

Constituents of *Encyclia longifolia* Schltr. (Orchidaceae)

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RESUMO: “Constituintes de *Encyclia longifolia* Schltr. (Orchidaceae)”. Uma análise química detalhada dos metabólitos secundários não voláteis de *Encyclia longifolia* Schltr. Sin. *Epidendrum longifolium* Barb. Rodr. foi realizada na tentativa de prestar suporte quimiotaxonômico para a recente separação do gênero *Encyclia* em *Encyclia* Hook e *Prosthechea* Knowles & Westc.

Unitermos: *Encyclia longifolia*, Orchidaceae, *Prosthechea*, 9,10-diidrofenantreno.

ABSTRACT: A detailed chemical analysis of the non-volatile secondary metabolites of *Encyclia longifolia* Schltr. syn. *Epidendrum longifolium* Barb. Rodr. was carried out in an attempt to lend a chemotaxonomic support for the recent separation of the genus *Encyclia* into *Encyclia* Hook and *Prosthechea* Knowles & Westc.

Keywords: *Encyclia longifolia*, Orchidaceae, *Prosthechea*, 9, 10-dihydrophenanthrene.

INTRODUCTION

The genus *Encyclia* Hook belongs to the sub tribe Laeliinae of the family Orchidaceae. There has been much controversy regarding the taxonomic group to which the genus *Encyclia* belongs which led to the recent delimitation of the genus into *Encyclia* Hook and *Prosthechea* Knowles & Westc. (Higgins, 1997). Traditionally, the genus *Encyclia* consisted of about 250 species which also included *Prosthechea*. *Encyclia* and *Prosthechea* were either considered congeners (Dressler, 1993), or *Prosthechea* had been treated under different epithets such as *Anacheilium* (Pabst et al., 1981) and *Hormidium* Lindl. Ex Heynh. (Brieger; Hunt, 1969). Most recently, the genera *Encyclia* and *Prosthechea* were separated initially on the basis of morphological characteristics which also justified the inclusion of *Anacheilium* and *Hormidium* in the latter (Higgins, 1997). Subsequent molecular genetic studies supported this separation and suggested a closer relationship of *Prosthechea* with *Cattleya* Lindl rather than *Encyclia* (van den Berg, 2000). The most recent study (Oliveira Pires et al., 2003) on the anatomical features of several *Encyclia* and *Prosthechea* species lent ample support to their separation. In this study, the presence of so-called “flavonoid crystals”, typical of *Prosthechea* species (Pabst et al., 1981; Higgins, 1997) were not observed in the various species of *Encyclia* including *E. longifolia*.

We have initiated a chemical investigation

to isolate and characterize the non-volatile secondary metabolites of several species of *Encyclia* and *Prosthechea* in an attempt to identify any characteristic chemical markers in support of their recent taxonomic separation. To our knowledge, other than some preliminary qualitative detection of alkaloids (Luning, 1964), some unidentified flavone-C-glycosides (Williams, 1979) and volatile substances (Kaiser, 1993), no report on the isolation and characterization of any non-volatile secondary metabolite of *E. longifolia* has appeared in the literature, so far. This communication describes the preliminary results of the isolation and characterization of non-volatile constituents of *Encyclia longifolia* Schltr. syn. *Epidendrum longifolium* Barb. Rodr.

MATERIAL AND METHODS

Plant material

Encyclia longifolia Schltr. syn. *Epidendrum longifolium* Barb. Rodr. grows throughout the tropical Americas especially in the eastern coastal areas of Brazil. The plant material used in the present study was collected in November 2001 from the dunes of Natal, Rio Grande do Norte, identified by Prof. Leonardo Felix, Departamento de Fitociencia, UFPB, Areia, Brazil and the herbarium specimen (L. P. Felix 8960) is deposited at the EAN Herbarium of UFPB, Areia, Brazil.

Extraction, isolation and identification

The aerial part of *E. longifolia* was extracted with 90% aqueous EtOH. The extract was concentrated *in vacuo*. The residue upon CC on silica gel using CHCl_3 - CH_3OH with increasing amounts of CH_3OH followed by CH_3OH with increasing amounts of H_2O as eluants resulted in the isolation of 4,7-dihydroxy-2-methoxy-9,10-dihydrophenanthrene (Majumdar et al., 1990), vitexin (Evans et al., 1957), 4-hydroxybenzoic acid, β -D-glucopyranosyl-4-hydroxybenzoic acid, gastrodin (Taguchi et al., 1981), 4-hydroxybenzaldehyde, 4-O- β -D-glucosylbenzylalcohol, sucrose, glucose and yet unidentified compounds, $\text{C}_9\text{H}_8\text{O}_3$ and a trisaccharide. The identification of all the compounds were done with the aid of the comparison of physical characteristics and spectroscopic data (mp, IR, EIMS, and ^1H and ^{13}C NMR) with those given in the literature.

RESULTS AND DISCUSSION

To our knowledge, this is the first report of the isolation and characterization of any non-volatile secondary metabolites of a species of *Encyclia*. Among the isolated constituents (*vide infra*), the presence of *p*-hydroxybenzoic acid and benzoic acid derivatives are widespread in Orchidaceae (Bates-Smith, 1968). Also, flavone-C-glucoside, vitexin has been encountered in various species of Orchidaceae (Williams, 1979) and a few other species outside of Laeliinae yielded 9,10-dihydrophenanthrenes (Majumdar; Banerjee, 1990). That leaves benzaldehyde and benzyl alcohol as constituents yet to be isolated from *Encyclia* and/or *Prosthechea* species. Further study is in progress.

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