Prenylated \( p \)-Hydroxyacetophenone Derivatives from the Giant \textit{Senecio johnstonii}

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Abstract—The extract of the aerial parts of \textit{S. johnstonii} afforded five known prenylated \( p \)-hydroxyacetophenone derivatives, scopoletin and 5-pentadecyl resorcinol together with the tridecyl derivative. The chemotaxonomic situation is discussed briefly.

Introduction

The group of giant \textit{Senecios} contains three species, all restricted to East Africa [1]. As the relationship of this group to other groups of \textit{Senecio} is of interest we have studied the chemistry of one species, \textit{S. johnstonii} Oliv. ssp. \textit{adnivalis} (Stapf) C. Jeffrey var. \textit{erici-rosenii} (R. E. & T. L. E. Fries) C. Jeffrey, grown from seeds, collected from Mt Karisimbi in Rwanda. The main constituent is the methyl ether of 2-senecioyl-\( p \)-hydroxyacetophenone (4) [2]. Furthermore, the \( p \)-hydroxyacetophenone derivatives 1 [3], 2 [4], 3 [5] and 5 [6] as well as scopoletin (6) and the 5-alkyl resorcinols 7 [7, 8] and 8 [8] were present. The structures were elucidated by their high field \( ^1H \) NMR spectra which were compared with those of authentic samples.

The results show that the typical furoeremophilanes, present in most groups of \textit{Senecio} and related genera like \textit{Euryops}, \textit{Ligularia} and \textit{Othonna}, are absent. Prenylated \( p \)-hydroxyacetophenones have been reported from some \textit{Senecio} species, however, so far mainly euparin-like derivatives [9]. The diketones 3 and 4 have never been isolated from \textit{Senecio} species. Prenyl-\( p \)-hydroxyacetophenone was reported from only three species [10–12].

Scopoletin (6) is also rare in \textit{Senecio}, it has been reported from only one species [13]. The resorcinol derivatives 7 and 8 have so far been isolated in the Compositae only from a \textit{Baccharis} species. Thus the chemistry of \textit{S. johnstonii} is relatively unusual. The analysis of this species may indicate that it is derived from a very old lineage within \textit{Senecio} as the prenylated \( p \)-hydroxyacetophenones are more accumulated in other tribes especially in the Eupatorieae.
Experimental
The air-dried aerial parts (200 g) were extracted with MEOH–Et₂O–petrol, 1:1:1, at room temperature. The extract obtained was separated by CC, TLC and HPLC as reported previously [14]. Finally 10 mg 1, 100 mg 2, 100 mg 3, 1.5 g 4, 200 mg 5, 50 mg 6, 350 mg 7 and 170 mg 8 were isolated. The compounds were identified by comparing the 400 MHz 'H NMR spectra with those of authentic material.

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