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Survey of plants popularly used for pain relief in Rio Grande do Sul, southern Brazil



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ABSTRACT

Ethnobotanical data can be an important tool in the search for new drugs. The Brazilian Health Surveillance Agency accepts the registration of herbal medicines based on ethnopharmacological and ethnobotanical studies. With the purpose of increasing the knowledge of potentially useful plants for the treatment of painful conditions, we analyzed the ethnobotanical studies carried out in Rio Grande do Sul state (RS-Southern Brazil); we had access to nineteen studies. To our knowledge, this is the first compilation of ethnobotanical studies that focus on pain relief carried out in RS. The species native to RS cited in at least nine (about 50%) of these studies were selected. The search retrieved 28 native species cited as used to alleviate painful conditions, which are distributed in eighteen botanical families, being Asteraceae the most mentioned. The species more frequently cited for pain relief were *Achyrocline satureioides*, *Baccharis articulata*, *Baccharis crispa*, *Lepidium didymum*, *Eugenia uniflora* and *Maytenus ilicifolia*. The only species not reported in any pre-clinical study associated with pain relief was *B. articulata*. Among the six species cited, no studies on clinical efficacy were found. In conclusion, the folk use of native plants with therapeutic purposes is widespread in RS State (Brazil), being pain relief an important property.

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Introduction

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage (IASP, 1986). It affects approximately 70% of world population and is associated with deficit in quality of life (WHO, 2007). The Brazilian Society for Pain

Study estimates that pain prevalence in the country is of 30% (around 50 million of people) (SBED, 2012).

Despite significant efforts and investments from academia and the pharmaceutical industry, very few new therapies for pain treatment have been introduced to clinical practice (Hruby et al., 2006). As a consequence, pain treatment continues to depend on therapeutic modalities that present limited efficacy and/or

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important adverse effects, such as respiratory depression, constipation, tolerance, dependence, gastritis and ulcers (Brunton et al., 2011).

In this context, medicinal plants may be expected to contribute to the search of new therapeutic strategies, as well as for new molecular patterns with antinociceptive activity, due to chemical diversity (Phillipson, 2007).

The main example of natural compounds relevance in analgesic drug development is the potent opioid alkaloid morphine isolated from *Papaver somniferum* L.; other important plant contributions are salicin and colchicine. Salicin, isolated from *Salix alba* L., is the precursor molecule to acetylsalicylic acid, a nonsteroidal analgesic, antipyretic and anti-inflammatory drug (Brunton et al., 2011). Colchicine is an alkaloid of *Colchicum autumnale* L., largely effective for the treatment of gouty arthritis, a painful inflammatory disease (Brunton et al., 2011). In addition, several other secondary metabolites derived from plants, such as phloroglucinols, alkaloids, terpenoids, methylxanthines and flavonoids have been evaluated in pre-clinical studies on antinociceptive activity (Calixto et al., 2000; Sardella et al., 2008; Galeotti et al., 2010; Haas et al., 2011; Sawynok, 2011; Silva et al., 2011; Radulovic et al., 2012).

The approach for drug development from plant resources depends on defined purposes. Different strategies yield particular active compounds or phytomedicines. The most common strategy is the careful observation of the use of natural resources in the folk medicine of different cultures. The traditional use of plants in primary health care is recognized by WHO (1992) and has increased significantly over the past 20 years (Calixto, 2000; Rates, 2001; Dhanani et al., 2011; Kumar et al., 2011; WHO, 2008). Besides contributing to primary health care, herbal medicine can be used as indicator of pharmacologically relevant activities in drugs development approaches (Rates, 2001).

By the year 2007, herbal medicine revenue in Brazil earned US\$160 million (WHO, 2008). Ethnobotanical studies demonstrate the popular use of plants for pain relief, as it was the case in Rio Grande do Sul state (Garlet, 2000; Marodin, 2000; Di Stasi, 2002; Agra et al., 2007; Matos, 2007). The Brazilian National Health Surveillance Agency (Anvisa) accepts the traditional uses reported by ethnopharmacological and/or ethnically oriented studies as evidence of efficacy of phytopharmaceuticals or herbal drugs used with therapeutic purpose (Anvisa, 2010; 2014). Furthermore, the Brazilian government has expressed interest in including phytotherapy in the public health system, and published a list of species considered relevant for research aiming at future therapeutic use (MS, 2009).

In the light of the above, a compilation of ethnobotanical studies carried out in the state of Rio Grande do Sul, Brazil, was performed with special focus on the knowledge of the plants potentially useful for the treatment of painful conditions, with special focus on native species.

Materials and methods

The present study comprises nineteen ethnobotanical studies (including original articles, theses and dissertations), which present data from communities living in Rio Grande do Sul (RS) state. The studies were found by performing searches within

virtual databases (PubMed, SciELO and Portal de Periódicos CAPES), using the following keywords: folk medicine, *medicina popular*, ethnobotany, *etnobotânica*; combined with Rio Grande do Sul, southern Brazil and *sul do Brasil*. Regional university libraries were also assessed. The criteria for selection were: accessibility, presence of a botanist in the team of researchers, publication time interval from 1997 to 2009.

These studies were grouped according to the eleven physiographic regions of RS territory defined by Fortes (1959) (Fig. 1): Depressão Central - Possamai (2000), Soares et al. (2004), Vendruscolo (2004) and Casagrande (2009); Encosta do Sudeste - Martha (2003), Veiga (2003), Zanandrea (2003) and Ceolin (2009); Litoral - Marodin (2000) and Haas (2003); Encosta Inferior do Nordeste - Sebold (2003) and Barbosa (2005); Alto Uruguai - Kubo (1997) and Löwe (2004); Serra do Sudeste - Fernandes (2001) and Leitzke (2003); Missões - Barros et al. (2007); Campos de Cima da Serra - Ritter et al. (2002); Planalto Médio - Garlet (2000); Campanha and Encosta Superior do Noroeste - no studies were found.

The species (native and exotics) cited in at least nine (about 50%) of the nineteen studies were listed; furthermore, those cited as useful for alleviating painful conditions were selected. The search terms considered as related to painful conditions were: pain (*dor*), headache/migraine (*dor de cabeça/enxaqueca*), sore throat (*dor de garganta*), stomachache (*dor de estômago*) and backache (*dor nas costas*), abdominal pain (*dor abdominal*), kidney pain/inflammation (*dor/inflamação nos rins*), leg pain (*dor nas pernas*), bellyache (*dor de barriga*), sprain pain (*dor de entorse*); or related ones, like colics (*cólica*), baby's colics (*cólica de bebê*), and rheumatism and pain of the joints (*reumatismo/dor nas articulações*). From the cited species, we selected the native ones cited in at least five (about 50%) of the eleven RS physiographic regions, in order to analyze published scientific data related to their antinociceptive activity and toxicity.

Pre-clinical and clinical studies were searched in PubMed, SciELO, Scopus and Portal de Periódicos CAPES. The scientific name of the plant combined with the terms "pain", "antinociceptive", "analgesic", "toxicity", "*dor*", "*analgesia*" and "*toxicidade*" were used as keywords. Additionally, the total number of publications for each species in Pubmed and SciELO Brazil was registered. In the Banco de Teses CAPES only the number of theses was considered. All these searches covered studies published until January 2013.

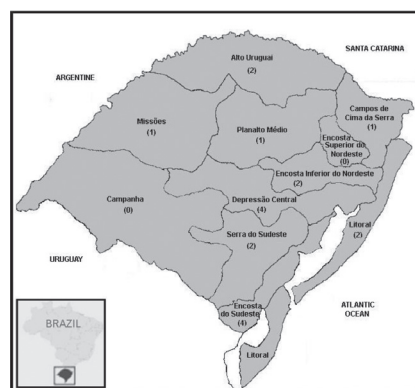


Figure 1 - Physiographic regions of the Rio Grande do Sul state (southern Brazil) defined by Fortes (1959). The number of studies found in each region is in parentheses.

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