

# Trypanocidal Activity of Oleoresin and Terpenoids Isolated from *Pinus oocarpa*<sup>§</sup>

Julieta Rubio<sup>a,b,\*</sup>, José S. Calderón<sup>c</sup>, Angélica Flores<sup>a</sup>, Clementina Castro<sup>a</sup>, and Carlos L. Céspedes<sup>c,d,\*</sup>

<sup>a</sup> Instituto de Investigaciones Biomédicas, Universidad Nacional Autónoma de México, C.U.  
Apartado Postal 70228, México, D. F., 04510, México

<sup>b</sup> Present address: Genomic Medicine and Environmental Toxicology Department,  
Universidad Nacional Autónoma de México, C.U. Apartado Postal 70228, México, D.F.,  
04510 México. Fax: +525556223845. E-mail: juruli@servidor.unam.mx

<sup>c</sup> Instituto de Química, Universidad Nacional Autónoma de México, Coyoacán 04510,  
México D.F., México

<sup>d</sup> Present address: Chemical Ecology Lab-2C, Natural Products Department, Universidad  
Nacional Autónoma de México, Coyoacán 04510, México D.F., México.  
Fax: +525556162203. E-mail: ccespede@servidor.unam.mx

\* Authors for correspondence and reprint requests

Z. Naturforsch. **60c**, 711–716 (2005); received March 4, 2005

Fractionation with *n*-hexane/ethyl acetate (1:1 v/v) by open column chromatography of the oleoresin from *Pinus oocarpa* Schiede yielded two diterpenes, pimaric acid (**1**) and dehydroabietic acid (**5**), the sesquiterpene longifolene (**3**) and a diterpenic mixture containing pimaric acid (**1**), isopimaric acid (**4**) and dehydroabietic acid (**5**). Subsequently, the isolated compounds, the mixture of **1**, **4** and **5**, the oleoresin and the dehydroabietic acid methyl ester (**2**), were tested *in vitro* against epimastigotes of *Trypanosoma cruzi*, the causative agent of Chagas disease. The most active compounds were **1**, **3** and the oleoresin, being as active as nifurtimox, a drug effective in the treatment of acute infection by American trypanosomiasis and used in this work as positive control.

**Key words:** Diterpenes, Trypanocidal Activity, *Pinus oocarpa*