

ON THE PRESENCE OF FALCARINOL IN ARALIACEAE

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Abstract—Leaves and stems of 10 species of Araliaceae were examined for the presence of falcarinol. *Fatshedera lizei*, *Hedera helix*, *H. helix* ssp. *canariensis* and *Tupidanthus calypttrata* were found to contain falcarinol. The finding of falcarinol in the two *Hedera* species and *Fatshedera lizei* coincides with the fact that they often are reported as causes of allergic contact dermatitis.

INTRODUCTION

Several members of Araliaceae have been reported to cause allergic contact dermatitis and skin irritation [1–8]. The relation between clinical effect and content of active principles has only to a minor extent been examined and only two species causing allergy and skin irritation have been examined for polyacetylenes. The sap of *Hedera helix* L. contains falcarinone [9] and have been reported to cause skin irritation and allergic contact dermatitis [1–5], but nothing is known about a possible causal relation. *Schefflera arboricola* (Hayata) Merrill contains falcarinol and possibly other closely related polyacetylenes [10] and is known to cause allergic contact dermatitis [6]. Patch testing of fractions obtained upon chromatographic separation of leaves and stems showed positive response for the fractions containing falcarinol. Falcarinol has been isolated and has been showed to be the major allergen [10]. It has further been reported that closely related polyacetylenes as falcarindiol, dehydrofalcarinol and the oxidation product of falcarinol, falcarinone, do not elicit allergic contact dermatitis [11].

Therefore, it is of interest to examine other species of Araliaceae for falcarinol and compare the obtained results with reports on dermatitis by species of the family. The present paper deals with the result of examining 10 species of Araliaceae for falcarinol.

RESULTS AND DISCUSSION

The results of the investigation are given in Table 1. From this can be seen that ordinary ivy, *Hedera helix* L. in addition to the earlier reported falcarinone contains the allergenic falcarinol, which also is found in the closely related Canary Island Ivy, *Hedera helix* L. ssp. *canariensis* (Willd.) P. Cout. Both species are in several cases reported as causes of contact dermatitis. Two more species, *Fatshedera lizei* (Cochet) Guillaumin and *Tupidanthus calypttrata* Hook fil. & Thoms. contain falcarinol, but of those only *Fatshedera* is known to cause allergic contact dermatitis [2]. Additionally can be mentioned that

Table 1. Species of Araliaceae examined for the presence of falcarinol

Species examined	Fresh leaves and stems (g)	Falcarinol present
<i>Dizygotheca kerchoviana</i> Hort.	64	
<i>Fatshedera lizei</i> (Cochet) Guillaumin	71	+
<i>Fatsia japonica</i> (Thunb.) Decne. & Planch	97	
<i>Hedera helix</i> L.	155	+
<i>Hedera helix</i> L. ssp. <i>canariensis</i> (Willd.) P. Cout.	65	+
<i>Schefflera tomentosa</i> (Blume) Harms	98	
<i>Schefflera venulosa</i> (Wight & Arn.) Harms	172	
<i>Trevesia palmata</i> (Roxb.) Vis.	167	
<i>Trevesia sundaica</i> Miq.	104	
<i>Tupidanthus calypttrata</i> Hook. fil. & Thoms	101	+

Fatshedera is a hybrid between *Fatsia japonica* var. *moseri* and *Hedera helix* L. var. *hibernica*.

It can of course not be excluded that investigation of larger amounts of plant materials will reveal the presence of minor amounts of falcarinol in the other species apparently devoid of falcarinol, but the four above species contain falcarinol as prominent constituents and are in this respect distinctive from the remaining six species. Likewise it cannot be excluded that other allergenic compounds, acetylenic or of quite different structure, are present in the four falcarinol-containing species. But it can be concluded that the oxidation product of falcarinol, falcarinone, present in *Hedera helix* is not an allergen and that falcarinol, as the first known acetylenic allergen is well adapted to act as an alkylating agent possessing a lipophilic terminal moiety as well as a hydrophilic acetylenylvinyl carbinol, which upon removal of the hydroxy

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group assisted by a proton, forms a stabilized carbocation able to react with sulhydryl and amino groups of a protein forming haptens.

Falcarinol, until now only known from two species of Araliaceae, is apparently relatively common in Araliaceae as is the case in Umbelliferae and here in species which also are known to be a cause of allergic contact dermatitis (*Daucus carota* L. [12], *Seseli gummiferum* Pall. [13], *Aegopodium podagraria* L. [1, 14, 15].

EXPERIMENTAL

Material was obtained from plants being cultivated in the green houses of the Botanical Garden of the University of Copenhagen.

Fresh leaves and stems of the plants were coarsely crushed and extracted with CH_2Cl_2 . The CH_2Cl_2 extracts were evapd *in vacuo*, dissolved in a small vol. of Et_2O and subjected to prep. TLC on silica gel plates employing Et_2O -hexane (1:4) as eluent. Authentic falcarinol (R_f 0.43) was co-chromatographed and the bands were detected by spraying with 1% of vanillin in conc H_2SO_4 followed by heating to 110° . The bands giving R_f identical to falcarinol were eluted with ether and rechromatographed. The purity and identity of the isolated falcarinol was checked by GC-MS, TLC and UV.

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