SCIENTIA NATURALIS
Scientia Naturalis, v. 5, n. 2, p. 874-896, 2023
Home page: http://revistas.ufac.br/revista/index.php/SciNat
DOI: https://doi.org/10.29327/269504.5.2-27
ISSN 2596-1640

Campomanesia guazumifolia (Cambess.) O. Berg: Ethnobotany, cultivation and potentialities

Thiago Luis Aguayo de Castro[1*], Claudia Andrea Lima Cardoso[2]

[1]Discente da Universidade Estadual de Mato Grosso do Sul, Pós-Graduação em Recursos Naturais, Dourados, Mato Grosso do Sul, Brasil. [2]Professora da Universidade Estadual de Mato Grosso do Sul, Pós-Graduação em Recursos Naturais, Dourados, Mato Grosso do Sul, Brasil *thiagoaguayo@gmail.com

Recebido em: 10/03/2023 **Aceito em: 21/10/2023** **Publicado em: 30/12/2023**

DOI: https://doi.org/10.29327/269504.5.2-27

ABSTRACT

The species *Campomanesia guazumifolia* (Cambess.) O. Berg is a fruit tree native to the southern region of South America, occurring sparsely in secondary forests. It presents different ethnobotanical uses, mainly by indigenous populations. Its fruit is used for food purposes, in nature, or handcrafted products. Its cultivation has been investigated, with its seedlings being used in reforestation due to its ecological importance. Studies on the leaves of *C. guazumifolia* highlight the presence of phenolic compounds. The essential oil composition of the leaves has also been analyzed. Biological activities have already been investigated: insecticide, antioxidant and antimicrobial. *C. guazumifolia* is little explored, despite the great potential for the elaboration of products due to its ethnobotanic indication and capacity to produce edible fruits.
Palavras-chave: Patents. Fruits. Chemical composition.

Campomanesia guazumifolia (Cambess.) O. Berg: Etnobotanica, cultivo e potencialidades

RESUMO

A espécie *Campomanesia guazumifolia* (Cambess.) O. Berg é uma árvore frutífera nativa da região sul da América do Sul, ocorrendo de forma pouco densa em matas secundárias. Apresenta diferentes usos etnobotanicos, principalmente por populações indígenas. Seu fruto é utilizado para fins alimentícios, *in natura* ou em produtos artesanais. Seu cultivo vem sendo investigado, com suas mudas sendo utilizada em reflorestamento devido a sua importância ecológica. Há estudos a respeito das folhas de *C. guazumifolia* que destacam a presença de compostos fenólicos. A composição do óleo essencial das folhas também já foi analisada. Já foram investigadas as atividades biológicas: inseticida, antioxidante e antimicrobiana. A *C. guazumifolia* é pouco explorada, apesar do grande potencial para elaboração de produtos devido a sua indicação etnobotânica e sua capacidade de produzir frutos comestíveis.
Keywords: Patentes. Frutos. Composição química.

INTRODUCTION

The Myrtaceae family consists of several predominantly pantropical genera with great diversity that present great morphological homogeneity, possibly having emerged during the Upper Eocene and the subtribes in the Oligocene (30-20 Mya) (SOUZA NETO et al., 2022). Its diversification occurred in the ancient continent of Australasia when Australia was connected to South America (VASCONCELOS et al., 2017; SYTSMA et al., 2004). Currently, this family is present in South America, Australia, tropical Asia, part of Europe and Africa, with several species in biodiversity hotspots in Australia (SouthWest Ecoregion) and Brazil (Cerrado and Atlantic Rainforest) (GRATTAPAGLIA et al., 2012).

The genus *Campomanesia* Ruiz & Pav. belongs to the Myrtaceae family, Myrtoidae, subfamily and Myrteae tripe (LIMA e al., 2011), described initially by Ruiz and Pavón (1794) based on the species *Campomanesia lineatifolia* Ruiz & Pav. The genus name *Campomanesia* is a tribute to the Spanish naturalist and explorer Pedro Rodriguez de Campomanes (1723-1802) (MONDIN et al., 2008).

This genus comprises woody and shrubby plants that produce flowers and berry-like fruits (LAWRENCE, 1969; LEGRAND; KLEIN, 1978; JOLY, 1993). The genus is also euryhaline about the pollen grains. That is, it presents a wide variation in the shapes of the grains for each species (LUBER et al., 2022).

The genus *Campomanesia* was recognized at the end of the 18th century (RUIZ & PAVÓN, 1794) and is divided into three informal complexes: *C. grandiflora* Complex (*C. grandifora* (Aubl.) Sagot, *C. guaviroba* (DC.) Kiaersk, *C. lineatifolia* Ruiz & Pav, *C. neriifora* (O. Berg) Nied and *C. speciosa* (Diels) McVaugh), *C. xanthocarpa* Complex (*C. adamantium* (Cambess.) O. Berg, *C. aromática* (Aubl.) Griseb., *C. aurea* O. Berg, *C. eugenioides* (Cambess.) D. Legrand ex Landrum, *C. pabstiana* Mattos & D. Legrand, *C. pubescens* (DC.) O. Berg, *C. reitziana* D. Legrand, *C. velutina* (Cambess.) O. Berg and *C. xanthocarpa* (Mart.) O. Berg) and *C. guazumifolia* Complex (*C. guazumifolia* (Cambess.), O. Berg, *C. rufa* (O. Berg) Nied., *C. schlechtendaliana* (O. Berg) Nied and *C. sessilifora* (O. Berg) Mattos) (LANDRUM, 1986). Oliveira et al., (2021) analyzed the molecular relationships of *Campomanesia* species. However, the study focused on the *C. xanthocarpa* complex.

The study by Pittarelli et al., (2021) analyzed the pericarp development of fruits of the genus *Campomanesia* and described that only the species *Campomanesia guazumifolia* (Cambess.) O. Berg, *Campomanesia rufa* (O. Berg) Nied and *Campomanesia sessiliflora* (O. Berg) Mattos present sclereids in the mesophyll ovarian, while the other species have this characteristic evidenced only after complete formation of the fruit. This characteristic is a promising marker for the *C. guazumifolia* complex described by Landrum (1986).

Relevant characters of the genus are: Ovary containing from 4 to 18 locules with several ovules, uniflorous peduncles, racemes and dichasia and may have an open or closed calyx (LIMA et al., 2011; RIBEIRO; PEIXOTO, 2022).

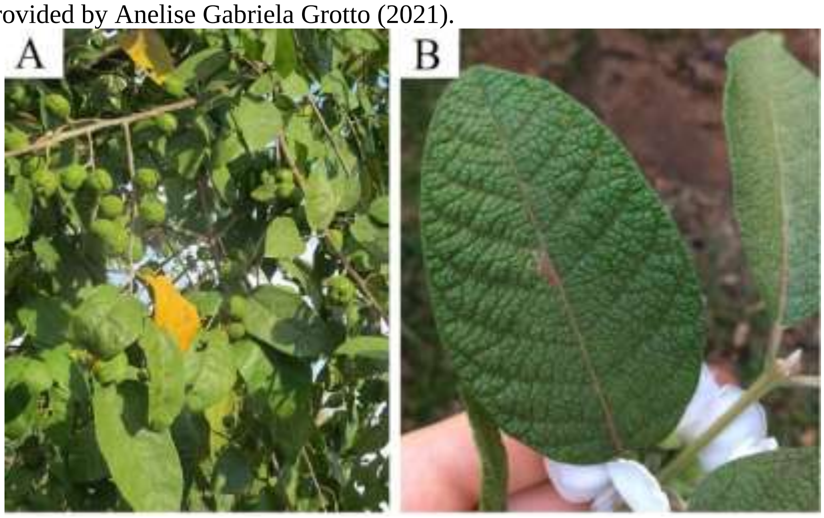
The genre has great economic and social relevance. In this context, Brazilian law 5,082 of November 2017 made the fruits of the genus *Campomanesia* a symbol of the state of Mato Grosso do Sul. In addition, Cardoso (2021) reports the various studies of biological activities carried out with *Campomanesia* species; however, the scientometric survey by Steckelberg et al., (2022) demonstrates that *C. guazumifolia* has fewer studies compared to other species of the genus.

Thus, this review will discuss the ethnobotanical knowledge and potential uses of the species *C. guazumifolia*, aiming to highlight the potential of the species.

CHARACTERISTICS AND DISPERSION OF THE SPECIES *C. guazumifolia*

According to Legrand and Klein (1977), the species *C. guazumifolia* was initially described in the work of Linnaea in 1856, with the name of the species referring to the similarity of the leaves of the species with those of the genus *Guazuma* Mill (Malvaceae) (Figure 1).

Figure 1 – Leaves of species (A) *Guazuma ulmifolia* Lam. (CULBERT, 2013) and (B) *C. guazumifolia* Provided by Anelise Gabriela Grotto (2021).



The popular names of *C. guazumifolia* in Brazil are: gabiroba, araçá, araçá-do-mato, gabirobão, goiabinha, guabiroba, sete-capotes, sete-casacas, capoteira, capote, capoteiro, guavirova, pêssego-do-mato, sete-capota, solta-capotes, araçazeiro-grande, ibará-piroca (CARVALHO, 2008), guamirim-araçá, guairim-chorão (MOSER et al., 2022), sete-capas (ISERNHAGEN et al., 2009; FURLAN et al., 2016) e brasa-viva (MIRANDA et al., 2020). In Spanish it is known as siete-capotes and as ñandú apysá and aguaricará in Guaraní (CROVETTO, 2012; WAGNER et al, 2020; KUJAWSKA et al., 2022).

They are considered synonyms of this species: *Britoa sellowiana* Berg. and *Psidium guazumaefolia* Cambessèdes (CARVALHO, 2008). Synonyms are also cited: *Abbevillea rugosa* O. Berg, *Britoa guazumifolia* (Cambess.) D. Legrand, *Britoa hassleriana* Barb. Rodr. ex Chodat & Hassl., *Britoa sellowiana* O. Berg, *Campomanesia albiflora* Rojas Acosta, *Campomanesia itanarensis* Kiaersk. and *Lacerdaea luschnathiana* O. Berg. by The World Flora Online (2022). Confusion with the synonyms of these species is not common in scientific works.

It is a terrestrial tree with a curved and furrowed trunk that can reach between 3 and 12 meters in height, 20 to 30 cm in crown diameter (LEGRAND; KLEIN, 1977; LORENZI et al., 2000; LORENZI, 2002); however, Moser et al., (2022) report that the species can reach 21 m in height. It is a perennial species of slow growth (PEREIRA et al., 2016) of non-pioneer character (AQUINO; BARBOSA, 2010), and Carvalho (2008) describes this species as early or late secondary. The trunks are grayish-brown, defoliating in sheets that form grooves in old individuals, forming fissures in the stem bark (Figure 2) (MARCHIORI, 1998; THE BRAZILIAN FLORA GROUP, 2018). It has a variable habit and may grow straight, irregular, slightly tortuous or with bifurcations (CARVALHO, 2008). It can live from 20 to 100 years (MOSER et al., 2022).

Figure 2 – Detail of the stem of *C. guazumifolia*. Source: Grasel (2011).

It is a mesophilic and hygrophytic species, occurring at low density in the interior of rainforests of the Atlantic Forest and pine forests (LEGRAND; KLEIN, 1977; LORENZI, 2002), semi-deciduous stationary forest, rainforest and mixed rainforest (MOSER et al., 2022). It is also associated with sandbanks in the states of Espírito Santo and Rio de Janeiro, cerradão in Minas Gerais and São Paulo, and river environments in the states of Mato Grosso do Sul, Minas Gerais, São Paulo and Paraná (CARVALHO, 2008).

It occurs in Argentina (Corrientes and Misiones), Paraguay (Alto Paraná, Amambay, Caazapa, Canindeyu, Guaira, Misiones, Paraguari and San Pedro) and Brazil (Figure 3) (CATALOGUE OF LIFE, 2022). In Brazil, it occurs in Paraná, Rio Grande do Sul, Santa Catarina, Bahia, Minas Gerais, Espirito Santo, São Paulo, Rio de Janeiro and Mato Grosso do Sul (CATALOGUE OF LIFE, 2022; OLIVEIRA et al., 2022).

Figure 3 – Distribution map of the species in Argentina (A), Brazil (B) and Paraguay (C). States that present the occurrence of the species are highlighted in blue. Source: Prepared by the authors based on the description in Catalog of Life (2022) and Oliveira et al. (2022).

It is a hermaphrodite plant, attracting small mammals and birds: red-fronted parakeets, tanagers, charões, among others (CARVALHO, 2008).

It has simple elliptical, lanceolate or oval leaves with marked veins (MONDIN et al., 2010; LIMA et al., 2011). The flowers are white axillary subsessile (MONDIN et al., 2010). The flowers have a closed calyx (Figure 4), a characteristic present in the genus only for *C. guazumifolia* and *Campomanesia espiritosantensis* Landrum (LANDRUM, 1987). The indumentum is concentrated on the leaf veins, with dense branches (SILVA; MAZINE, 2016).

Figure 4 – Flower of the species *C. guazumifolia* Source: Provided by Anelise Gabriela Grotto (2021).

The scientometric study by Steckelber et al. (2022) demonstrated that there are still few studies in the literature for *C. guazumifolia* and that 80% of these were published between 2017 and 2021, indicating that there has been an increase in interest in this species.

ETHNOBOTANICAL ASPECTS

The wood is hard, compact and moderately heavy, with medium durability, is used in carpentry and charcoal production (LORENZI, 2002; SUGUINO et al., 2009). Record and Hess (1949) recommend using this wood for manufacturing tool handles, turned materials and charcoal. Rodrigues et al., (2002) confirm the use of *C. guazumifolia* wood to manufacture tools in their survey of plants used by the population of Luminárias-MG. It can be used for ornamental purposes (CARVALHO, 2008).

Farmers from Misiones (Argentina) use *C. guazumifolia* from the Yabotí biosphere reserve to treat hypertension (KELLER; ROMERO, 2006). The leaves of *C.*

guazumifolia are used to treat liver diseases in the municipality of São João Polésine, Rio Grande do Sul (DORIGONI et al., 2001). The Guarani Mbya people of Missiones use the bark decoction to wash ears for deafness, consume the fruits to eliminate intestinal worms and add the leaves to mate to treat stomach pain (CROVETTO, 2012). The Guarani Mbya people use the decoction of *C. guazumifolia* leaves to treat parasites (POCHETTINO et al., 2003; CRIVOS et al., 2006).

The leaves of *C. guazumifolia* are also traditionally used to treat gastrointestinal problems (ARRUDA et al., 2013). Zuchiwschi et al., (2010) use *C. guazumifolia* tea to treat stomach pain and flu.

The Kaingang use *C. guazumifolia* to control postpartum bleeding and avoid pregnancy and menstrual problems (IGNÁCIO et al., 2020). The fruits of this species are among the few that can be consumed by Iñengue, Mbya-Guarani girls who are in the community initiation rite after their first menstruation (BADIE, 2015).

According to Kujawska and Schmeda-Hirschmann (2022), Paraguayan immigrants in Missiones use an infusion of the leaves and bathe with the bark of *C. guazumifolia* to treat burns, diarrhea, indigestion and ulcers. Moreover, Polish emigrants from Misiones use the decoction of the leaves to treat diarrhea (KUJAWSKA; HILGERT, 2014). The use of tea made from the leaves to treat diarrhea is also mentioned in the survey carried out by Glowka et al., (2021) in Laranjeiras do Sul – PR.

It is reported by Coan and Matias (2014) that indigenous people from Ventarra Alta – RS use tea from the roots and bark of the trunks to treat back pain. The species is popularly used for liver diseases, flu prevention, expectorant, low blood pressure and the leaves are used by indigenous people as a tonic (WAGNER et al., 2020). It is reported by Colet et al. (2015) the use of the species C. *guazumifolia* by users of the public health service in Ijuí - RS.

CHARACTERISTICS AND USES OF FRUITS

The species *C. guazumifolia* is registered as the common name of sete-capotes in the list of native species of socio-biodiversity with food value for commercialization *in natura* or its derivative products (MAPA/MMA, 2021). According to this ordinance, the fruit can be marketed *in natura* or as jam, jelly, yogurt, liqueur, sauce, mousse, frozen pulp, ice cream, juice and pie through harvesting from nature or with improvement programs. Andrade et al., (2023) classified *C. guazumifolia* as a Non-conventional Edible Plant in the popularization process.

The fruits (Figure 5) have a sweet acidic flavor and are consumed fresh or as jellies, sweets and jams (LORENZI et al., 2000; LORENZI, 2002; FONSECA-KRUEL; PEIXOTO, 2004; DUJAK et al., 2015). Teixeira et al. (2019) classify the fruit flavor as being tasty. The main characteristic to identify fruit maturation is not the change in the epicarp's color but the fruit's firmness (PINTALUBA; LUACES, 2013).

Figure 5 - Fruits of the species *C. guazumifolia*. Source: Provided by Gustavo Giocon (2021).

The fruits of this species are yellowish-green in color, with 6 to 11 grayish-white seeds per fruit, with a moisture content of 78% for the mesocarp and 9% for the seeds (SANTOS et al., 2004; SOUZA et al., 2018; GOLDONI et al., 2019). It is reported by Suguino et al., (2009) that each kilogram of seeds has approximately 22,000 units. The fruits are between 3 and 5 cm in diameter and the fruiting period can vary with the planting location, starting in December and lasting until May, depending on the planting location (Figure 6) (CARVALHO, 2008; EMBRAPA, 2018). The fruits have an average volume of 12.9 cm^3 (GOLDONI et al., 2019).

Figure 6 - Period of flowering (yellow) and fruiting (orange) according to the Brazilian state. Sept = September; Oct = October; Nov = November; Dec = December; Jan = January; Fev = February; Mar = March; Apr = April. Source: The authors prepared based on Carvalho's description (2008). Note. Gray coloring indicates missing data.

Bento et al., (2017) prepared flours with dehydrated *C. guazumifolia* fruit and incorporated them into gluten-free cookies; however, bitterness was possibly associated with tannins. Table 1 presents the physicochemical characteristics reported for the fruits of *C. guazumifolia*.

Table 1 - Physicochemical characteristics reported for the fruits of *C. guazumifolia*.

Análise	**Goldoni et al., (2019)**	**Pintaluba and Luaces (2013)**	
		Mature	**Immature**
Pulp yield (%)	97.39	-	-
Fruit mass (g)	14.32	-	-
pH	3.38	-	-
Number of seeds per fruit	10.9	-	-
Moisture content (%)	77.16	79.17 – 80.52	68.97 – 69.24
Titratable acidity (%)	1.591	4.40 – 5.82	3.74 – 4.95
Brix degrees	13.18	13.80 – 14.75	12.50 – 13.00
Proteins (g 100 mL^{-1})	1.904	-	-
Lipids (g 100 g^{-1})	0.67	-	-
Total sugars (g 100 mL^{-1})	2.86	-	-
Vitamin C (mg ascorbic acid 100 mL^{-1})	198.33	-	-
Pectin (%)	5.28	-	-
Macro and micronutrientes (mg kg^{-1})			
Potassium	2443	-	-
Nitrogen	1872	-	-
Calcium	338	-	-
Magnesium	144	-	-
Phosphorus	23	-	-
Iron	27	-	-
Zinc	2,7	-	-
Copper	1.6	-	-

Boron	7.5	-	-

Source: Pintaluba and Luaces (2013) e Goldoni et al. (2019)

The fruits of *C. guazumifolia* can host the South American fruit fly (*Anastrepha fraterculus* (Diptera: Tephritidae)), and it is necessary to control this pest during cultivation to avoid production losses (SANTOS, 2022).

PROPAGATION

C. guazumifolia is registered as the common name of gabiroba-capoteira in the National Registry of Cultivars (*Registro Nacional de Cultivares*) – RNC under number 23635; thus, the production and commercialization of seedlings are enabled in Brazil. *C. guazumifolia* is also recommended for the recomposition and consolidation of riparian forests and degraded areas (LOPES; GONÇALVES, 2006; PEREIRA et al., 2016).

Oliveira et al. (2016) studied the implementation of the species in the Taungya agroforestry system, but pioneer species showed an adequate crown formation, despite there are reports of the use of this species in agroforestry systems (BIERHALS et al., 2020; DA SILVA et al., 2020).

This species is indicated for urban afforestation (SECRETARIA MUNICIPAL DO VERDE E DO MEIO AMBIENTE, 2021). This species is protected in domestic gardens in Argentina by the local population (FURLAN et al. 2017), and is used to provide shade in patios (STAMPELLA et al., 2008). There is also popular cultivation among Brazilians due to the appreciation of the fruits (ECHER et al., 2021).

Propagation occurs through seeds (SUGUINO et al., 2009). The seeds of *C. guazumifolia* present about 50% of the maturity of the seeds of the fruit, being necessary for an analysis of the maturity of the seeds (SANTOS; FERREIRA; ÁQUILA, 2004). In this sense, Guollo et al., (2021a) studied pollen storage to obtain higher rates and germination and obtained the ideal conditions with a post-anthesis collection of flowers, with dehydration for 24 h and a culture medium of 12% sucrose, 10% boric acid and 20% of calcium nitrate.

The seeds present from 102 to 167 days for germination in the study by Santos, Ferreira and Áquila (2004) and 75 days in the study by Pirola et al. (2018), however Suguino et al. (2009) reported that seedling emergence occurs between 15 and 30 days after planting.

The seeds of *C. guazumifolia* present negative photoblastism with morphophysiological dormancy, and using hot water or sulfuric acid in the seeds is not recommended (Pirola et al., 2021). The seeds are recalcitrant, do not support desiccation with short post-harvest longevity, and it is recommended that the seeds be washed with running water, keeping them in a humid place with planting after a short storage time (MIRANDA et al., 2020; MOSER et al., 2022).

Seed germination is recommended at temperatures between 25 and 30 ºC on paper, with or without light (SOUZA et al., 2018). In the case of planting in soil, it is recommended to use an organo-clay substrate in a semi-shaded place in 0.5 cm holes and 2 waterings per day, transplanting to the definitive location when the seedling is between 3 and 5 cm (SUGUINO et al., 2009).

It bears fruit at 5 years old when planted in fertile soil (CARVALHO, 2008). The ambient temperature is relevant for cultivating *C. guazumifolia*, as leaf fall increases in cold weather and fruiting is intensified and synchronized in high temperatures (ORTIZ et al., 2019).

The adult species supports stony soil if organic matter is available (CARVALHO, 2008). Cassol et al., (2021) analyzed 200 agricultural properties in Paraná (Dois Vizinhos, Itapejara D'Oeste, Verê and São Jorge D'Oeste), verifying the number of specimens of *C. guazumifolia* and soil characteristics, where more specimens were observed in places with high content of organic matter, calcium, magnesium, phosphorus and potassium, in addition to high cation exchange capacity (CEC).

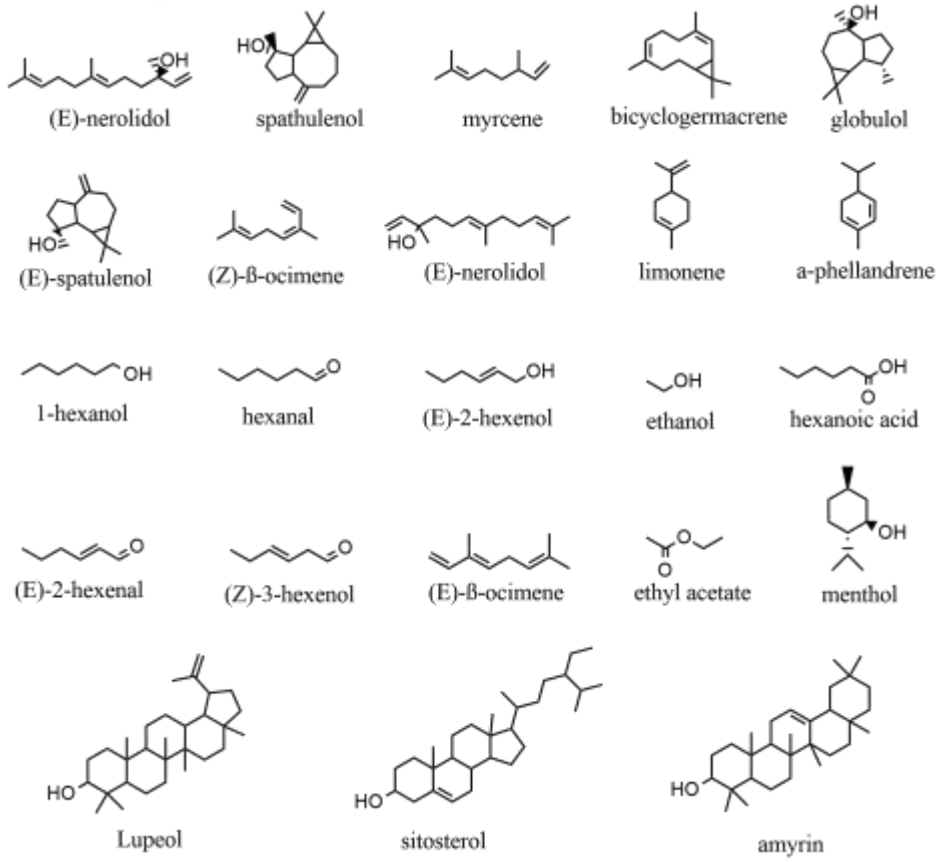
The study by Pirola et al., (2018) indicated that *C. guazumifolia* seeds are resistant to seed dissection, losing up to 36.8% of moisture after 240 hours of drying. Pollination of *C. guazumifolia* flowers occurs by stingless bees of the family *Apis* (Apidae), with the flower emitting a mildly sweet aroma to attract insects (GRESSLER; PIZO; MORELLATO, 2006; GUOLLO et al., 2021b). Natural dispersal occurs mainly by birds and monkeys (GRESSLER; PIZO; MORELLATO, 2006).

CHEMICAL COMPOSITION

The essential oil of the leaves of *C. guazumifolia* mainly presents oxygenated sesquiterpenes (82.2%), presenting 28.8% of (E)-nerolidol, 27.7% of spathulenol, also has 11.5% of myrcene monoterpene hydrocarbon (LIMBERGER et al., 2001). In the study by Santos et al. (2019), the major compounds in the essential oil of *C. guazumifolia* leaves were bicyclogermacrene (15%), globulol (5%) and spathulenol (5%).

For the essential oil of the bark and seeds of *C. guazumifolia*, there is a predominance of hydrocarbon monoterpenes (82.25% and 75.53%, respectively) and both primarily present β-ocymene (Z), nerolidol (E) and limonene; however, they differ in the contents, showing respectively 62.66%, 11.38% and 11.39% for the peels and 55.92%, 16.45% and 9.27% for the seeds (VENDRUSCOLO et al., 2021). Figure 7 presents the chemical structure of the main compounds of essential oils reported in the literature.

Figure 7 - Volatile compounds found in the fruit and essential oils of *C. guazumifolia*. Source: The authors.



Vendruscolo et al., (2021) also analyzed the volatile compounds of the pulp of the fruit of *C. guazumifolia* through microextraction in the solid phase, identifying as main compounds: 1-hexanol (19.28%), hexanal (13.82%), (E)-2-hexenol (8.48%), ethanol (7.11%), hexanoic acid (4.74%), (E)-2-hexenal (4.65%), (Z)- 3-hexenol (3.38%), (E)-β-cymene (3.15%), ethyl acetate (2.24%) and menthol (2.35%). Figure 8 shows the structure of the volatile compounds present in the epicarp of *C. guazumifolia*

Müller et al., (2012) carried out phytochemical tests on the leaves of *C. guazumifolia* and identified the presence of saponins and tannins and Castro et al. (2023b) reported the presence of alkaloids, phenolic compounds, flavonoids, glycosides and saponins in peel ethanolic extract of *C. guazumifolia*. The aqueous extract of *C. guazumifolia* leaves 342.7 mg mL^{-1} of phenolic compounds, 81.4 mg mL^{-1} of flavonoids and 1.3 mg mL^{-1} of tannins (SOUZA et al., 2019).

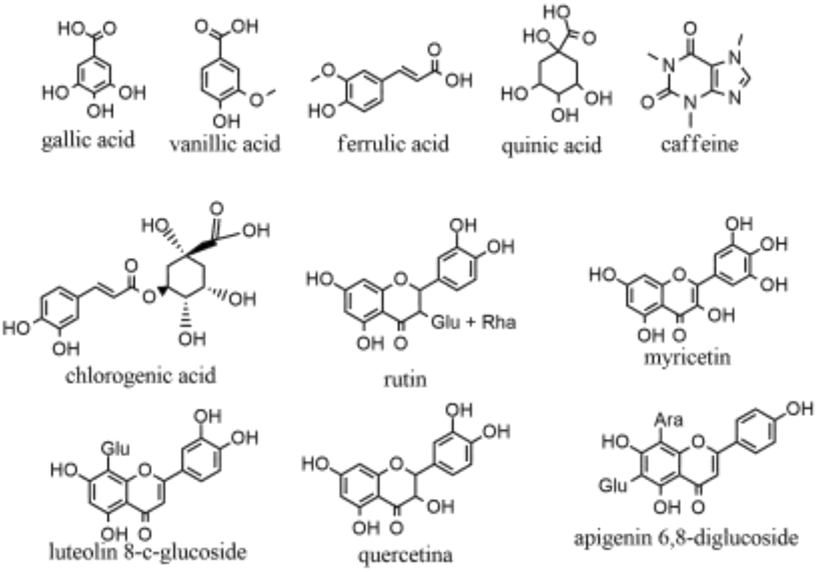
Catelan et al., (2019) quantified 444.78 mg gallic acid equivalent (GAE) g^{-1} of phenolic compounds and 312.73 mg GAE g^{-1} of flavonoids by colorimetric techniques in the ethanol extract of *C. guazumifolia* leaves. The fruit of *C. guazumifolia* has 312.13 mg GAE 100 g^{-1} of phenolic compounds (Goldoni et al., 2019). The ethanolic extract of *C. guazumifolia* fruit peels has a flavonoid content of 49.06 mg rutin equivalent (RE) g^{-1} (SILVA et al., 2022). The *C. guazumifolia* infusion has 150.00 ± 1.51 mg GAE g^{-1} of phenolic compounds, 59.10 ± 1.01 mg RE g^{-1} of flavonoids and 62.29 ± 1.03 mg tannic acid equivalent (TAE) g^{-1} of tannins (CASTRO et al., 2023a). The peel ethanolic extract of *C. guazumifolia* has 218.46 mg GAE g^{-1} of phenolic compounds, 47.80 mg RE g^{-1} of flavonoids, 68.18 mg TAE g^{-1} of tannins, 14.58 mg cyanidin-3-glucoside equivalent g^{-1} and 10.22 mg barberine equivalent g^{-1} (CASTRO et al., 2023b).

Obtaining phenolic compounds from ethanolic extracts of *C. guazumifolia* leaves was optimized by Santos et al. (2020), obtaining a maximum value of 626.57 μg AGE mg^{-1} with 20% ultrasound power, 60 °C and a proportion of 10 mL g^{-1} of solvent in leaves. Santos et al. (2020) also identified the volatile compounds of the samples, obtaining 19.57% lupeol, 15.23% sitosterol and 10.02% of amyrin (Figure 8); however, the major compound that represents 23.43% of the sample not was identified.

For leaf infusion, quinic acid, quercetin pentose, quercetin deoxyhexoside and myricetin deoxyhexoside were identified by Catelan et al. (2018) and quantified 36.33 mg g^{-1} of gallic acid, 27.56 mg g^{-1} of caffeine and 28.49 mg g^{-1} of rutin by Castro et al. (2023a). Also reported 5.54 mg g^{-1} of caffeine in peel ethanolic extract of *C. guazumifolia* (CASTRO et al., 2023b). In the study developed by Lescano et al. (2023) were quantified 27.3 ± 0.1 mg mL^{-1} of quinic acid, 132.3 ± 0.7 of mg mL^{-1} of rutin, 26.9 ± 0.2 mg mL^{-1} of apigenin 6,8-diglucoside and 14.1 ± 0.1 mg mL^{-1} of (luteolin 8-C-glucoside.

Vagula et al., (2019) quantified 393.005 μg g^{-1} of gallic acid and 0.847 μg g^{-1} of myricetin in the pulp of *C. guazumifolia*, with chlorogenic, vanillic acid and being below the quantification limit (Figure 8).

Figure 8 - Structure of the phenolic compounds present in extracts and pulp of *C. guazumifolia*. Source: The authors.



Furthermore, peel ethanolic extract of *C. guazumifolia* has 1.41 mg g^{-1} of chlorophyll α, 1.77 mg g^{-1} of chlorophyll β and 0.20 mg g^{-1} of carotenoids (CASTRO et al., 2023b) and Castro et al. (2023a) analyzed *C. guazumifolia* leaves infusion and quantified 9 amino acids.

BIOLOGICAL ACTIVITIES

The essential oil of the leaves of *C. guazumifolia* has an antioxidant potential of 26.1 µg mL^{-1} against the radical 2,2-diphenyl-1-picrylhydrazyl (DPPH) and 68.3% in the β-carotene bleaching test (BCB) (SANTOS et al., 2019). The methanolic extract of *C. guazumifolia* seeds has 79.98 µmol of trolox equivalent (TE) per gram of sample by the ORAC test and 124.58 µmol TE g^{-1} by the DPPH test (VAGULA et al., 2019). The leaves infusion of *C. guazumifolia* showed an antioxidant potential of 2.77 ± 0.01 µg mL^{-1} by the DPPH test, 9.16 ± 0.01 µM Trolox g^{-1} by the ABTS test and 1.71 ± 0.04 µM g^{-1} by FRAP test (CASTRO et al., 2023a). The peel ethanolic extract of *C. guazumifolia* showed an antioxidant potential of 34.68 µg mL^{-1} by DPPH (CASTRO et al., 2023b).

Santos et al. (2020) obtained potential antioxidants between 6.49 and 2.79 µmol TE mg^{-1} for the ethanolic extract of *C. guazumifolia* leaves by changing the ultrasound power (20 to 80%), temperature (40 to 60 °C) and solvent/biomass ratio (10 to 20 mL g^{-1}).

The essential oil of the leaves of *C. guazumifolia* presents antimicrobial activity in the study by Santos et al. (2019), with a minimum inhibitory concentration (MIC) of 15 μg mL^{-1} for *Staphylococcus aureus*, 25 μg mL^{-1} for *Escherichia coli*, and 5 μg mL^{-1} for *Candida albicans*. The essential oil of *C. guazumifolia* has a subinhibition concentration of 0.0625 μL mL^{-1} against *Pseudomonas aeruginosa* (RAMÍREZ-RUEDA; SALVADOR, 2020). The leaves infusion of *C. guazumifolia* has activity against *Candida albicans* (7.81 μg mL^{-1}), *Candida krusei* (1.95 μg mL^{-1}), *Candida parapsilosis* (7.81 μg mL^{-1}), *Candida tropicalis* (15.62 μg mL^{-1}), *Bacillus cereus* and *Staphylococcus aureus* (250 μg mL^{-1}) (CASTRO et al., 2023a). The peel ethanolic extract of *C. guazumifolia* has activity against Staphylococcus aureus (250 μg mL^{-1}), Bacillus cereus (125 μg mL^{-1}), *Candida albicans* (31.25 μg mL^{-1}), *Candida krusei* (7.81 μg mL^{-1}), *Candida parapsilosis* (15.62 μg mL^{-1}), *Candida tropicalis* (31.25 μg mL^{-1}) (CASTRO et al., 2023b).

The infusion of *C. guazumifolia* leaves showed no toxicity in female mice and anti-inflammatory potential, with a decrease in mechanical hyperalgesia (700 mg kg^{-1}) and sensitivity to cold (300 mg kg^{-1}) (CATELAN et al., 2018). This extract has low toxicity in the *Artemia salina* model (CASTRO et al., 2023a) and no toxicity in the Zebrafish (*Danio rerio*) model (LESCANO et al., 2023). Lescano et al. (2023) demonstrated the antiplatelet effect of infusion of *C. guazumifolia* leaves via COX-1 with *in vitro* and *in silico* studies.

In studying the effect of the aqueous extract of the leaves of *C. guazumifolia* against the agricultural pest *Plutella xylostella* (Lepidoptera: Plutellidae), there is already a reduction in the larval stage, male longevity and oviposition period (SOUZA et al., 2019).

PRODUCT DEVELOPMENT

The ethanolic extract of the leaves of *C. guazumifolia* presents light absorption in the UV region, with photoprotective potential; however, the study by Catelan et al. (2019) indicates that other species of this genus have more significant potential for this type of extract. However, Castro et al. (2023b) related an SPF of 5.56 to peel ethanolic extract of *C. guazumifolia*.

Bevilacqua et al. (2021) studied the use of sulfuric acid (H_2SO_4) treatment of the bark to alter the lignocellulosic structure, obtaining a material capable of removing 312.81 mg g^{-1} of 2,4-dichlorophenoxyacetic acid at a temperature of 298 K. Preigschadt et al.

(2022) also studied the alteration of the bark of *C. guazumifolia* for use as an adsorbent, obtaining retention of 158.3 mg g^{-1} for ketoprofen at a temperature of 298 K.

PATENTS

No patents are related to *C. guazumifolia* United States Patent and Trademark Office (USPTO) and European Patent Office (Espacenet). The only deposit request at the National Institute of Industrial Property (INPI) was submitted by Miguel et al. (2016) but was filed.

ACKNOWLEDGMENT

Fundação de Apoio ao Desenvolvimento do Ensino, Ciência e Tecnologia do Estado de Mato Grosso do Sul (FUNDECT), Financiadora de Inovação e Pesquisas (FINEP), Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) TLAC (Finance Code 001) and Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) CALC (process 312671/2021-0).

REFERÊNCIAS

ARRUDA, M. F. C.; MIGUEL, O. G.; STUELP-CAMPELO, P. M.; DUARTE, M. R. Leaf and stem morpho-anatomy of *Campomanesia guazumifolia* (Cambess.) O. Berg, Myrtaceae. **Latin American Journal of Pharmacy**, v. 32, n. 9, p. 1342-1348, 2013.

ANDREADE, G. M. M.; MENDONÇA, A. V. R.; SOUZA, M. O.; BOTEZELLI, L.; CANEDO JUNIOR, E. O. Plantas alimentícias não convencionais (PANC) nos levantamentos etnobotânicos do brasil. **Novos Cadernos NAEA**, v. 26, n. 2, p. 179-224, 2023.

AQUINO, C.; BARBOSA, L. M. Classes sucessionais e síndromes de dispersão de espécies arbóreas e arbustivas existentes em vegetação ciliar remanescente (Conchal, SP), como subsídio para avaliar o potencial do fragmento como fonte de propágulos para enriquecimento de áreas revegetadas no rio Mogi-Guaçu, SP. **Revista Árvore**, v. 33, n. 2, p. 349-358, 2010.

BADIE, M. C. Rituais de iniciação e relações com a natureza entre os Mbya-Guarani. **Mana**, v. 21, n. 1, p. 7-34, 2015.

BENTO, G. S.; SANTOS, R. F.; SANTOS, E. P.; KNOB, J. C.; TONIAL, I. B.; LUCHETTA, L. Conservação e processamento de frutas nativas e suplementação de produtos alimentícios. **Synergismus Scyentifica UTFPR**, v. 13, n. 1, p. 189-190, 2018.

BEVILACQUA, R. C.; PREIGSCHADT, I. A.; NETTO, M. S.; GEORGIN, J.; FRANCO, D. S. P.; MALLMANN, E. S.; SILVA, L. F. O.; PINTO, D.; FOLETTO, E. L.; DOTTO, G. L. One step acid modification of the residual bark from *Campomanesia guazumifolia* using H_2SO_4 and application in the removal of 2,4-dichlorophenoxyacetic from aqueous solution. **Journal of Environmental Science and Health, Part B**, v. 56, n. 12, p. 995-1006, 2021.

BIERHALS, D. F.; HENZEL, A. B. D.; GUARINO, E. S. G.; CUNHA, H. N.; MIURA, A. K.; OLIVEIRA, I. H. S. Espécies arbóreas nativas plantadas por agricultores agroflorestais no extremo sul do Brasil. **Cadernos de Agroecologia**, v. 15, n. 2, 2020.

CARDOSO, C. A. L. **Plantas do gênero Campomanesia: Pontenciais medicinal e nutracêutico**. Dourados, MS: Editora UEMS, 2021.

CARVALHO, P. E. R. **Espécies arbóreas brasileiras**, vol. 3. Colombo, PR: Embrapa Florestas, 2008.

CASSOL, D. A.; WAGNER, A. JR.; DONAZZOLLO, J.; CASSOL, L. C.; MIRANDA, F. D. A.; CONCEIÇÃO, P. C. Soil fertility of two hundred properties in the southwest paraná with the presence of native fruit trees. **Scientia Agraria Paraensis**, v. 20, n. 3, p. 249-258, 2021.

CASTRO, T. L. A.; CATELAN, T. B. S.; SANTOS, J. V. A.; OLIVEIRA, K. M. P.; CARDOSO, C. A. L. Chemical composition and biological activities of the infusion of leaves of *Campomanesia guazumifolia* (Cambess.) O. Berg: Tea with nutraceutical and medicinal potential. **Food and Humanity**, v. 1, p. 912-920, 2023a.

CASTRO, T. L. A; SANTOS, J. V. A.; OLIVEIRA, K. M. P.; CARDOSO, C. A. L. Peels of the fruits of *Campomanesia guazumifolia* (cambess) O. berg and *Campomanesia sessiliflora* (O. Berg) mattos: Residues with cosmetic and food potentials. **Sustainable Chemistry and Pharmacy**, v. 35, e101198, 2023b.

CATALOGUE OF LIFE. ***Campomanesia guazumifolia* (Cambess.) O. Berg.. (n.d.)**. Disponível em: https://www.catalogueoflife.org/data/taxon/QDCR. Acesso em: 23 jan. 2023.

CATELAN, T. B. S.; GAIOLA, L.; DUARTE, B. F.; CARDOSO, C. A. L. Evaluation of the in vitro photoprotective potential of ethanolic extracts of four species of the genus *Campomanesia*. **Journal of Photochemistry & Photobiology, B: Biology**, v. 197, e111500, 2019.

CATELAN, T. B. S.; RADAI, J. A. S.; LEITÃO, M. M.; BRANQUINHO, L. S.; VASCONCELOS, P. C. P.; HEREDIA-VIEIRA, S. C.; KASSUYA, C. A. L.; CARDOSO, C. A. L. Evaluation of the toxicity and anti-inflammatory activities of the infusion of leaves of *Campomanesia guazumifolia* (Cambess.) O. Berg. **Journal of Ethnopharmacology**, v. 226, p. 132-142, 2018.

COAN, C. M.; MATIAS, T. A. Utilização das plantas medicinais pela comunidade indígena de Ventarra Alta- RS. **SaBios - Revista de Saúde e Biologia**, v. 9, n. 1, p. 11-19, 2014.

COLET, C. F.; CAVALHEIRO, C. A. N.; MOLIN, G. T.; CAVINATTO, A. W.; SCHIAVO, M.; SCHWAMBACH, K. H.; OLIVEIRA, K. R. Uso de plantas medicinais por usuários do serviço público de saúde do município de Ijuí/RS. **Revista Brasileira de Medicina de Família e Comunidade**, v. 10, n. 36, p. 1-13, 2015.

CRIVOS, M.; MARTÍNEZ, M. R.; NAVONE, G. T.; POCHETTINO, M. L.; ARENAS, P.; REMORINI, C.; TEVES, L.; GAMBOA, M. I.; ZONATA, L. Puesta en común de saberes y prácticas sobre las enteroparasitosis (Valle del Cuña piru, Misiones). *In*: EQUIPO DE ETNOBIOLOGÍA. **Cultivando memorias cosechando vida**. Córdoba, ES: Museo de Antropología. Facultad de Humanidades, Universidad de Córdoba, 2006.

CROVETTO, R. N. M. Estudios etnobotánicos 5. Nombres de plantas y su utilidad según los Mbya guaraní de Misiones, Argentina. **Bonplandia**, v. 21, n. 2, p. 109-133, 2012.

CULBERT, D. **Description API Known as Pigeonwood or as Guacima. Used for wood, fodder and folk medicine. Widespread and widely planted in Latin America and beyond**, 2013. Disponível em: https://upload.wikimedia.org/wikipedia/commons/8/84/Guazuma_ulmifolia_(25042641476).jpg. Acesso em: 23 jan. 2023.

DA SILVA, R. Q.; DE LIMA, I. T. B.; CHAVES, I. L. R.; ARANCIBIA, I. A. L.; VISMARA, E. D. S.; DONAZZOLO, J. Estimativa do incremento médio e periódico em altura de espécies florestais pioneiras e secundárias em um sistema agroflorestal em Dois Vizinhos-PR. **Cadernos de Agroecologia**, v. 15, n. 2, 2020.

DORIGONI, P. A.; GHEDINI, P. C.; FRÓES, L. F.; BAPTISTA, K. C.; ETHUR, A. B. M.; BALDISSEROTTO, B.; BÜRGER, M. E.; ALMEIDA, C. E.; LOPES, A. M. V.; ZÁCHIA, R.A. Levantamento de dados sobre plantas medicinais de uso popular no Município de São João Polésine, RS, Brasil. I-relação entre enfermidades e espécies utilizadas. **Revista Brasileira de Plantas Medicinais**, v. 4, n. 1, 69-79, 2001.

DUJAK, M.; FERRUCCI, M. S.; JIMÉNEZ, V.; PINEDA, J.; CHAPARRO, E.; BRÍTEZ, M. Registros sobre las especies vegetales alimenticias utilizadas por dos comunidades indígenas Mbyá - Guaraní de la Reserva para Parque Nacional San Rafael, Itapúa – Paraguay. **Steviana**, 7, 25-47, 2015.

ECHER, R.; MAUCH, C. R.; HEIDEN, G.; KRUMREICH, F. D. O saber sobre as Plantas Alimentícias Não Convencionais (PANC) na Agricultura Familiar vinculada à Escola Família Agrícola da Região Sul (EFASUL), Canguçu, RS. **Revista Thema**, v. 19, n. 3, p. 635-655, 2021.

EMBRAPA. **Bioma Mata Atlântica**: época de coleta de frutos e sementes nativos para recomposição ambiental. Brasília, DF: Embrapa Cerrados, 2018.

FARIAS, D. P.; NERI-NUMA, I. A.; ARAÚJO, F. F.; PASTORE, G. M. A critical review of some fruit trees from the Myrtaceae family as promising sources for food applications with functional claims. **Food Chemistry**, v. 306, e125630, 2020.

FONSECA-KRUEL, V. S.; PEIXOTO, A. L. Etnobotânica na reserva extrativista Marinha de Arraial do Cabo, RJ, Brasil. **Acta Botanica Brasilica**, v. 18. n. 1, p. 177-190, 2004.

FURLAN, V.; KUJAWSKA, M.; HILGERT, N. I.; POCHETTINO, M. L. To what extent are medicinal plants shared between country home gardens and urban ones? A case study from Misiones, Argentina. **Pharmaceutical Biology**, v. 54, n. 9, p. 1628-1640, 2016.

FURLAN, V.; POCHETTINO, M. L.; HILGERT, N. I. Management of fruit species in urban home gardens of Argentina Atlantic Forest as an influence for landscape domestication. **Frontiers in Plant Science**, v. 8, e1690, 2017.

GLOWKA, K. K. O.; MARQUES, S. A.; MOURA, G. S. Conhecimento popular sobre plantas medicinais em comunidades rurais do Município de Laranjeiras do Sul, Paraná. **Revista Verde de Agroecologia e Desenvolvimento Sutentável**, v. 16, n. 1, p. 48-59, 2021.

GOLDONI, J.; GIACOBBO, C. L.; GALON, L.; ZARZZEKA, C.; UBERTI, A.; LUGARESI, A. Physicochemical characterization of fruits of *Campomanesia guazumifolia* (Cambess.) O. Berg (Myrtaceae). **Acta Scientiarum. Biological Sciences**, v. 41, e45923, 2019.

GRASEL, D. **Sete-capote**. Nova Mata. Disponível em: https://novamata.org/especie/sete-capote/. Acesso em: 23 jan. 2023.

GRATTAPAGLIA, D.; VAILLANCOURT, R. E.; SHEPHERD, M.; THUMMA, B. R.; FOLEY, W.; KÜLHEIM, C.; POTTS, B. M.; MYBURG, A. A. Progress in Myrtaceae genetics and genomics: *Eucalyptus* as the pivotal genus. **Tree Genetics & Genomes**, v. 8, p. 463-508, 2012.

GRESSLER, E.; PIZO, M. A.; MORELLATO, L. P. C. Polinização e dispersão de sementes em Myrtaceae do Brasil. **Revista Brasil**, v. 29, n. 4, p. 509-530, 2006.

GUOLLO, K.; WAGNER, A., JR.; KOSERA NETO, C.; RADAELLI, J. C.; KELLER, W. M. T. Collection time, dehidration, culture media and environment for germination and storage of *Campomanesia guazumifolia* (Cambess.) O. Berg. pollen. **Revista Brasileira de Fruticultura**, v. 43, n. 1, e996, 2021.

GUOLLO, K.; WAGNER, A., JR.; KOSERA NETO, C.; RADAELLI, J. C.; KELLER, W. M. T. Floral and reproductive biology and pollinators of *Campomanesia guazumifolia* (Cambess.) O. Berg., neglected species. **Acta Scientiarum. Biological Sciences**, v. 43, e55816, 2021.

IGNÁCIO, Z. M.; VON ONÇAY, S. T.; FAGUNDES, J. R.; BERTOLLO, A. G.; CADETE, S. D. **O cuidado em saúde com o uso de plantas medicinais na cultura indígena Kaingang**. Porto Alegre, RS: Editora RedeUnida, 2020.

ISERNHAGEN, I.; BOURLEGAT, J. M. G.; CARBONI, M. Trazendo a riqueza arbórea regional para dentro das cidades: possibilidades, limitações e benefícios. **Revista da Sociedade Brasileira de Arborização Urbana**, v. 4, n. 2, p. 117-138, 2009.

JOLY, A. B. **Botânica**: Introdução a taxonomia vegetal. São Paulo, SP: Companhia Editora Nacional, 1993.

KELLER, H. A.; ROMERO, H. F. Plantas medicinales utilizadas por campesinos del área de influência de la reserva de biósfera Yabotí (Misiones, Argentina). **Bonplandia**, v. 15, n. 3/4, p. 125-141, 2006.

KUJAWSKA, M.; HILGERT, N. I. Phytotherapy of Polish migrants in Misiones, Argentina: Legacy and acquired plant species. **Journal of Ethnopharmacology**, v. 153, p. 810-830, 2014.

KUJAWSKA, M.; SCHMEDA-HIRSCHMANN, G. The use of medicinal plants by Paraguayan migrants in the Atlantic Forest of Misiones, Argentina, is based on Guaraní tradition, colonial and current plant knowledge. **Journal of Ethnopharmacology**, v. 283, e114702, 2022.

LANDRUM, L. R. *Campomanesia*, *Pimenta*, *Blepharocalyx*, *Legrandia*, *Acca*, *Myrrhinium*, and *Luma* (Myrtaceae). **New York Botanical Garden Press on behalf of Organization for Flora Neotropica**, v. 45, p. 1-178, 1986.

LANDRUM, L. R. A New Species of *Campomanesia* (Myrtaceae) from Brazil. **Brittonia**, v. 39, n. 2, p. 245-247, 1987.

LAWRENCE, G. H. M.; BUCHHEIM, A. F. G.; DANIELS, G. S.; DOLEZAL, H. **Botanicum-Periodicum-Huntianum**. Pittisburgh, USA: Hunt Botanical Library, 1969.

LEGRAND, D. C.; KLEIN, R. M. **Flora ilustrada caratinense**: Mirtáceas. Itajaí, SC: P. Raulino Reitz, 1977.

LESCANO, C. H.; LIMA, F. F.; CATELAN, T. B. S.; GUIMARÃES, V. H. D.; PEREIRA, U. A.; AGUILAR, C. M.; CARDOSO, C. A. L.; SANTOS, S. H. S.; BORGES, A.; OLIVEIRA, I. P. *Campomanesia guazumifolia* infusion decreases human platelet aggregation by reducing cyclooxygenase 1 activity and its underlying mechanisms. **Food Bioscience**, v. 55, e102955, 2023.

LIMA, D. F., GOLDENBERG, R.; SOBRAL, M. O gênero *Campomanesia* (Myrtaceae) no estado do Paraná, Brasil. **Rodriguésia**, v. 62, n. 3, p. 683-693, 2011.

LIMBERGER, R. P.; APEL, M. A.; SOBRAL, M.; MORENO, P. R. H.; HENRIQUES, M. T.; MENUT, C. Chemical composition of essential oils from some *Campomanesia* Species (Myrtaceae). **Journal of Essential Oil Research**, v. 13, n. 2, p. 113-115, 2001.

LOPES, S. B.; GONÇALVES, L. **Elementos para aplicação prática das árvores nativas do Sul do Brasil na conservação da biodiversidade**. Porto Alegre, RS: Fundação Zoobotânica do Rio Grande do Sul, 2006.

LORENZI. H.; BACHER. E. U., LACERDA. M.; SARTORI. S. **Frutas brasileiras e exóticos cultivados**. Nova Odessa, SP: Instituto Plantarum De Estudos Da Flora LTDA, 2000.

LORENZI, H. **Árvores brasileiras**. 4ª Ed., vol. 1, Nova Odessa, SP: Instituto Plantarum De Estudos Da Flora LTDA, 2002.

LUBER, J.; CARRIJO, T. T.; MARTINS, M. M.; MENDONÇA, C. B. F.; GONÇALVES-ESTEVES, V. Pollen morphology: A source of information for taxonomic studies within *Campomanesia* (Myrtaceae). **Palynology**, v. 47, n. 1, e2119293, 2022.

MAPA/MMA. **Portaria Interministerial MAPA/MMA Nº 10, de 21 de Julho de 2021**. Institui lista de espécies nativas da sociobiodiversidade de valor alimentício, para fins de comercialização *in natura* ou de seus produtos derivados, Brasília, DF, 2021. Disponível em: https://www.in.gov.br/en/web/dou/-/portaria-interministerial-mapa/mma-n-10-de-21-de-julho-de-2021-333502918. Acesso em: 23 jan. 2023.

MARCHIORI, J. N. C. Estudo microscópico da madeira de sete-capotes *Campomanesia guazumaefolia* (Camb.) Berg., Myrtaceae. **Ciência Rural**, v. 28, n. 1, 47-51, 1998.

MIGUEL, O. G.; ARRUDA, M. F. C.; DUARTE, M. R.; CAMPELO, P. M. S.; MIGUEL, M. D.; ZANIN, S. M. W.; DIAS, J. F. G. **Método de extração e atividade antioxidante dos componentes e produtos originários da planta da espécie *Campomanesia guazumifolia* (Cambess.) O. Berg, Myrtaceae**. *INPI. BR 102012017788-9 A2*, Brasília, BR, 2016.

MIRANDA, E.; MALTA, E.; VIEIRA, D. L. M.; ROCHA, G.; FERREIRA, M.; PACHÊCO, B.; CORTES, C. A.; da SILVA, J. S.; MOTTA, C. P.; CAMARGO, M. E. M. S.; KUHLMANN, M.; COSTA, L. A.; CARMO, G. H. P.; NASCIMENTO, J. S.; LIMA, M. V. S.; MARMET, C.; OLIVEIRA, M. A.; ISERNHAGEN, I.; PIÑA-RODRIGUES, F. C. M.; ALMEIDA, L. S.; NASCIMENTO, T. J.; PERUSSI, G.; ASSI, D. G.; ALBUQUERQUE, N. C. B.; MORAES, C. E.; BARROS, R. L. C.; SOUZA, M. R.; SAMPAIO, A. B.; RIBEIRO, J. F.; FREIRE, J. M.; LOPES, A. R.; RODRIGUES, R. R.; PAIVA, J. B.; NAVE, A. G.; de SOUSA, N.; SILVA, R. S. **Espécies para semeadura direta na Amazônia, Cerrado e Mata Atlânticas:** Características de sementes e plantas, e sugestões de coleta, processamento e plantio. São Paulo, SP: Caminhos da Semente, 2020.

MONDIN, C. A.; EGGERS, L.; FERREIRA, P. M. A. **Catálogo ilustrado de plantas**: Espécies ornamentais da PUCRS. Porto Alegre, RS: EDIPUCRS, 2010.

MOSER, P.; ROCHA, G. P. E.; ROCHA, H. L. L.; KULHMANN, M.; SILVA, R. R. P.; CAMPOS FILHO, E. M. **Guia para coleta de sementes e restauração da bacia do Rio Doce**. Recife, PE :Centro de Pesquisas Ambientais do Nordeste, 2022.

MÜLLER, N. T. G.; FASOLO, D.; BERTÊ, R.; ELY, C. V.; HOLZ, D. T. Análise fitoquímica das folhas de Myrtaceae: *Psidium cattleianum* Sabine e *Campomanesia guazumaefolia* (Camb.) Berg. **Vivências: Revista Eletrônica de Extensão da URI**, 8(14), 65-71, 2012.

OLIVEIRA, M. I. U.; COSTA, I. R.; PROENÇA, C. E. B**. *Campomanesia in* Flora e Funga do Brasil**. Jardim Botânico do Rio de Janeiro. Disponível em: https://floradobrasil.jbrj.gov.br/FB10316. Acesso em: 23 jan. 2023.

OLIVEIRA, M. I. U.; VIEIRA, J. P. S.; VAN DEN BERG, C.; OLIVEIRA, R. P.; FUNCH, L. S. Understanding molecular relationships in *Campomanesia* Ruiz & Pav. (Myrtaceae): emphasizing the *C. xanthocarpa* complex based on multiple accessions. **Brazilian Journal of Botany**, 44, 917-927, 2021.

OLIVEIRA, T. J. F.; BARROSO, D. G.; ANDRADE, A. G.; FREITAS, S. J. Consórcio de espécies nativas da mata atlântica com milho e feijão para revegetação de mata ciliar na região noroeste fluminense. **Floresta**, v. 46, n. 3, p. 315-324, 2016.

ORTIZ, J.; OLIVEIRA, L. M.; SOUZA, A. C.; SÁ, A. C. S.; SOUZA, G. F. S; CORRÊA, B. J. S. Aspectos das fenofases reprodutiva e vegetativa *de Campomanesia guazumifolia* (Myrtaceae), na Região de Lages, Santa Catarina. **Revista de Ciências Agroveterinárias**, v. 18, n. 3, p. 292-300, 2019.

PEREIRA, I. M.; BOTELHO, S. A.; ARAÚJO, F. V.; MORANDI, D. T.; PASCHOAL, E. M. Espécies potenciais para recomposição de matas ciliares na região do alto rio grande, minas gerais. **Enciclopédia Biosfera**, v. 13, n. 23, p. 571-587, 2016.

PINTALUBA, N.; LUACES, P. A. Caracterización de frutas comestibles de especies nativas de uso popular en el parque provincial "salto encantado del valle del cuñá pirú – Misione. **Bonplandia**, v. 22, n. 2, p. 191-201, 2013.

PIROLA, K.; CASSOL, D. A.; WAGNER, A., JR.; POSSENTI, J. C.; CITADIN, I. Sensibilidade à dessecação em sementes de seis fruteiras nativas. **Revista de la Facultad de Agronomía**, v. 117, n. 1, p. 31-41, 2018.

PIROLA, K.; WAGNER, A., JR.; CASSOL, D. A.; POSSENTI, J. C.; CITADIN, I. Dormancy in native fruit seeds of the Brazilian South Region. **Colloquium Agrariae**, v. 17, n. 3, p. 21-32, 2021

PITTARELLI, B. F. S.; MOURÃO, K. S. M.; THADEO, M. Pericarp development in *Campomanesia* Ruiz & Pav. (Myrtaceae) species and systematic implications for the genus. **Flora**, v. 282, e151885, 2021.

POCHETTINO, M. L.; MARTINEZ, M. R.; ARENAS, P.; CRIVOS, M.; NAVONE, G.; DIGIANI, M. C.; TEVES, L.; REMORINI, C.; SY, A.; ILLKOW, C.; DELORENZI, N. Fitoterapia Mbya: análisis y evaluación del tratamiento de las parasitosis. **Journal of Ethnobotany**, v. 46, p. 301-310, 2003.

PREIGSCHADT, I. A.; BEVILACQUA, R. C.; NETTO, M. S.; GEORGIN, J.; FRANCO, D. S. P.; MALLMANN, E. S.; PINTO, D.; FOLETTO, E. L.; DOTTO, G. L. Optimization of ketoprofen adsorption from aqueous solutions and simulated effluents using H_2SO_4 activated *Campomanesia guazumifolia* bark. **Environmental Science and Pollution Research,** v. 29, p. 2122-2135, 2022.

RAMÍREZ-RUEDA, R.; SALVADOR, M. J. Phenotypic detection of quorum sensing inhibition in *Pseudomonas aeruginosa* pyoverdine and swarming by volatile organic products. **Future Microbiology**, v. 15, n. 12, p. 1147-1156, 2020.

RECORD, S. J.; HESS, R. W. **Timbers of the news world**. USA: New Haven, 1949.

RIBEIRO, C. L.; PEIXOTO, J. C. Myrtaceae occurring in the Cerrado: Contributions and advances. **Conjecturas**, v. 22, n. 9, p. 201-224, 2022.

RODRIGUES, L. A.; CARVALHO, D. A.; GOMES, L. J.; BOTREL, R. T. Espécies vegetais nativas usadas pela população local em Luminárias-MG. **Boletim Agropecuário**, v. 52, p. 1-34, 2002.

RUIZ, H.; PAVÓN, J. **Florae Peruvianae et Chilensis Prodromus**. Madrid, ES: La Imprenta de Sancha, 1794.

SAGUINO, E.; MARTINS, A. N.; DEL AGUILA, L. S. H.; DEL AGUILA, J. S.; MINAMI, K. **Mirtáceas com frutos comestíveis do Estado de São Paulo**: Conhecendo algumas plantas. Piracicaba, SP: ESALQ, 2006.

SANTOS, A. L.; POLIDORO, A. S.; CARDOSO, C. A. L.; BATISTOTE, M.; VIEIRA, M. C.; JACQUES, R. A.; CAMARÃO, E. B. GC×GC/qMS analyses of *Campomanesia guazumifolia* (Cambess.) O. Berg essential oils and their antioxidant and antimicrobial activity. **Natural Product Research**, v. 33, n. 4, p. 593-597, 2019.

SANTOS, C. M. R.; FERREIRA, A. G.; ÁQUILA, M. E. A. Características de frutos e germinação de sementes de seis espécies de Myrtaceae nativas do Rio Grande do Sul. **Ciência Florestal**, v. 14, n. 2, p. 13-20, 2004.

SANTOS, J. P. Frutíferas hospedeiras de moscas-das-frutas: arrancá-las ou conservá-las? **Agropecuária Catarinense**, v. 35, n. 1, p. 5-7, 2022.

SANTOS, M. R. M.; FETSCH, V. T.; SANTOS, K. A.; TAVARES, F.; SILVA, E. A. Ultrasound-assisted extraction of bioactive compounds from sete capote leaves (*Campomanesia guazumifolia* Cambess.). **Journal of Multidisciplinary Engineering Science and Technology**, v. 7, n. 5, p. 11782-11790, 2020.

SECRETARIA MUNICIPAL DO VERDE E DO MEIO AMBIENTE. **Manual técnico de arborização urbana**. 3ª ed. São Paulo, SP: Prefeitura de São Paulo, 2021.

SILVA, A. T.; MAZINE, F. F. A família Myrtaceae na Floresta Nacional de Ipanema, Iperó, São Paulo, Brasil. **Rodriguésia**, v. 67, n. 1, p. 203-223, 2016.

SILVA, B. A.; CASTRO, T. L. A.; VIANA, L. F.; SANTOS, M. S. M.; CARDOSO, C. A. L. Effect of the peel extracts from two *Campomanesia* (Myrtaceae) species on *Allium cepa* L. (Amaryllidaceae). **Revista de Agricultura Neotropical**, v. 9, n. 1, e6831, 2022.

STAMPELLA, P. C.; ESPÓSITO, E.; KELLER, H. A. Los frutales del nordeste argentino en la "materia médica misionera" del jesuita Pedro Montenegro. **Bonplandia**, v. 28, n. 2, p. 99-116, 2019.

STECKELBERG, R. M. B.; PAULA, J. R.; ROMANO, C. A.; STECKELBERG, D. B. Scientometric analysis of scientific production on the genus *Campomanesia* Ruiz & Pav. (Myrtaceae) and most studied species -research trends involving native Brazilian plants. **Research, Society and Development**, v. 11, n. 1, e19111124639, 2022.

SOUZA, M. T.; SOUZA, M. T.; PANOBIANCO, M. Morphological characterization of fruit, seed and seedling, and seed germination test of *Campomanesia guazumifolia*. **Journal of Seed Science**, v. 40, n. 1, p. 75-81, 2018.

SOUZA, S. A.; COUTO, I. F. S.; PEREIRA, M.; CARDOSO, C. A. L.; SCALON, S. P. Q.; PEREIRA, F. F.; CARVALHO, E. M.; MUSSURY, R. M. Aqueous extracts of species of the genus *Campomanesia* (Myrtaceae) affect biological characteristics of *Plutella xylostella* (Linnaeus, 1758) (Lepidoptera: Plutellidae). **Journal of Agricultural Science**, v. 11, n. 5, p. 334-341, 2019.

SOUZA NETO, J. D. DE S.; DOS SANTOS, E. K.; LUCAS, E.; VETÖ, N. M.; BARRIENTOS-DIAZ, O.; STAGGEMEIER, V. G.; VASCONCELOS, T.; TURCHETTO-ZOLET, A. C. Advances and perspectives on the evolutionary history and diversification of Neotropical Myrteae (Myrtaceae). **Botanical Journal of the Linnean Society**, v. 199, p. 173-195, 2022.

SUGUINO, E.; MARTINS, A. N.; AGUILA, L. S. H.; AGUILA, J. S.; MINAMI, K. **Mirtáceas com frutos comestíveis do Estado de São Paulo**: Conhecendo algumas plantas, Parte 2. Série produtor rural, 45. Piracicaba, SP: ESALQ, 2009.

SYTSMA, K., J.; LITT, A.; ZJHRA M. L.; PIRES, J. C.; NEPOKROEFF, M.; CONTI, E.; WALKER, J.; WILSON, P. G. Clades, clocks, and continents: historical and biogeographical analysis of Myrtaceae, Vochysiaceae, and relatives in the Southern Hemisphere. **International Journal of Plant Sciences**, v. 165, S85–S105, 2004.

TEIXEIRA, N.; MELO, J. C. S.; BATISTA, L. F.; PAULA-SOUZA, J.; FRONZA, P.; BRANDÃO, M. G. L. Edible fruits from Brazilian biodiversity: A review on their sensorial characteristics versus bioactivity as tool to select research. **Food Research International**, v. 119, p. 325-348, 2019.

THE BRAZILIAN FLORA GROUP. FILARDI, F. L.; BARROS, F.; BAUMGRATZ, J. F. A.; BICUDO, C. E. M.; CAVALCANTI, T. B.; COELHO, M. A. N., ZUNTINI, A. R. (2018). Brazilian Flora 2020: Innovation and collaboration to meet Target 1 of the Global Strategy for Plant Conservation (GSPC). **Rodriguésia**, v. 69, n. 4, p. 1513-1527.

THE WORLD FLORA ONLINE. ***Campomanesia guazumifolia* (Cambess.) O. Berg**. Disponível em: http://www.worldfloraonline.org/taxon/wfo-0000793237#E. Acesso em: 23 jan. 2023.

VAGULA, J. M.; VISENTAINER, J. V.; LOPES, A. P.; MAISTROVICZ, F. C.; ROTTA, E. M.; SUZUKI, R. M. Antioxidant activity of fifteen seeds from fruit processing residues by different methods. **Acta Scientiarum. Technology**, v. 41, e35043, 2019.

VASCONCELOS, T. N. C.; PROENÇA, C. E. B.; AHMAD, B.; AGUILAR, D. S.; AGUILAR, R.; AMORIM, B. S.; CAMPBELL, K.; COSTA, I. R.; DE CARVALHO, P. S.; FARIA, J. E. Q.; GIARETTA,

A.; KOOIJ, P. W.; LIMA, D. F.; MAZINE, F. F.; PEGUERO, B.; PRENNER, G.; SANTOS, M. F.; SOEWARTO, J.; WINGLER, A.; LUCAS, E. J. Myrteae phylogeny, calibration, biogeography and diversification patterns: increased understanding in the most species rich tribe of Myrtaceae. **Molecular Phylogenetics and Evolution**, v. 109, p. 113–137, 2017.

WAGNER, A., JR.; CALMON, L. L.; CITADIN, I. **Frutas nativas**: Aprendendo com diversão. Dois vizinhos, PR: Universidade Tecnológica Federal do Paraná, 2020.

VENDRUSCOLO, R. G.; WAGNER, R.; TISCHER, B.; FERREIRA, D. F.; VICTORIA, F. N. Caracterização dos compostos voláteis e óleos essenciais de sete-capotes (*Campomanesia guazumifolia* (Cambess.) O. Berg). In: BORGES, C. D.; MENDONÇA, C. R. **Tecnologia de Frutas e Hortaliças**: Compostos químicos de interesse. Canoas, RS: Mérida Publishers, 2021.

ZUCHIWSCHI, E.; FANTINI, A. C.; ALVES, A. C.; PERONI, N. Limitações ao uso de espécies florestais nativas pode contribuir com a erosão do conhecimento ecológico tradicional e local de agricultores familiares. **Acta Botanica Brasilica**, v. 24, n. 1, p. 270-282, 2010.