

Distillation of *Ambrosia peruviana* essential oil from Colombia and their chemical characterization

Sheila B. Beltrán, Angie K. Romero, Lady J. Sierra, Jairo R. Martínez, Elena E. Stashenko*



Research Center for Chromatography and Mass Spectrometry, CROM-MASS, CIBIMOL-CENIVAM, Building 45, Universidad Industrial de Santander, Carrera 27, Calle 9, 680002, Bucaramanga, Colombia.

*E-mail: elena@tucan.uis.edu.co



Introduction

Ambrosia peruviana Willd. is an herbaceous plant, belonging to the Asteraceae family, known as altamisa, artemisa, altamiz, alcanfor, ambrosia silvestre and Maki. It is native to Peru and is distributed from Mexico to South America. This species grows as small shrub, with a height between 50 and 100 cm, with branched stems covered with leaves (Lans *et al.*, 2007).



Plant material

Family: Asteraceae
Genus: *Ambrosia*
Species: *peruviana*
Botanical name: *Ambrosia peruviana* Willd.
Collection site: CENIVAM, Bucaramanga, Colombia, (N 07°08,422' W 073°06,960')

Voucher was deposited at UIS-Herbarium.

Experimental

Essential oil distillation



The whole, undamaged plants were collected from experimental plots at the CENIVAM research center. The essential oil (EO) was obtained by microwave-assisted hydrodistillation (MWHD) using a Clevenger apparatus, with a Dean-Stark trap and a commercial microwave oven (Samsung, 1000 W, 2,45 GHz) operated at 60% of its capacity.

Chromatographic analysis

EO analysis was performed on a gas chromatograph (Agilent Technologies, AT, 6890 Plus, Palo Alto, CA, U.S.A.), coupled to a mass selective detector (AT, MSD 5973 Network, full scan mode), *split/splitless* injector (*split* 30: 1) and a ChemStation Data System, G1701- DA, which included the ADAMS (2007), NIST (2017) and WILEY (2008) spectral libraries. Fused-silica capillary columns DB-5MS [(J&W Scientific Folsom, CA, U.S.A.) of 60 m x 0.25 mm ID, coated with 5% phenyl poly(dimethylsiloxane), 0.25 μ m film thickness] and DB-WAX [(J&W Scientific) of 60 m x 0.25 mm ID, coated with poly(ethyleneglycol), 0.25 μ m film thickness] were used.

Results and Discussion

The *A. peruviana* EO chromatographic profile and peak identification are shown in **Figure 1** and **Table 1**, respectively

In the *A. peruviana* EO ca. 60% of compounds were positively identified, in relative concentrations >0.1%. *ar*-Curcumene (10.8%), germacrene D (10.6%), γ -curcumene (10.5%), chrysanthenone (9.2%), bicyclogermacrene (6.2%), β -myrcene (2.7%), β -bisabolene (2.1%), (*E*)- β -caryophyllene (1.8%), phytol (1.1%), and linalool (1.1%) were major components.

Table 1. Major compounds found in the *A. peruviana* EO obtained by MWHD.

Peak N° Fig. 1	Compound	DB-5MS Column		GC relative peak area, %
		LRI _{exp}	LRI _{lit} **	
3	β -Myrcene	990	989	2.7
4	Linalool	1101	1099	1.1
5	Chrysanthenone	1127	1125	9.2
6	(<i>E</i>)- β -Caryophyllene	1433	1420	1.8
10	γ -Curcumene	1485	1480	10.5
11	<i>ar</i> -Curcumene	1488	1482	10.8
12	Germacrene D	1494	1481	10.6
13	Bicyclogermacrene	1508	1491	6.2
14	β -Bisabolene	1513	1508	2.1
16	Phytol	2109	2116	1.1

*LRI: Linear retention indices. ** Babushok *et al.*, 2011.

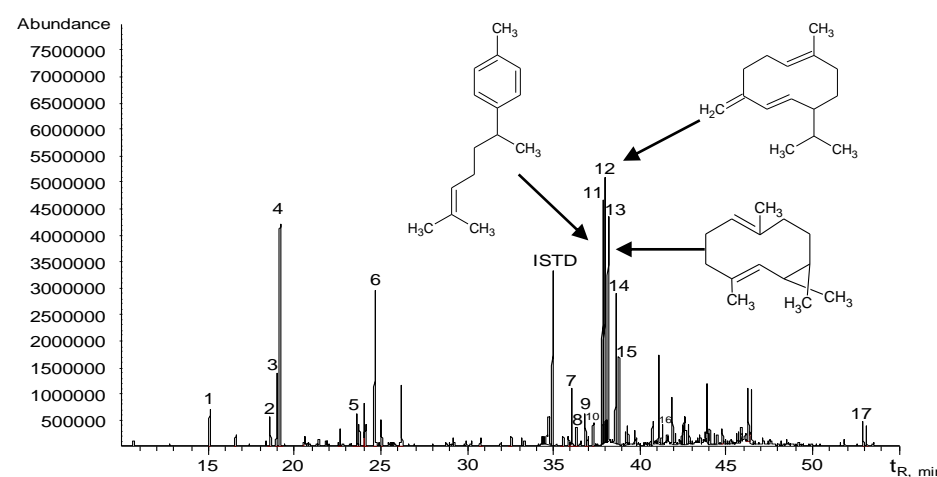


Figure 1. The *A. peruviana* EO, obtained by MWHD. GC/MS, DB-5MS (60 m) Column. *Split* 1:30 MSD (70 eV, EI).

Conclusions

The chemical composition found in this study differs from that reported for *A. peruviana* species cultivated in Venezuela. Probably, that is because the composition of secondary metabolites depends on the plant growth conditions, environmental variations, type of soil and its biota, among others.

Acknowledgements

Fondo de Ciencia, Tecnología e Innovación - FCT del Sistema General de Regalías - SGR [BPIN-2018000100044].

References

- Babushok, V.; Linstrom, P.; Zenkevich, I. 2011. Retention indices for frequently reported compounds of plant essential oils. *J. Phys. Chem. A*, 40: 043101.
- Lans, C. 2007. Ethnomedicines used in Trinidad and Tobago for reproductive problems. *J. Ethnobiol. Ethnomedicine*, 3, 1-12.