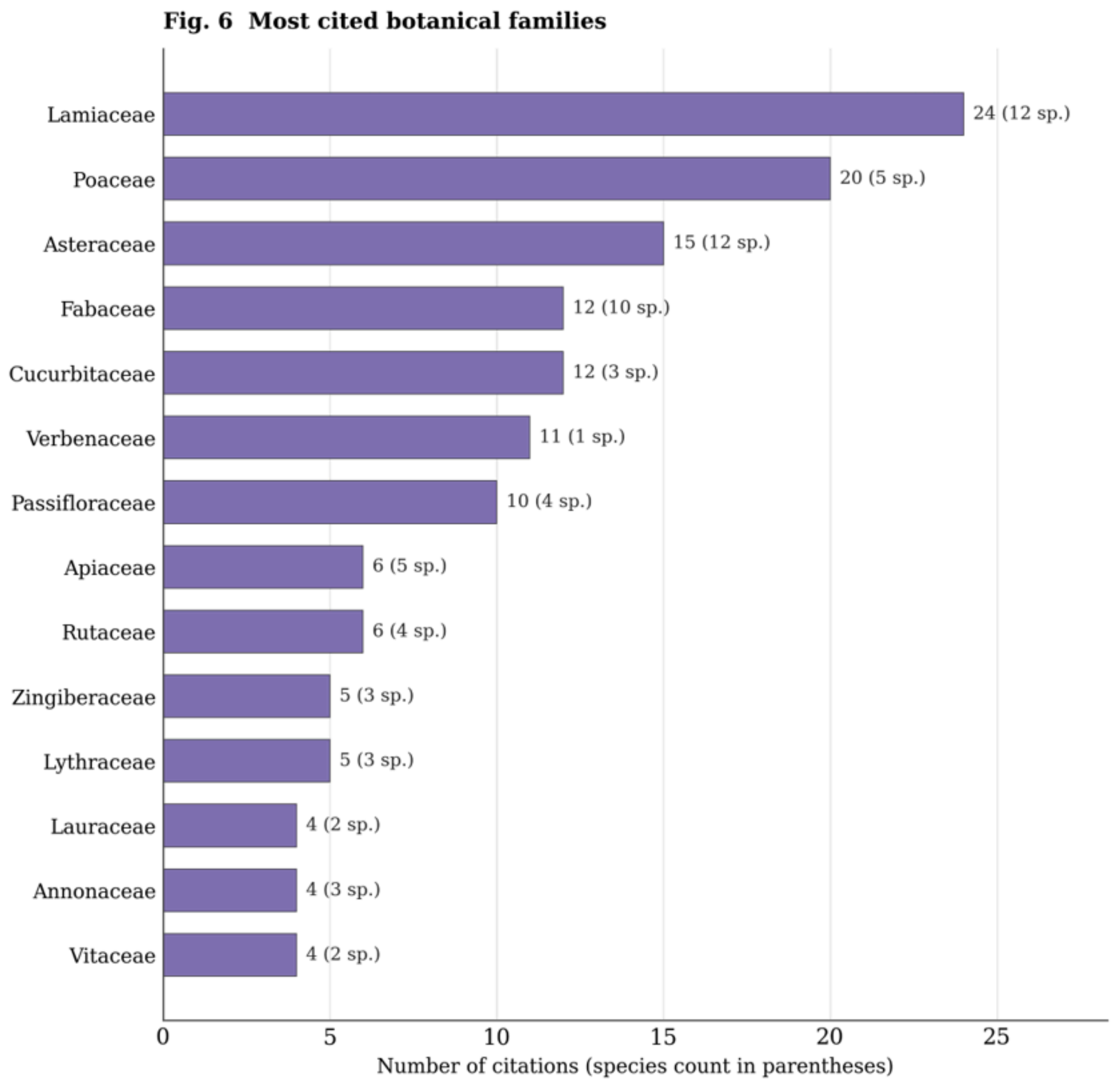

Figure 6

Most cited botanical families in the hypotensive category, with the corresponding number of species.

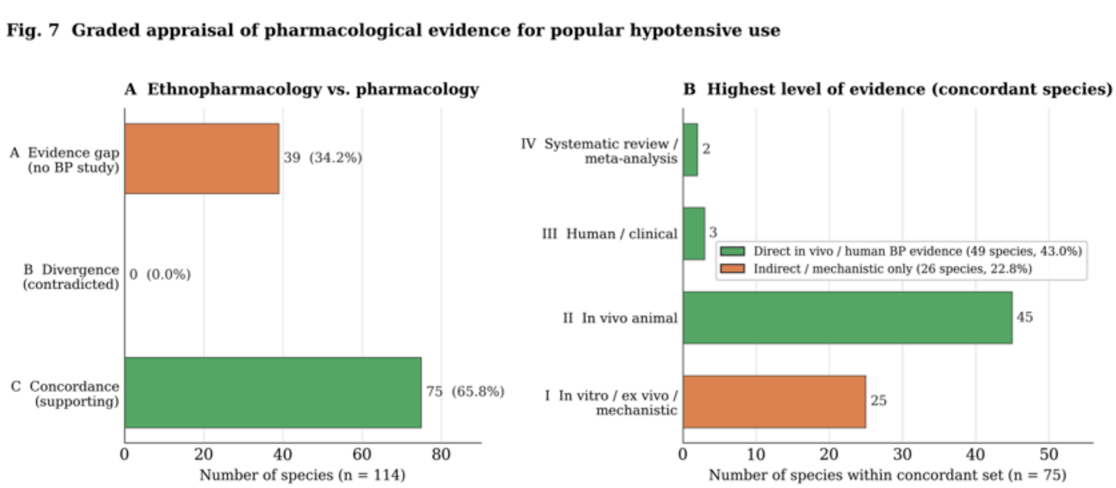

Figure 7

Graded appraisal of the pharmacological evidence for the popular hypotensive use of the 114 species. (**A**) Concordance between popular use and the pharmacological literature: A = evidence gap, no blood-pressure study identified (39 species, 34.2%; comprising 36 species with no pharmacological study and 3 with studies on non-hypotensive endpoints only); B = divergence, a study reporting null, negative or contradictory blood-pressure findings (0 species, 0.0%); C = concordance, evidence supporting hypotensive/antihypertensive activity (75 species, 65.8%). (**B**) Highest level of evidence among the 75 concordant species: IV = systematic review or meta-analysis (2); III = human/clinical (3); II = in vivo animal (45); I = in vitro/ex vivo/mechanistic (25). Bars are coloured by the direction of the evidence: green = direct in vivo or human blood-pressure reduction (49 species, 43.0% of all 114); orange = indirect/mechanistic effect only, such as ex vivo vasorelaxation, in vitro ACE inhibition, or diuretic-only/sedative-only activity (26 species, 22.8%). Note that one Level II species is supported only by an in vivo diuretic study and is therefore counted as indirect. Percentages in panel A are calculated over all 114 species; counts in panel B sum to the 75 concordant species.