Myrtaceae Juss.: a review of historical context, biogeographical distribution, ethnobotanical and ethnopharmacological aspects

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Review

Abstract

Background: The Myrtaceae family is a taxonomically rich and widely distributed group of plants occurring predominantly in tropical and subtropical regions, extensively used in traditional medicine and recognized for its strong ethnopharmacological relevance across diverse cultural contexts. This review integrates historical, taxonomic, biogeographical, ethnobotanical, and ethnopharmacological knowledge to identify use patterns, centers of diversity, and knowledge gaps limiting sustainable valorization

Methods: A stepwise literature review was conducted using PubMed, Scopus, Wiley, ScienceDirect, and Google Scholar, complemented by Flora do Brasil, Flora of Australia, GBIF, and Plants of the World Online. Ethnobotanical and ethnopharmacological studies were systematically selected based on formal botanical identification supported by voucher specimens. Publications were screened and analyzed to compile data on plant parts used, preparation methods, therapeutic indications, geographic distribution, and associated biological activities

Results: *Psidium guajava*, *Syzygium* spp., *Eucalyptus* spp., and *Eugenia* spp. were the most cited taxa. South America and Australia emerged as major centers of diversity, although Asia and Africa also stand out due to the high number of ethnobotanical studies. Leaves were the most frequently used plant part, mainly prepared as decoctions or infusions and administered orally. The main indications included gastrointestinal, respiratory, inflammatory, and infectious conditions. Available evidence partially supports traditional uses, especially antimicrobial and anti-inflammatory activities.

Conclusions: Despite its ethnopharmacological relevance, gaps in taxonomic standardization and sustainable valorization persist, highlighting the need for more integrative and methodologically consistent approaches to support conservation and innovation.

Keywords: Ethnopharmacology, ethnobotanic, *Eugenia*, Folk medicine, *Psidium*, *Syzygium.*

Background

The Myrtaceae family is among the most important plant families in tropical and subtropical regions, with a wide distribution across South America, Australia, tropical Asia, Africa, and parts of Europe. Brazil has the second-highest diversity of taxa and tribes, ranking behind only Australia, but it stands out as the country with the greatest variety of fruit tree species within the Family (Farias *et al*. 2020, GBIF-Secretariat 2023, Govaerts *et al*. 2008). Because of the socioeconomic relevance of their fruits, species in this family are widely exploited in the food and cosmetics supply chains (Farias *et al*. 2020, Santos-Neves *et al*. 2024). Other plant parts also stand out, such as the woody trunks (Jo *et al*. 2022), and the leaves, which are frequently used in traditional medicine (Saber *et al*. 2024).

Despite the extensive diversity and traditional use of Myrtaceae species, information regarding their historical taxonomic development, global biogeographical patterns, and ethnopharmacological significance remains fragmented across different scientific fields. Therefore, this review aims to integrate historical taxonomic perspectives, biogeographical distribution patterns, and ethnobotanical and ethnopharmacological knowledge of the Myrtaceae family, highlighting its cultural importance and potential for future scientific and economic applications.

Materials and Methods

Search strategy

This review was conducted in sequential stages according to each thematic section. For the historical background, geographic distribution, and economic potential of the Myrtaceae family, an extensive search was performed in ScienceDirect, Scopus, PubMed, Wiley Online Library, and Google Scholar using the terms “Myrtaceae” and (“Myrtaceae” AND “economic potential”). Searches included both early publications (1700–1900) and recent studies published up to 2025.

For the ethnobotanical and ethnopharmacological survey, a systematic search was conducted in PubMed, Scopus, and Wiley Online Library using the query “Myrtaceae AND (ethnobotanical AND ethnopharmacology)”. Original research articles from all publication years were considered.

Data sources for taxonomic and distribution information

Updated taxonomic and distribution data were obtained from specialized botanical databases were consulted, including *Flora do Brasil*, *Flora of Australia*, *Global Biodiversity Information Facility* (GBIF), *Plants of the World Online* (POWO). These platforms were used to verify global distribution patterns, accepted species names and taxonomic classification.

Historical botanical books and documents were accessed through the *Biodiversity Heritage Library*, ensuring consultation of classical botanical literature while complying with copyright regulations.

Inclusion and exclusion criteria

Studies were included if they reported ethnobotanical and/or ethnopharmacological data, regardless of whether experimental biological activities were evaluated. Only studies with formal botanical identification, supported by a voucher specimen number, were included, given the potential inconsistencies associated with vernacular names.

Studies lacking botanical identification or voucher information were excluded. The literature search was conducted between October and December 2025, yielding 708 records (PubMed: 145; Scopus: 253; Wiley Online Library: 314). After title and abstract screening, 123 articles were assessed in full (PubMed: 36; Scopus:69; Wiley Online Library: 18). Following the removal of duplicates and the application of exclusion criteria, 38 studies were included in the final analysis, table preparation and discussion (PubMed: 17; Scopus: 12; Wiley Online Library: 9).

From the selected studies, information regarding species name, plant part used, preparation method, therapeutic indication, and geographic location was extracted and organized for qualitative synthesis. To provide an integrative perspective, the analysis was structured into four thematic sections: *Historical context and taxonomic development of Myrtaceae*, *Biogeographical distribution and global diversity*, *Ethnobotanical and ethnopharmacological significance*, *and Economic relevance and future perspectives* (Figure 1). This structure allowed the integration of historical, ecological, and ethnopharmacological information to identify patterns of diversity, traditional use, and potential applications of Myrtaceae species.

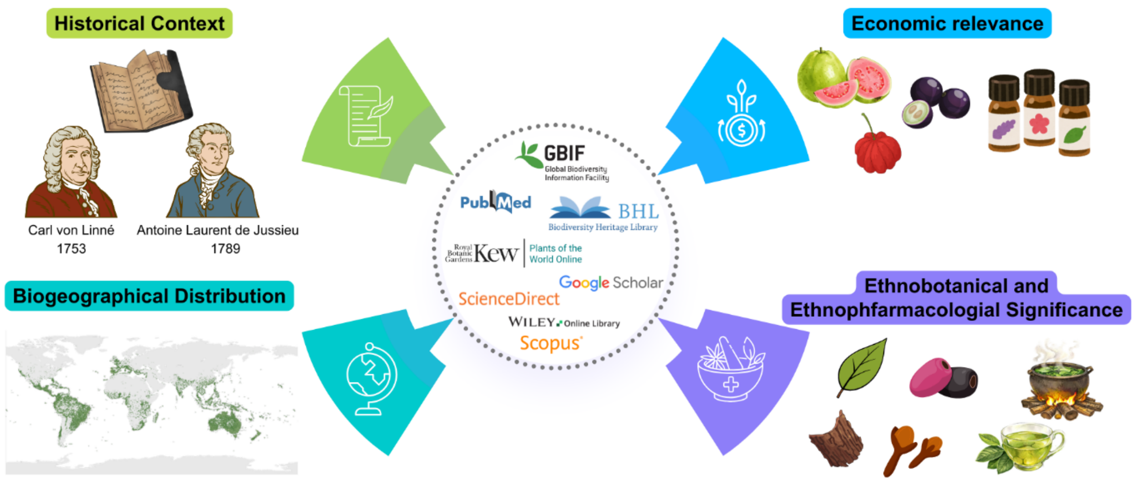

Figure 1. Schematic overview of the literature search and thematic organization of this integrative review, including consulted databases and the main analytical sections of the study. Source: Composite prepared by the author.

Results and Discussion

Historical context and taxonomic development of Myrtaceae

The historical understanding of the Myrtaceae family has evolved in parallel with the development of botanical classification systems over the past three centuries. The first recorded informal mentions of species from the genera *Myrtus* L, *Eugenia* P.Micheli ex L., and *Psidium* L., later characterized as members of the Myrtaceae family, were made by the botanist Carl von Linné (Linnaeus) in 1753 in his work *Species Plantarum* (Linné 1753). In that work, the genera were grouped according to the flowers' reproductive characteristics, placing them in *Icosandria Monogynia*, a Greek term referring to twenty stamens (male organ) and one pistil (female organ).

A few decades later, the French botanist Antoine Laurent de Jussieu proposed a more refined grouping of these genera by considering additional shared morphological characters, and he named the different groups "Ordo." In his work *Genera Plantarum*, Jussieu established the genera listed by Linnaeus and additionally included the genera *Melaleuca* L. and *Leptospermum* J.R.Forst. & G.Forst., grouping them within *Ordo* XIV - *Myrti* (Figure 2) (Jussieu 1789).

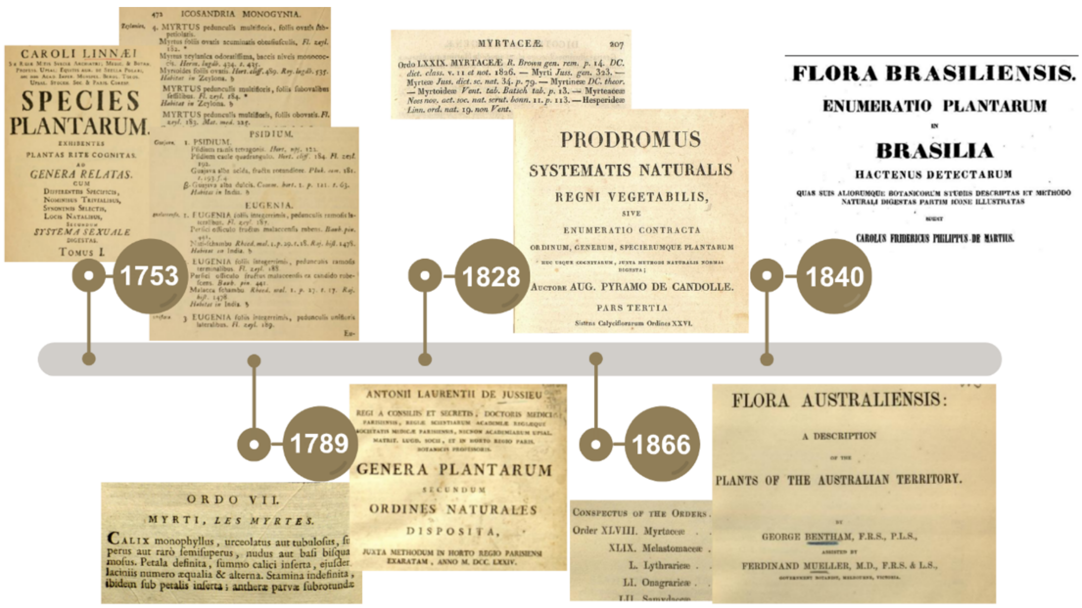

Figure 2. Composite image of book covers from classical works of botanical taxonomy: *Species Plantarum* (1753), *Genera Plantarum* (1789), *Prodromus Systematis Naturalis Regni Vegetabilis* (1828), *Flora Australiensis* (1866) and *Flora Brasiliensis* (1840). Source: Public domain images obtained from the Biodiversity Heritage Library (BHL). Composite prepared by the author.

The concept of botanical families was formally established some years later by Augustin Pyramus de Candolle in 1813 in his work *Théorie Élémentaire de la Botanique*. In this publication, Candolle introduced the hierarchical taxonomic category "Famille" to replace the term "Ordo" proposed by Jussieu and also defined the standardized ending "-eae" for botanical families (Candolle 1813). Subsequently, British botanist Robert Brown described the term Myrtaceae, combining Jussie's Myrti and Candolle's standardized family suffix. In his work, Brown also mentioned detailed descriptions of the genera *Eucalyptus* L'Hér, *Melaleuca*, and *Leptospermum* (Brown & Bauer 1814).

Following these advances, Candolle later cited Brown's contribution and formally recognized the Myrtaceae group as a botanical family in volume 3 of *Prodromus Systematis Naturalis Regni Vegetabilis*, published in 1828. In this work, he also proposed the first internal subdivisions of the family, which would later be recognized as (Candolle & Candolle 1828).

Throughout the 19th century, the taxonomic knowledge of Myrtaceae expanded considerably as botanical expeditions and regional floristic studies increased the number of described species. English botanist George Bentham and German botanist Johannes Conrad Schauer made important contributions to the description and classification of species within the family. In *Flora Australiensis*, Bentham and Mueller (1866) listed hundreds of Australian Myrtaceae species and grouped them into the tribes Chamelaucieae DC., Leptospermeae DC., Myrteae DC., and Lecythideae. The latter, however, is currently recognized as the independent family Lecythidaceae A. Rich. This classification was primarily based on floral and fruit characteristics previously highlighted by Candolle. Around the same period, Schauer (1841), a specialist in Myrtaceae, also contributed by reviewing and listing new species mainly from Australia and analyzing specimens collected during botanical expeditions in South America.

In Brazil, an important milestone in the study of Myrtaceae occurred between 1840 and 1906 with the publication of *Flora Brasiliensis*, coordinated by the German physician, botanist, and anthropologist Karl Friedrich Philipp von Martius. The work was sponsored by the emperors of Austria and Brazil and the king of Bavaria and was inspired by national botanical projects such as *Flora Australiensis*. With a major contribution from German botanist and pharmacist Otto Karl Berg, the work contains taxonomic treatments of 173 families with more than 1600 cataloged genera. Myrtaceae was one of the most representative families in the work, with 43 genera listed, 37 of which belong to the Myrteae tribe (Martius *et al*. 1840). The predominance of the Myrteae tribe in Brazil was also observed by Danish botanist Hjalmar Kiaerskou in *Enumeratio Myrtacearum Brasiliensium.* Kiaerskou described species of *Eugenia*, *Myrcia* DC. Ex Guill., and *Psidium* of the tribe Myrteae, and only one species of *Melaleuca*, tribe Leptospermeae (Kiaerskou 1893).

More than a century later, a series of fundamental studies on American tropical Myrtaceae species was published by American botanist Rogers McVaugh, significantly expanding knowledge about the family globally (Mcvaugh 1956; 1963; 1968). McVaugh's work contributed to highlighting the relevance of the Myrtaceae family by describing 106 new species in just two publications in a short period of time (Mcvaugh 1956; 1963). In addition, his works introduced more refined morphological criteria for species identification and emphasized the influence of seasonality on morphological characteristics.

Subsequent studies continued to refine the taxonomy of Myrtaceae, particularly in regions with high species diversity such as Brazil. Recognizing the challenges associated with species identification based on generalized catalogs and the influence of seasonal variation, Landrum and Kawasaki (1997) produced an illustrated synoptic treatment and identification keys for genera and species occurring in Brazil. During the same period, additional studies began reporting new endemic species in the country (Kawasaki 1998, Kawasaki & Holst 2002). The discovery of new species in Brazilian territory continues to the present day (Amorim *et al*. 2021, Fernandes *et al*. 2024), demonstrating that Brazil's vast flora still harbors undocumented diversity and highlighting ongoing challenges in the taxonomic delimitation of the family.

Advances in molecular biology during the late twentieth century brought new perspectives to the classification of Myrtaceae. Due to the morphological diversity observed within Myrtaceae, it was one of the families included in the pioneering study of the construction of one of the first comprehensive molecular phylogenies (Chase *et al*. 1993). Earlier phylogenetic investigations had already explored evolutionary relationships using morphological and anatomical characters (Johnson & Briggs 1984, Landrum 1981, Prober *et al*. 1990), but molecular data allowed for a more robust reconstruction of evolutionary relationships.

More comprehensive phylogenetic analyses focused specifically on Myrtaceae began in the early 21st century (Wilson *et al*. 2001). With expanded sampling and the inclusion of additional species, Wilson *et al*. (2005) proposed a revised classification of the family based on molecular evidence, organizing Myrtaceae into two major subfamilies: Psiloxyloideae Schmid and Myrtoideae Sweet. This framework has since become an important reference for modern taxonomic studies.

Currently, global taxonomic databases such as the Catalogue of Life, a global database that compiles validated taxonomic lists with annual updates, provide updated hierarchical classifications for the family. According to this database, the subfamily Psiloxyloideae comprises only two tribes (Heteropyxideae Harv. and Psiloxyleae (Croizat) A.J.Scott) and four genera with two species, while the subfamily Myrtoideae encompasses the majority of the diversity of the Myrtaceae family, including numerous tribes and subtribes that contain most of the currently recognized species (Figure 3) (Catalogue of Life 2025). These modern classifications, supported by molecular phylogenetic studies, reflect the culmination of centuries of taxonomic investigation and provide the framework for contemporary research on the diversity, evolution, and biogeography of Myrtaceae.

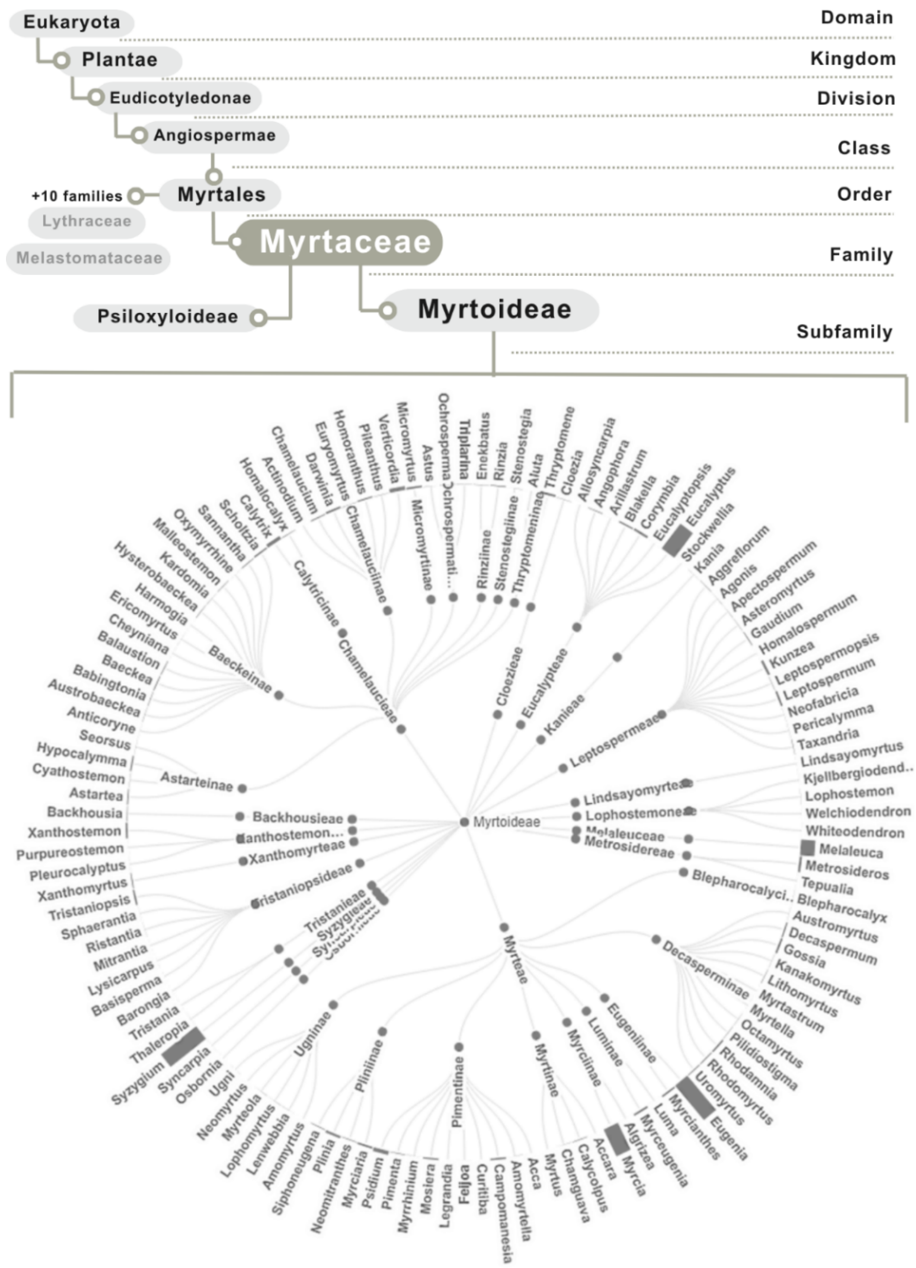

Figure 3. Hierarchical classification of the Myrtaceae family. Source: Created with Flourish using own data,

Biogeographical distribution and global diversity

The global distribution of the Myrtaceae family has been documented since the earliest botanical records. In *Species Plantarum*, Linné (1753) cited specimens of the genera *Psidium* and *Eugenia* as originating from India, while *Myrtus* specimens were reported from Europe, Asia, Africa, and South America. In Jussieu's 1789 work, although there are no references to the geographical data of the species included, it is known that the work was based mainly on collections from European herbaria and on samples obtained by colonial scientific expeditions in tropical areas of South America, Australia, and Southeast Asia (Jussieu 1789). Over time, the number of botanical records expanded substantially as new floristic surveys, and taxonomic studies were conducted worldwide. In recent decades, the number of publications has grown significantly with the cataloging of species worldwide, in addition to the advances in digital infrastructure and data sharing, which has stimulated the creation of open-access platforms that provide updated taxonomic data and georeferenced occurrence records.

Among these platforms, the *Global Biodiversity Information Facility* (GBIF) provides one of the most comprehensive sources of georeferenced occurrence data for plant species. This international network, supported by governments and research institutions, currently provides access to more than three million occurrence records for species belonging to the Myrtaceae family as of the last update (GBIF-Secretariat 2023). Confirming the early findings of Linnaeus and Jussieu, the family's main centers of diversity are located in South America, Australia, and Tropical Asia (Figure 4A). A high concentration of occurrence records can be observed particularly in Brazil and Australia, which are the countries with the greatest number of documented records (Figure 4B).

In terms of number of species, according to *Plants of the World Online* (POWO), a taxonomic reference platform maintained by the Royal Botanic Gardens and aligned with the Angiosperm Phylogeny Group IV system (APG IV, 2016), reported that the Myrtaceae family comprised 144 accepted genera and 5,923 accepted species in 2024. According to this database, the subfamily Psiloxyloideae includes two genera and four species, whereas the subfamily Myrtoideae contains the vast majority of the family’s diversity (Chase *et al*. 2016, POWO 2024). However, slight differences in taxonomic interpretation can be observed across databases. For example, the Catalogue of Life reports the same number of genera and species for Psiloxyloideae but lists 140 genera and 5,903 species within Myrtoideae (Catalogue of Life 2025). Such discrepancies reflect the ongoing taxonomic revisions and the dynamic nature of species delimitation within the family.

At the regional level, Brazil and Australia stand out not only for the number of occurrences, but also for the number of cataloged species. Of the 140 genera recognized worldwide, 75 were cataloged in Australia, with 55 endemic genera and more than 1,500 species (George 2025, Verdcourt 2001). In Brazil, there are records of 29 genera and 1,213 species, including four endemic genera and 806 endemic species to the country (Flora do Brasil 2025). Despite sharing high species richness, the two countries exhibit markedly distinct floristic compositions that reflect different evolutionary histories and ecological conditions. In Australia, the genera *Eucalyptus* and *Melaleuca*, adapted to Mediterranean climates and savannas, are predominant in terms of species diversity, while in Brazil, neotropical genera such as *Eugenia* and *Myrcia* predominate (Figure 5). Other genera, including *Syzygium* and *Leptospermum*, occur in both countries, although they are significantly more prevalent in Southeast Asia and Oceania.

The differences in distribution between the two countries reflect historical processes of continental isolation and distinct ecological pressures, the understanding of which has advanced with the development of phylogenetic studies. Wilson *et al*. (2005) demonstrated that the subfamily Myrtoideae is distributed across three major biogeographical groups: the Eugenia clade in the Neotropics, the Syzygium clade in pantropical regions, and the Melaleuca clade in Australasia. These findings highlight the strong geographical structure underlying the diversification and highlight the need for further investigation into the origins and biogeographic distribution of the family Myrtaceae.

Subsequent phylogenetic investigations have further explored evolutionary relationships within the most diverse tribes of Myrtaceae. Lucas *et al*. (2007) sought to elucidate the evolutionary relationships within the Myrteae tribe, the most diverse in the family, and observed that the largest genera, *Eugenia* and *Myrcia*, probably originated in western and southeastern South America, respectively. A decade later, Vasconcelos *et al*. (2017) expanded these investigations and highlighted evidence that intrinsic biological factors may be accelerating diversification rates, which makes it difficult to accurately reconstruct evolutionary origins.

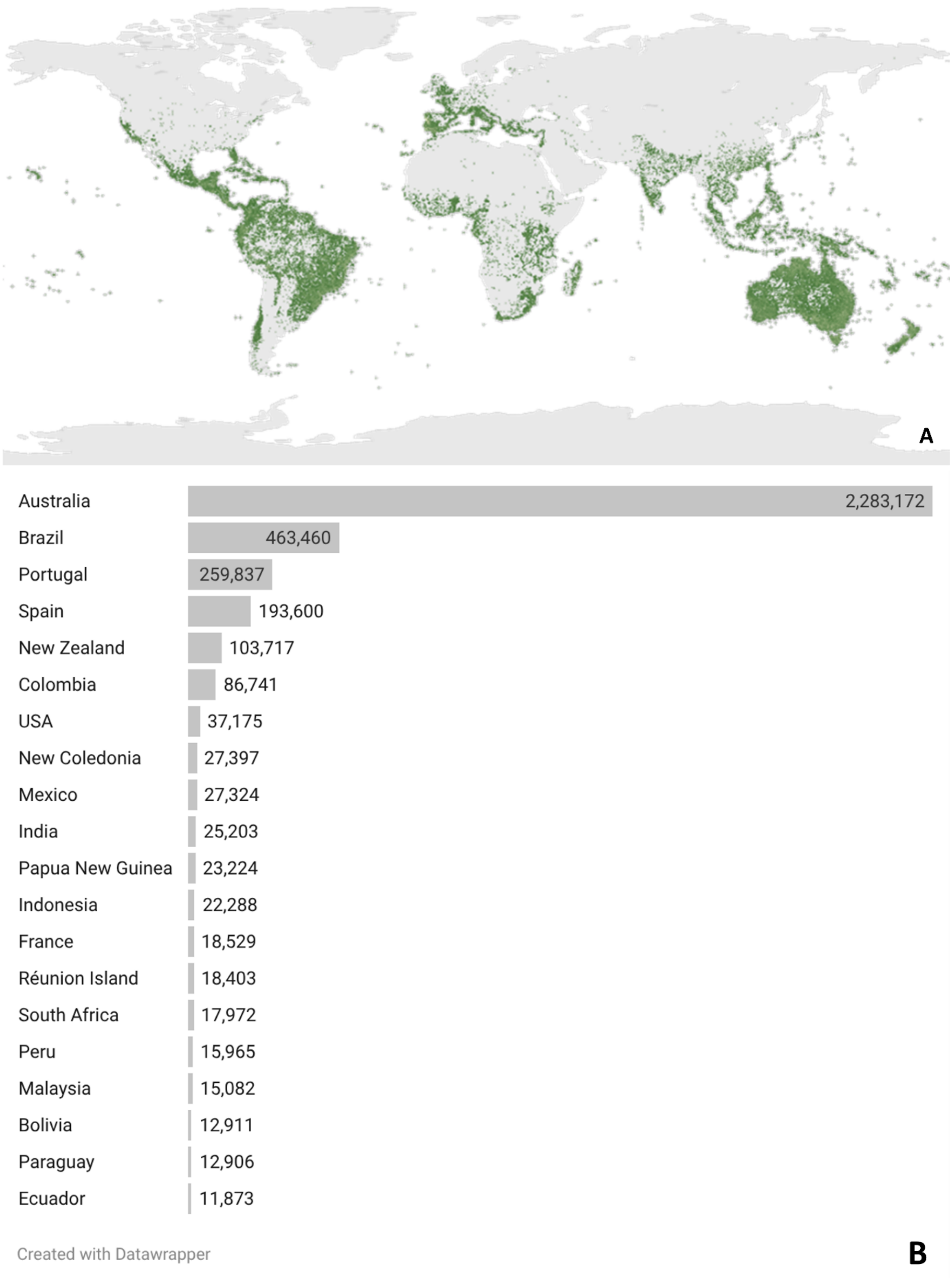

Figure 4. Global distribution map of Myrtaceae based on georeferenced occurrence records available through the Global Biodiversity Information Facility (GBIF) (A) and occurrences of species records in numbers in the 20 most cited countries (B) until the year 2025. Source: Map generated using GBIF occurrence data. Available at: https://doi.org/10.15468/39omei (A). Created with Datawrapper using own data, ©2025 Datawrapper GmbH (B).

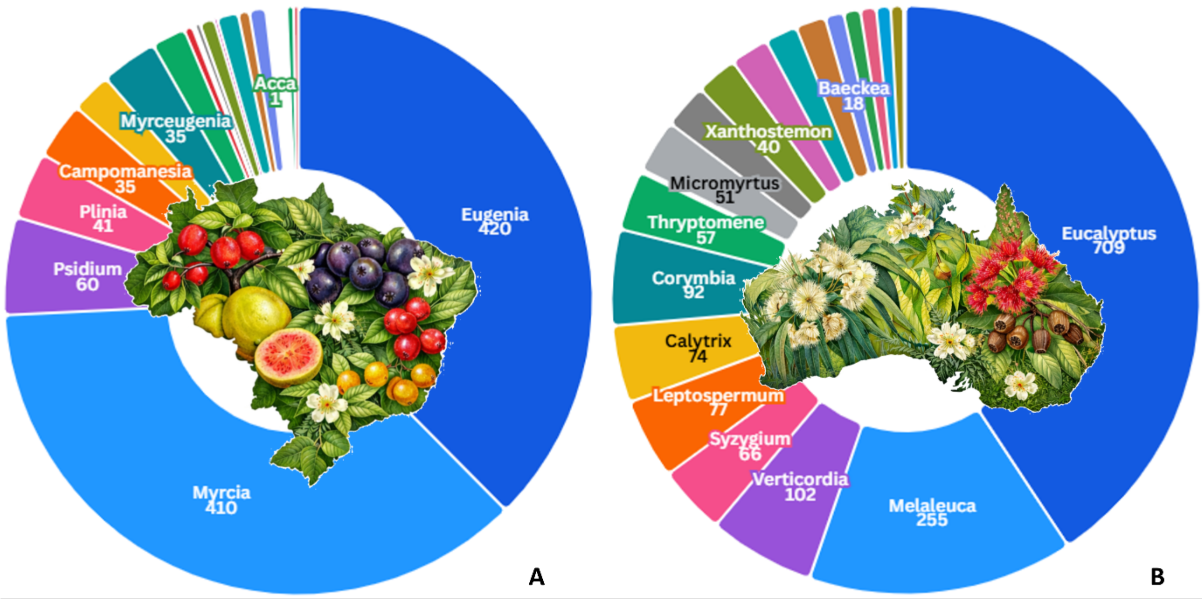

Figure 5. Most prevalent Myrtaceae genera in the two countries with the highest number of Myrtaceae species: Brazil (A) and Australia (B). Source: The graphical visualization was created with Flourish using the authors' data, ©2024 Flourish, a Canva UK Operations Limited brand. The botanical illustration was generated using DALL·E (OpenAI) based on prompts provided by the authors.

Despite these advances, the taxonomy and evolutionary history of Myrtaceae remain complex. Regional diversity patterns continue to pose challenges for classification, and several authors have suggested that future taxonomic revisions may incorporate regional diversification trends (Thornhill *et al*. 2019, Thornhill *et al*. 2015). Comprehensively covering the Myrteae tribe, a recent study highlights the complex taxonomy and provides a calibrated tree with a sample of 712 species that can be used to investigate diverse groups from the Neotropics, one of the planet's major biogeographic regions that includes South America, Central America, the Caribbean, and part of southern North America (Staggemeier *et al*. 2024). In contrast, analyses of Australian taxa suggest that certain tribes, such as Chamelaucieae, show limited geographic diversification despite considerable species richness (Nge *et al*. 2025, Vasconcelos *et al*. 2017).

Taken together, these studies demonstrate that the current distribution and diversity of Myrtaceae are the result of complex historical, ecological, and evolutionary processes. Understanding these patterns is essential for interpreting the remarkable diversity of the family and provides an important framework for future studies on taxonomy, evolution, and conservation. The wide geographic distribution and high species diversity of Myrtaceae also contribute to the extensive range of traditional uses documented for species of the family in different cultural contexts.

Ethnobotanical and ethnopharmacological significance

Global ethnobotanical records and patterns of use

Ethnobotanical and ethnopharmacological studies analyzed in the literature highlight the importance of the Myrtaceae family in traditional medicine in different regions of the world, particularly South America, Africa, Southeast Asia, and Oceania (Figure 6). Table 1 brings together records from different sociocultural contexts, covering indigenous communities, traditional healers, practitioners of folk medicine, and rural populations, which reinforces the wide cultural dissemination of the family. The bibliographic survey revealed a diversity of genera and species, with *Syzygium*, *Eucalyptus*, *Psidium*, and *Eugenia* being the most frequently cited genera, reflecting both their wide geographical distribution, as highlighted above, and their central role in traditional health systems.

In the records collected, leaves were the most used plant part, followed by bark and fruit. This pattern is commonly observed in ethnobotanical studies and is often associated with ease of collection and the adoption of practices considered more sustainable. Decoctions and infusions were the predominant methods of preparation, indicating the central role of aqueous preparations in traditional herbal medicine. Oral administration was the most reported route of administration, although topical and inhalation applications were also frequently described, particularly in treatments for respiratory and dermatological diseases (Table 1).

Figure 6. Map showing the locations where ethnobotanical and ethnopharmacological data were collected for the studies included in this review. Source: Created with Datawrapper using own data, ©2025 Datawrapper GmbH.

Regional differences were observed in the medicinal indications reported for Myrtaceae species. While gastrointestinal disorders predominated in all regions, malaria and inflammatory conditions were reported mainly in African contexts, whereas respiratory and gynecological disorders were more frequent in South and Southeast Asia. South America presented a broader therapeutic spectrum, including metabolic and cardiovascular indications (Table 1).

Regional ethnomedicinal uses and ethnopharmacological relevance

Among the species recorded, *Psidium guajava* stood out as the most frequently cited, being reported in virtually all regions analyzed and across multiple cultural contexts. In the Philippines, the species was described as a medicinal and ritual plant used by indigenous communities for the treatment of gastrointestinal disorders, respiratory diseases, and skin conditions (Andalan *et al*. 2024). In West Africa, particularly in Togo, *P. guajava* was among the most frequently cited species used in the treatment of diabetes (Karou *et al*. 2011). In North America, specifically in Guerrero, Mexico, the species has been widely mentioned for gastrointestinal disorders, fever, and flu, including combined use with *Mentha piperita* leaves for relief from stomach pain (Juárez-Vázquez *et al*. 2013). In India, *P. guajava* has been cited in various ethnobotanical surveys, both in general studies and in investigations focused on the treatment of urolithiasis, which is often associated with species of the genus *Syzygium* (Agarwal & Varma 2015, Vijayakumar *et al*. 2015).

Species of the genus *Eucalyptus* were also frequently cited, mainly in association with the treatment of respiratory diseases, inflammatory conditions, and infections (Figure 7). In Senegal, Ba *et al*. (2024) integrated ethnobotanical data with *in vitro* assays and demonstrated that extracts and fractions of *Eucalyptus camaldulensis* exhibited significant antimicrobial activity against respiratory tract pathogens, with MIC values ranging from 0.037 to 0.6 mg/mL against strains of *Staphylococcus aureus*, *Streptococcus pyogenes*, and Gram-negative strains such as *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*. The traditional use of *Eucalyptus globulus* for flu-like symptoms and respiratory diseases has also been widely documented in different countries, including Tanzania, Pakistan, and Morocco, where inhalation of leaf infusions is a common practice (Benamar *et al*. 2024, Kacholi & Amir 2024, Mogha 2024, Tufail *et al*. 2020). In northeastern Nigeria, species such as *E. camaldulensis*, *P. guajava*, *Corymbia citriodora* and *Melaleuca comosa* were among the main ones used for gastrointestinal, respiratory, inflammatory disorders, and malignant diseases (Dogara *et al*. 2024).

Table 1. Ethnobotanical and ethnopharmacological overview of Myrtaceae Juss. species across diverse biogeographical regions, highlighting traditional uses, preparation methods, routes of administration, and associated cultural contexts.

Scientific name	Popular name	Part used	Preparation method	Route of administration	Indications	Cultural context	Country/ region	Voucher Identification	Reference
Psidium guajava L.	Bayabas	Leaves; Young leaves; Shoots	Decoction; Chewed	Oral; Topical	Skin diseases; Gastrointestinal disorders; Respiratory diseases	Indigenous communities	Philippines, Southeast Asia	NSM-3554	Andalan *et al.* 2024
	Goyaba	Leaves	Decoction	Oral	Diabetes	Traditional healers	Togo, West Africa	10866	Karou *et al*. 2011
	Jambu biji	Leaves	Decoction; Raw	Oral	Gastrointestinal disorders	Traditional healers; Folk medicine	Indonesia, Southeast Asia	GOR-2128	Ekasari *et al*. 2025
	Guayabo	Leaves	Infusion	Oral	Gastrointestinal disorders; Respiratory diseases	Folk medicine	Mexico, North America	FEZA 12386	Juárez-Vázquez *et al*. 2013
	Amrood	Unripe fruit; Seeds	Crushed (with cow urine)	Oral	Urolithiasis	Folk medicine; Indigenous communities	India, South Asia	10308	Agarwal & Varma 2015
	Fanseglou’iab	Leaves	Infusion	Oral	Gastrointestinal disorders	Traditional medicine	China, East Asia	TA0522	Au *et al*. 2008
	Goyav; Gwayav	Leaves; Fruits; Shoots	Infusion	Oral	Gastrointestinal disorders	Folk medicine	France, Western Europe	Delens 23, VEN	Courric *et al*. 2023
	mpera	Fresh leaves	Decoction	Oral; Inhalation	Respiratory diseases	Folk medicine	Tanzania, East Africa	NGM18	Mogha 2024
	Mpera	Leaves	Infusion	Oral	Respiratory diseases	Traditional healers	Tanzania, East Africa	UR21	Kacholi & Amir 2024
	Goiabeira	Fruits; Shoots; Bark	Infusion; Maceration	Oral; Bath	Gastrointestinal disorders; Gynecological disorders	Traditional healers; Folk medicine	Brazil, South America	MCF 209	Coelho-Ferreira 2009
	Gova	Leaves	Decoction	Oral	Malaria	Folk medicine	Nigeria, West Africa	PCG/UNN/0045	Odoh *et al*. 2018
	Gwaiba	Bark; Stem; Leaves	Decoction	Oral	Inflammatory conditions; Malaria; Malignant diseases	Folk medicine	Morocco, North Africa	ABU063668	Dogara *et al*. 2024
	Perala	Bark; Leaves; Seeds	Crushed; Decoction	Oral	Musculoskeletal disorders	Folk medicine	India, South Asia	YGA 107	Anadka & Gulimane 2024

	Koyya	Leaves; Roots	Raw; Decoction	Oral	Gastrointestinal disorders	Traditional healers	India, South Asia	PHC-1255	Vijayakumar *et al*. 2015
Psidium cattleianum Sabine	Araçá	Leaves; Fruits	Syrup	Oral	Respiratory diseases	Folk medicine	Brazil, South America	Bonaldi R142*	Bolson *et al*. 2015
Syzygium aromaticum (L.) Merr. & L.M.Perry	Hungolawa	Flowers; Fruits	Decoction; Infusion	Oral; Topical; Inhalation	Respiratory diseases; Inflammatory conditions; Gastrointestinal disorders	Traditional healers; Folk medicine	Indonesia, Southeast Asia	GOR-2118	Ekasari *et al*. 2025
	Labanga	Flower buds	Infusion; Decoction; Maceration	Oral	Gynecological disorders	Indigenous communities	India, South Asia	SGD085	Modak *et al*. 2015
	karafuu	Flower buds	Maceration	Oral	Respiratory diseases	Folk medicine	Tanzania, East Africa	NGM19	Mogha 2024
	Mkarafuu	Flowers	Infusion	Oral	Respiratory diseases	Traditional healers	Tanzania, East Africa	UR28	Kacholi & Amir 2024
	Lavanga	Bark; Fruits	Crushed; Boiled in coconut oil	Topical	Musculoskeletal disorders	Folk medicine	India, South Asia	YGA 076	Anadka & Gulimane 2024
	Cravinho	Roots	Maceration	Oral	Depurative; Allergy; Rheumatism	Folk medicine	Brazil, South America	000217	Gomides *et al*. 2022
Syzygium cumini (L.) Skeels	—	Fruits	Decoction; Dried	Oral	Gastrointestinal disorders; Febrile inflammatory conditions	Folk medicine	Pakistan, South Asia	SMHR-023	Ali *et al*. 2023
	Daun jambolang	Leaves	Maceration	Oral	Gastrointestinal disorders	Traditional healers; Folk medicine	Indonesia, Southeast Asia	GOR-2127	Ekasari *et al*. 2025
	Jam; Kalojam	Bark	Paste	Topical	Snakebite	Indigenous communities	Bangladesh, South Asia	MFK 130 (DACB)	Kadir *et al*. 2015
	Jam	Bark	Infusion; Decoction; Maceration	Oral	Gynecological disorders	Indigenous communities	India, South Asia	SGD086	Modak *et al*. 2015
	Nerale	Bark	Decoction	Oral	Musculoskeletal disorders	Folk medicine	India, South Asia	YGA 142	Anadka & Gulimane 2024
	Jamelão	Fruits; Leaves	Raw; Decoction	Oral	Diabetes; Hypercholesterolemia; Hypertension; Diuretic	Folk medicine	Brazil, South America	000219	Gomides *et al*. 2022

	Ameixa	Bark	Infusion	Oral	Hemorrhoids	Traditional healers; Folk medicine	Brazil, South America	MCF 19	Coelho-Ferreira 2009
Syzygium polyanthum (Wight) Walp.	Salam	Leaves	Decoction	Oral	Dizziness	Traditional healers; Folk medicine	Indonesia, Southeast Asia	GOR-2161	Ekasari *et al*. 2025
Syzygium guineense (Willd.) DC.	Dokima	Leaves; Roots	Decoction (with other species)	Oral	Skin cancer	Traditional healers	Ethiopia, East Africa	Bel-006	Tesfaye *et al*. 2020
Syzygium anacardiifolium (Craib) Chantaran. & J. Parn.	Jamun	Leaves; Bark	Decoction; Infusion	Oral; Topical	Gastrointestinal disorders; Infectious diseases; Inflammatory conditions; Skin diseases	Folk medicine	India, South Asia	RDS-1226	Panda *et al*. 2018
Syzygium praecox (Roxb.) Rathakr. & N.C.Nair	Jamun	Leaves	Decoction	Oral; Topical	Gastrointestinal disorders; Infectious diseases; Inflammatory conditions; Skin diseases	Folk medicine	India, South Asia	RDS-1225	Panda *et al*. 2018
Syzygium jambolanum DC.	Naaval	Leaves; Bark; Seeds	Paste; Decoction	Oral	Gastrointestinal disorders; Diabetes	Traditional healers	India, South Asia	PHC-1241	Vijayakumar *et al*. 2015
Syzygium travancoricum Gamble	vathankolli	Bark	Decoction	Bath	Musculoskeletal disorders	Folk medicine	India, South Asia	YGA 098	Anadka & Gulimane 2024
Syzygium caryophyllatum (L.) Alston	Kuntanerale	Bark	Decoction (with other species)	Oral	Musculoskeletal disorders	Folk medicine	India, South Asia	YGA 080	Anadka & Gulimane 2024
Syzygium afromontanum (F. White) Byng	Gosu	Fruits	Raw; Ripe	Oral	Food use	Indigenous communities; Folk medicine; Rural population	Ethiopia, East Africa	Mk012	Guzo *et al*. 2023
Syzygium guineense (Willd.) DC. subsp. guineense	Badesa	Fruits	Raw; Ripe	Oral	Food use	Indigenous communities; Folk medicine; Rural population	Ethiopia, East Africa	Mk002	Guzo *et al*. 2023

Syzygium guineense (Willd.) DC. subsp. macrocarpum	Gumari	Fruits	Raw; Ripe	Oral	Food use	Indigenous communities; Folk medicine; Rural population	Ethiopia, East Africa	Mk029	Guzo *et al*. 2023
Eucalyptus globulus Labill.	Bahirzaf/Nech	Leaves	Decoction	Inhalation	Fever	Folk medicine	Ethiopia, East Africa	WY045	Misganaw & Yiblet 2024,
	—	Leaves; Oil	Infusion	Oral; Inhalation	Respiratory diseases; Infectious diseases	Folk medicine	Pakistan, South Asia	Myr-03/20	Tufail *et al*. 2020
	mkaratusi	Fresh leaves	Decoction (with other species)	Oral; Inhalation; Steam	Respiratory diseases	Folk medicine	Tanzania, East Africa	NGM10	Mogha 2024
	Mkalatusi	Leaves	Infusion	Inhalation	Respiratory diseases	Traditional healers	Tanzania, East Africa	UR20	Kacholi & Amir 2024
Eucalyptus camaldulensis Dehnh.	Khottou boutel	Leaves	Infusion; Decoction	Oral	Respiratory diseases	Traditional healers; Folk medicine; Rural population	Senegal, West Africa	BA14	Ba *et al*. 2024
	Turare; Sandal	Bark; Leaves; Stem; Roots	Decoction	Oral	Gastrointestinal disorders; Malaria; Inflammatory conditions	Folk medicine	Morocco, North Africa	ABU09861	Dogara *et al*. 2024
Eucalyptus robusta Sm.	Hiong'on'iab	Leaves	Decoction	Topical	Dermatitis	Traditional medicine	China, East Asia	TA06027	Au *et al*. 2008
Eucalyptus tereticornis Sm.	Neelagiri	Bark; Leaves	Ground; Boiled with ghee, sesame oil and coconut oil	Topical	Musculoskeletal disorders	Folk medicine	India, South Asia	YGA 100	Anadka & Gulimane 2024
Eugenia uniflora L.	Pitangueira	Leaves	—	Oral; Topical	Skin diseases; Infectious diseases	Folk medicine	Brazil, South America	LFP02	Santos *et al*. 2019
	Pitanga; Pitangueira	Leaves; Fruits	Infusion	Oral	Respiratory diseases; Endocrine disorders; Cardiovascular diseases; Gastrointestinal disorders; Musculoskeletal disorders	Folk medicine	Brazil, South America	Silva SM 922*	Bolson *et al*. 2015

	Pitanga; cereja brasileira	Leaves	Infusion	Oral	Gastrointestinal disorders; Abdominal pain	Folk medicine	Brazil, South America	25.591	Da Costa Ferreira *et al*. 2021
Eugenia involucrata DC.	Cereja	Leaves	Infusion	Oral	Respiratory diseases	Folk medicine	Brazil, South America	Selusniaki M 509*	Bolson *et al*. 2015
Eugenia dysenterica DC.	Gaiteira	Fruits; Leaves	Raw; Decoction	Oral	Gastrointestinal disorders (laxative)	Folk medicine	Brazil, South America	000160	Gomides *et al*. 2022
Eugenia caryophyllata Thunb.	Girofle; Xorompole	Flower buds	Infusion (with other species)	Oral	Visual disorders	Traditional healers; Folk medicine	Italy, Southern Europe	UNISGSEN38	Ellena *et al*. 2012
	Manro	Leaves	Decoction	Oral; Topical	Gastrointestinal disorders; Wound healing	Folk medicine	Afghanistan, Central Asia	Bot.467	Haq *et al*. 2022
Myrtus communis L.	Al-A's/Hadass	Leaves; Bark	Maceration; Infusion; Paste	Oral; Topical	Gastrointestinal disorders; Respiratory diseases; Cardiovascular disorders; Wound healing	Traditional healers; Folk medicine; Rural population	Saudi Arabia, Western Asia	CERSH-035	Tounekti *et al*. 2019
	Adese	Leaves	Paste (with butter)	Topical	Dandruff	Folk medicine	Ethiopia, East Africa	WY038	Misganaw & Yiblet 2024
	—	Leaves; Fruits	Decoction	Oral	Respiratory diseases (cough)	Folk medicine	Pakistan, South Asia	SMHR-024	Ali *et al*. 2023
Melaleuca leucadendra (L.) L.	Kayu putih	Leaves; Fruits	Maceration; Crushed	Topical; Inhalation	Dizziness; Respiratory diseases	Traditional healers; Folk medicine	Indonesia, Southeast Asia	GOR-2103	Ekasari *et al*. 2025
Melaleuca comosa (R.Br.) S.T.Blake	Danli	Leaves	Decoction; Raw	Oral	Respiratory diseases	Folk medicine	Morocco, North Africa	ABU086671	Dogara *et al*. 2024
Corymbia intermedia (R.Br.) K.D.Hill & L.A.S.Johnson	Pink bloodwood	Sap; Latex; Resin	—	Topical	Warts; Hemostasis	Traditional healers	Australia, Oceania	NSW 792670	Packer *et al*. 2012
Corymbia citriodora (Hook.) K.D.Hill & L.A.S.Johnson	Turare	Leaves	Decoction	Oral	Respiratory diseases; Inflammatory conditions	Folk medicine	Morocco, North Africa	ABU09775	Dogara *et al*. 2024
Lophostemon suaveolens (Sol. ex Gaertn.) Peter G.Wilson & J.T.Waterh.	Apple gum	Leaf ash	—	Topical	Wound healing	Traditional healers	Australia, Oceania	MQ 73008908	Packer *et al*. 2012

Campomanesia xanthocarpa (Mart.) O.Berg	Guabirova; Guabiroba	Fruits; Leaves; Bark	Maceration; Infusion; Decoction; Raw	Oral	Endocrine disorders; Gastrointestinal disorders; Skin diseases; Musculoskeletal disorders; Infectious diseases	Folk medicine	Brazil, South America	Bolson M 298	Bolson *et al*. 2015
Campomanesia adamantium (Cambess.) O.Berg	Gabiroba	Fruits	Raw	Oral	No medicinal indication reported	Folk medicine	Brazil, South America	000218	Gomides *et al*. 2022
Plinia cauliflora (Mart.) Kausel	Jabuticaba; Jabuticabeira	Leaves; Fruits	Infusion; Decoction	Oral	Endocrine disorders; Cardiovascular diseases; Malignant diseases; Gastrointestinal disorders	Folk medicine	Brazil, South America	Scheer M et al. 365*	Bolson *et al*. 2015
Plinia rivularis (Cambess.) Rotman	Guamirin	Bark; Fruits	Decoction	Oral	Gynecological or urinary disorders; Gastrointestinal disorders; Infectious diseases	Folk medicine	Brazil, South America	Bolson M 296	Bolson *et al*. 2015
Myrcia tomentosa (Aubl.) DC.	Goiabinha-do-campo	Fruits; Leaves	Raw; Infusion	Oral	Gastrointestinal disorders (diarrhea); Infectious diseases	Folk medicine	Brazil, South America	000161	Gomides *et al*. 2022
Myrcia bracteata (Rich.) DC.	Murtinha	Leaves	Infusion	Bath	Postpartum uterine cleansing	Traditional healers; Folk medicine	Brazil, South America	MCF 244	Coelho-Ferreira 2009
Myrcia silvatica (G.Mey.) DC.	Murta	Leaves	Infusion; Maceration	Bath; Oral	Vaginal discharge; Postpartum uterine cleansing	Traditional healers; Folk medicine	Brazil, South America	MCF 129	Coelho-Ferreira 2009
Myrciaria tenella (DC.) O.Berg	Vassourinha	Leaves	Infusion	Bath	Postpartum uterine cleansing	Traditional healers; Folk medicine	Brazil, South America	MCF 148	Coelho-Ferreira 2009

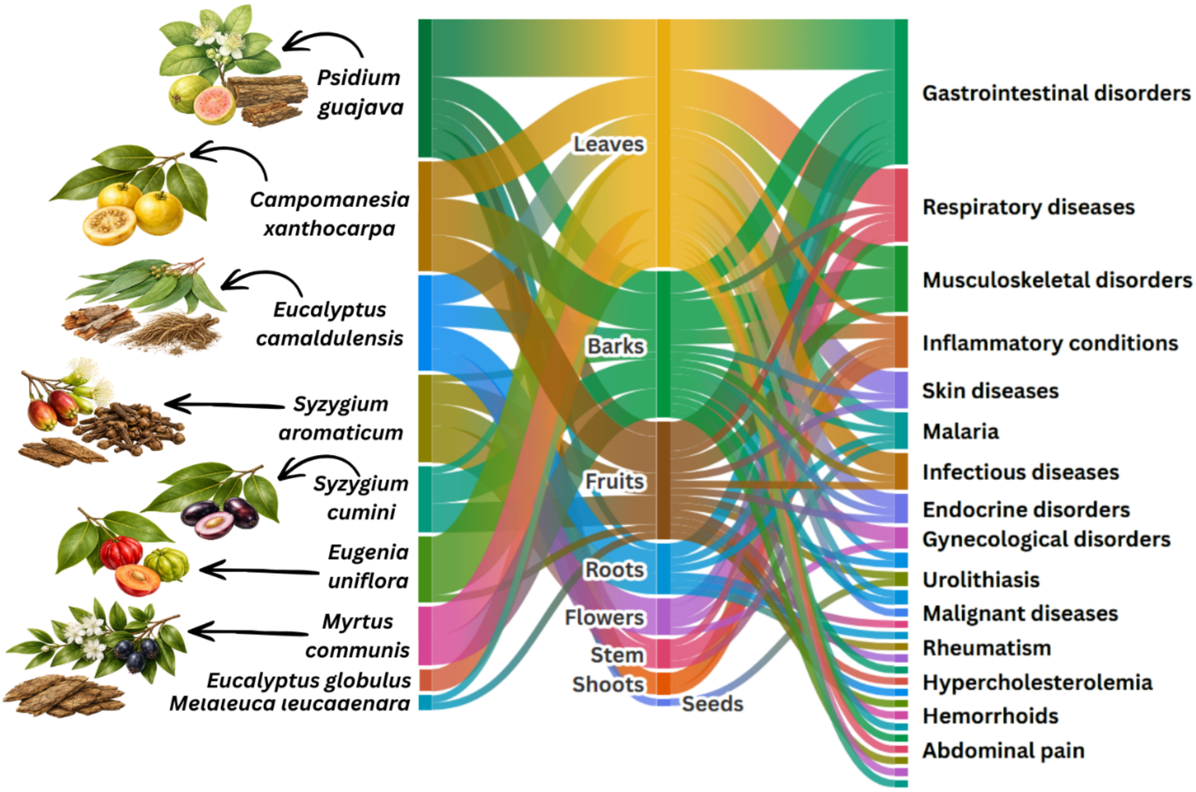

Figure 7. Species with the most indications for use according to the ethnobotanical and ethnopharmacological studies included in this review. Source: Created with Flourish using own data, ©2024 Flourish, a Canva UK Operations Limited brand. All rights reserved. The illustration was generated using DALL·E (OpenAI) based on prompts provided by the authors.

Following in order of highest number of citations, the genus *Syzygium* presented a wide diversity of medicinal and food uses. In Ethiopia, species such as *S. guineense* and *S. afromontanum* were reported mainly for fruit consumption by indigenous communities and rural populations (Guzo *et al*. 2023). In India, *S. anacardiifolium* and *S. praecox* were cited for gastrointestinal, infectious, and inflammatory disorders. The authors performed *in vitro* tests, and the extracts presented MIC values between 238 and 1000 µg/mL against strains of *Escherichia coli* and *Candida albicans*, while Antiviral activity against Enterovirus 71 showed IC_{50} values between 3 and 10 µg/mL. Experimental studies have demonstrated the antibacterial, antifungal, and antiviral activity of its extracts, corroborating traditional uses (Panda *et al*. 2018). Similar approaches were also applied to *S. cumini* and *S. lineare*, and although botanical confirmation of the species was not available, the study was included in the review due to the potential of the extracts against resistant strains of *S. aureus* and *Staphylococcus epidermidis* (Duraipandiyan *et al*. 2006, Lone & Jain 2022). Additional ethnomedicinal use have also been documented, such as the topical application of *S. cumini* paste in the treatment of snake bites in Bangladesh (Kadir *et al*. 2015).

In Brazil, the high diversity of the Myrtaceae family was reflected in the number of species and the variety of uses recorded. In the Northeast, species such as *Eucalyptus* sp., *Eugenia uniflora*, *Plinia cauliflora*, *P. guajava*, and *Syzygium* spp. were cited, although limitations in botanical identification were observed in some studies (Da Costa Ferreira *et al*. 2021). In the southern Brazil, surveys conducted in Paraná documented the medicinal and food use of native species such as *E. uniflora*, *E. involucrata*, *Campomanesia xanthocarpa*, *P. cauliflora* and *P.* cattleianum, mainly for gastrointestinal and musculoskeletal disorders (Bolson *et al*. 2015). In the Midwest and North of the country, specific uses have also been reported, including the use of fruits and leaves of *E. dysenterica*, *Myrcia* spp., and *Myrciaria tenella*, as well as the use of sitz baths for postpartum uterine cleansing (Coelho-Ferreira 2009, Gomides *et al*. 2022).

In addition to ethnobotanical and ethnopharmacological knowledge, several studies have demonstrated the diversity of biological activities associated with Myrtaceae species, and although this is not the focus of this review, it is important to highlight. Antonelo *et al*. (2023) demonstrated the antioxidant, antimicrobial, and cytotoxic potential of essential oils from *E. uniflora*, *Myrcia oblongata*, *Myrciaria tenella* e *Myrcianthes gigantea*, correlating biological responses to the presence of sesquiterpenes such as curzerene, germacrene B, and caryophyllene. Complementarily, the phytochemical complexity of plant extracts from the family has been associated with anti-inflammatory, antimicrobial, antioxidant, antitumor, and vasodilator effects, especially due to the presence of polyphenols, such as flavonoids and tannins, widely distributed in different parts of the plants (Correia *et al*. 2022, Garcia *et al*. 2023).

Studies focused specifically on antimicrobial activity reinforce this potential, demonstrating that extracts from species of the genera *Psidium*, *Campomanesia*, *Myrtus*, *Eucalyptus*, *Eugenia*, and *Syzygium* exhibit activity against human pathogenic strains, including resistant bacteria, with efficacy similar to commercial antibiotics used as controls (Garcia *et al*. 2023, Lone & Jain 2022). The presence of secondary metabolites promotes these activities through multiple mechanisms of action, including compromising cell membrane integrity, enzyme inhibition, and interference with DNA and protein synthesis (Correia *et al*. 2022), which gives the family promising potential in the context of growing microbial resistance.

Overall, the Myrtaceae family stood out among the families with the highest number of citations in the studies analyzed, ranking behind only Fabaceae, Lamiaceae, and Asteraceae among the 154 families documented in the studies included in this review. Among the most frequently cited species were *Psidium guajava*, *Syzygium aromaticum*, *Syzygium cumini*, and *Eugenia uniflora*. Approximately 3,500 people contributed to the knowledge compiled in this review; exact figures were not estimated due to the absence of the number of respondents in some of the studies. In addition to its medicinal value, the versatility of the family offers promising opportunities for the sustainable use of fruits and leaves, integrating the conservation of native species, the strengthening of local production chains, and innovation in the food and pharmaceutical sectors (Farias *et al*. 2024).

Economic relevance and future perspectives

The economic relevance of the Myrtaceae family has been recognized since the earliest botanical and industrial records. Early reports already highlighted the commercial potential of species rich in essential oils and aromatic compounds. In 1952, the commercial exploitation of essential oil from *Eucalyptus* spp. species was documented, with Australia identified as the main producer for medicinal and perfumery purposes, followed by Spain and Brazil. At the time, the presence of organized plantations and established production systems for these species was already noted (Guenther 1952). In addition to essential oil production, *Eucalyptus* plantations expanded significantly during the twentieth century for pulp and paper production. From the 1960s onwards, countries such as Brazil, Chile, and Uruguay consolidated large-scale cultivation systems and industrial infrastructure for chemical pulp processing, establishing themselves as major global producers (Klein & Luna 2022, Oliveira & Neves 2024).

Beyond their industrial uses, several Myrtaceae species are also recognized for their edible fruits and their relevance to regional and global food systems. In 1979, the genera *Eugenia*, *Psidium*, *Syzygium*, and *Myrciaria* were already cited as economically important angiosperms, particularly due to their fruit production and associated embryological studies aimed at supporting crop improvement (Prakash 1979). Among these species, *P. guajava* stands out as one of the most widely cultivated and commercially important fruits of the family. According to reports from the Food and Agriculture Organization (FAO), Guava is recognized as a fruit of global commercial relevance, although its international trade remains limited by issues related to supply chains and market availability. Nevertheless, export volumes have increased in recent years, reflecting growing global demand for nutritious and exotic fruits (FAO 2024).

Although other Myrtaceae fruits have not yet reached the same level of global market consolidation as guava, many species exhibit considerable potential for value-added production. These fruits often present desirable organoleptic characteristics for fresh consumption, high pulp yield, and a composition rich in vitamins, minerals, and secondary metabolites (Farias *et al*. 2020, Seraglio *et al*. 2018). In addition to fresh consumption, they can be incorporated into the production of processed foods such as juices, jams, fermented beverages, and functional ingredients (Sganzerla & Da Silva 2022). Recent studies have also explored biotechnological applications, including the use of Myrtaceae-derived compounds as natural colorants and bioactive ingredients in food systems (Bocker & Silva 2024).

Several species with promising nutritional and functional characteristics remain underutilized, particularly in regions with high biodiversity such as South America. In recognition of this potential, species such as *Eugenia uniflora*, *Myrciaria dubia*, and *Eugenia stipitata* were highlighted in a technical report by Bioversity International as neglected and underutilized species with considerable potential for food, medicinal, and economic applications, particularly in Latin America (Padulosi *et al*. 2013).The value of these species may contribute to strengthening local production systems, diversifying agricultural markets, and promoting the sustainable use of native biodiversity.

Despite the recognized economic and nutritional potential of many Myrtaceae species, several challenges remain for their broader commercial exploitation. These challenges include the need for domestication programs, improved cultivation systems, and technological development for large-scale processing. In this context, integrating scientific research with strategies aimed at sustainable production and biodiversity conservation is essential. Advances in phytochemical studies, product development, and agroindustrial innovation may contribute to expanding the economic relevance of the family while supporting emerging bioeconomy initiatives in biodiversity-rich regions.

Overall, the Myrtaceae family represents an important resource for the development of new food, pharmaceutical, and biotechnological products. Expanding research efforts focused on cultivation, processing technologies, and value chain development will be fundamental for unlocking the full economic potential of its species and promoting their sustainable use in regional and global markets.

Conclusion

The Myrtaceae family presents remarkable taxonomic diversity and a wide geographical distribution, particularly in tropical and subtropical regions, with Brazil and Australia standing out as major global centers of diversity and endemism. Over time, historical botanical studies, combined with advances in molecular phylogenetics, have progressively refined the taxonomic classification of the family, although challenges still persist in highly diverse groups such as the tribe Myrteae. Ethnobotanical and ethnopharmacological evidence highlights the widespread use of Myrtaceae species in traditional health systems across different regions of the world, especially for the treatment of gastrointestinal, respiratory, inflammatory, and infectious diseases. In this context, leaves, bark, and fruits are the most commonly used plant parts, typically prepared as infusions or decoctions, reflecting consistent and well-established patterns in traditional medicinal practices. Genera such as *Psidium*, *Eucalyptus*, *Syzygium*, and *Eugenia* are among the most frequently reported in ethnobotanical surveys, with several studies demonstrating a convergence between traditional uses and experimentally validated biological activities. Beyond their medicinal importance, many Myrtaceae species also hold significant economic value, particularly in fruit production, essential oil extraction, and various industrial applications. Nevertheless, numerous native species remain underexplored, especially considering their nutritional and phytochemical potential. Despite the advances achieved so far, important challenges remain, including the need to improve botanical identification in ethnobotanical surveys, expand pharmacological validation of less studied species, and strengthen multidisciplinary approaches that integrate taxonomy, ethnobotany, phytochemistry, and technological innovation.

Declarations

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