

Chemical, Physiological, and Toxicological Aspects of the Essential Oil of Some Species of the Genus *Bystropogon**

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Abstract

The composition of the essential oils of *Bystropogon plumosus*, *B. organifolius* var. *palmensis*, *B. wildpretii*, *B. maderensis*, and *B. canariensis* var. *smithianus* were studied by GLC and GLC/MS. The first four species provide relatively similar oils characterized by monoterpene ketones as the main constituents while the last species is quite different with main constituents consisting of mono- and sesquiterpene hydrocarbons. In *B. plumosus* the ontogenetic variation of the monoterpene ketones was studied for a period of four years. During this time the behaviour of pulegone was inversely correlated with that of menthone and isomenthone. Pulegone was the most active compound of the monoterpene ketones in antimicrobial tests using three species of bacteria and fungi, respectively.

Key words

Essential oil, monoterpene ketones, pulegone, menthone, isomenthone, ontogenetic variation, antimicrobial activity, toxicity, *Bystropogon*, Lamiaceae.

Introduction

The genus *Bystropogon* (incl. *Minthostachys* Bunge) includes evergreen shrubs and belongs to the plant family Lamiaceae (Stachyoideae: Saturejeae: Thyminae). Centers of distribution are the Canary Islands, Madeira, and South America (Chile, Argentina). According to Engler and Prantl (1) the genus is subdivided into the two sections *Bystropogon* Benth. (Canarian-Maderian species) and *Minthostachys* Benth. (South American species: *B. molle* Kunth., *B. spicatus* Benth., *B. tomentosus* Benth., *B. canus* Benth., *B. glabrescens* Benth.). Based mainly on morphological and anatomical data the section *Bystropogon* was recently further divided (2) into the section *Plumosus* L. La-Serna (1. *B. plumosus* L'Her., 2. *B. organifolius* L'Her.

with var. *organifolius*, var. *ferrensis* (Ceb. et Ort.) L. La-Serna and var. *palmensis* Bornm., 3. *B. odoratissimus* Bolle, and 4. *B. wildpretii* L. La-Serna) and the section *Canariense* L. La-Serna (5. *B. canariensis* L'Her. with var. *canariensis* and var. *smithianus* Christ, 6. *B. punctatus* L'Her., and 7. *B. maderensis* Webb) (2). The authors of (2) and (3) regret that phytochemical data which may help to clarify the systematic position of these species are rare; nevertheless they state that all members of the group *Plumosus* smell like menthol whereas those of *Canariense* do not (3).

Bystropogon species are traditionally used in South America to inhibit the germination of stored potatoes and to protect them against predatory insects (4). The dried leaves of *B. plumosus* are used in the Canary Islands as a remedy against colds in native folk medicine ("poleo"-tea) (5). Several batches of leaves of *B. plumosus* have been analyzed for their essential oils and these were found to contain more than 80 % monoterpene ketones with pulegone, menthone, and iso-menthone as main constituents (5). A search for monoterpene glycosides in *B. plumosus* failed but succeeded in the isolation of the new hemiterpene glucoside 2*S*-methyl-1-yl- β -D-glucoside (6).

In the present study the Canarian species *B. organifolius* var. *palmensis* (B in Table 1) and *B. wildpretii* (C) of section *Plumosus* and *B. maderensis* (D) and *B. canariensis* var. *smithianus* (E) of section *Canariense* were investigated with regard to their essential oil composition. The data obtained in (5) of a comparable batch of *B. plumosus* (section *Plumosus*) are presented as A in Table 1 for comparison. The oil of *B. plumosus* and its main constituents were tested for their activities towards some bacteria and some fungi; the ontogenetic variation of the oil and of its main constituents was investigated and is discussed.

Materials and Methods

Plant material

B. plumosus and *B. canariensis* var. *smithianus* were obtained from Dr. Buttler (Univ. Bochum); *B. maderensis* was collected from Madeira. All three species were cultivated in the Experimental Garden of this Institute; vouchers are deposited under FBM 2, 3, and 4, respectively. The essential oils B and C were distilled from dried leaves of *B. organifolius* var. *palmensis* and *B. wildpretii* obtained through the courtesy of Dr. Ehmske (Teichm.

* Dedicated to Professor Ernst Reinhard on the occasion of his 65th birthday on August 21, 1991.

Antioxidants Chemical Physiological Nutritional And Toxicological Aspects

RS Peters



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