Macro and microscopical identification of four species of *Baccharis* from trimera group

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Abstract

Different species of *Baccharis* belonging to the Trimera group are commonly named as *carqueja* and employed for their digestive and diuretic properties. Since the members of this group are alike, this work has aimed to study the macro and microscopical characters of *Baccharis articulata, B. cylindrica, B. gaudichaudiana and B. trimera*, in order to contribute for the drug analysis and to complement taxonomic knowledge for the Trimera group. These species are shrubs and have three-winged stem, except for *B. articulata* which possesses two wings. *B. gaudichaudiana* axis reveals ribs, *B. articulata* has oval contour and *B. cylindrica* and *B. trimera* stem is circular. In *B. cylindrica* and *B. trimera*, included phloem has been observed in older basal regions. Calcium oxalate crystals are seen in the four species, being styloid in *B. articulata* and *B. cylindrica* and prismatic in *B. gaudichaudiana* and *B. trimera*. The other microscopical features observed are similar.

Resumo

Diferentes espécies de Baccharis pertencentes ao grupo Trimera são comumente denominadas como *carqueja* e empregadas por suas propriedades digestivas e diuréticas. Como os membros desse grupo são semelhantes, este trabalho objetivou estudar as características macro e microscopicas de *Baccharis articulata, B. cylindrica, B. gaudichaudiana e B. trimera*, como forma de contribuir à análise das drogas e complementar o conhecimento taxinômico do grupo Trimera. Estas espécies são arbustos e tem caules trialados, com exceção de *B. articulata* a qual possui duas alas. O axis de *B. gaudichaudiana* revela nervuras, de B. *articulata* tem contorno oval e de *B. cylindrica* e *B. trimera* stem são circulares. Em *B. cylindrica* e *B. trimera*, floema incluso tem sido observado em regiões basais antigas. Cristais de oxalate de calico são vistos nas quarto espécies, do tipo estilóide em *B. articulata* e *B. cylindrica* e prismáticos em *B. gaudichaudiana* e *B. trimera*. As outras características microscópicas observadas são similares.

The genus *Baccharis* comprises approximately 500 species, classified in 28 groups based on morphological similarities[1]. Different species belonging to the Trimera group are commonly named as *carqueja* and employed for their digestive and diuretic properties [2,3,4,5]. In Brazil, the *carquejas* are one of the most commercialized medicinal plants and Paraná State is considered the major collector [6]. The Trimera group members are alike and their identification presents some difficulties, even for specialists. Therefore, this work has aimed to study the macro (morphological) and microscopical (anatomical) characters of four species from this group, *Baccharis articulata* (Lam.) Persoon, *B. cylindrica* (Less.) DC., *B. gaudichaudiana* DC. and *B. trimera* (Less.) DC., in order to contribute for the drug analysis and to complement taxonomic knowledge for the Trimera group.

The four species are shrubs, having winged stems which assume the leaf photosynthetic role, as foliar appendages are absent. In common, these species show some microscopical characters, such as uniseriate epidermis with polygonal shaped cells in face view and coated by thin and striated cuticle, anomocytic stomata even or slightly raised regarding the other epidermal cells, and clusters of pluricellular glandular trichomes united at the basis and localized in a small depression. The wings, in transection, reveal the chlorenchyma composed of an atypical palisade parenchyma beneath the epidermis and spongy parenchyma in the middle. Collateral vascular bundles are embedded in the chlorenchyma, encircled by a parenchymatic sheath and associated with secretory ducts. The caulinar axis has a dermal system similar to the wings, besides alternating chlorenchyma and angular collenchyma, and a vascular cylinder formed by phloem outside and xylem inside. The former may exhibit perivascular fibre caps and the latter surrounds the parenchymatic pith.

In contrast, *B. articulata* has a two-winged stem while the three others possess three wings. In transection, *B. gaudichaudiana* axis reveals ribs, *B. articulata* has oval contour and *B. cylindrica* and *B. trimera* stem is circular. In *B. cylindrica* and *B. trimera*, included phloem has been observed in older basal regions. Calcium oxalate crystals are seen in the four species, being styloid in *B.*

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articulata and *B. cylindrica*, and prismatic in *B. gaudichaudiana* and *B. trimera*.

In conclusion, the macro and microscopical characters encountered for the four species correspond to the aspects described for the Trimera group[7, 8, 9, 10]. However, since outstanding characters lack for each species, the whole assembled characters are relevant for the pharmacognostic and taxonomic species identification.

Material and Methods

The botanical material was collected in Paraná State and the vouchers were identified by a taxonomist. Stem fragments were fixed in FAA70[11], maintained in 70% ethanol[12], free-hand sectioned and stained either with toluidine blue[13] and basic fuchsine and astra blue[14].

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