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Aplotaxene, an Allelochemical from Roots of the Invasive Species Carduus nutans and C. acanthoides

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Congress Abstract (/ejournals/abstract/10.1055/s-0033-1336457)

Carduus nutans L. (musk thistle or nodding thistle), a member of the Asteraceae family, is a Eurasian native plant [1], but is an invasive species in North America, Australia, and New Zealand where it is more competitive in many habitats than in its native area and part of its success may be due to allelopathy [2]. Several secondary compounds have been identified in the genus Carduus. Among them are sterols such as taraxasterol and sitosterol, and flavonoids such as kaempferol, apigenin, and rutin [3,4,5]. The objective of this study was to identify the phytotoxic compounds present in *Carduus acanthoides* and *C. nutans* roots and aerial part by systematically performing bioassay-directed isolation and subsequent identification of the bioactive constituents according to Dayan et al. [6]. No significant phytotoxic activity against *Lactuca sativa* or *Agrostis stolonifera* was detected in methanol, or water extracts when tested at 1.0 $mg \cdot mL^{-1}$; however, the dichlormethane root extract of *C. acanthoides* was active. Further fractionation using hexane:diethyl ether step gradient was performed with the DCM extract. The active compound was isolated and identified by GC-MS and 1 H- and 13C-NMR. The isolated compound (Figure 1) was identified as the moderately phytotoxic, highly lipophilic compound aplotaxene and was found in roots of both species *C. canthoides* and *C. nutans.*

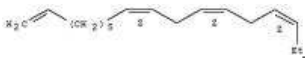
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Fig. 1: *Isolated compound aplotaxene (CAS Registry Number: 10482 - 53 - 8): 1,8,11,14-Heptadecatetraene, (Z,Z,Z)-, or (8Z,11Z,14Z)-heptadeca-1,8,11,14-tetraene*

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