

Study of essential oil obtained from *Salvia aratocensis* (Lamiaceae) cultivated in Colombia

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INTRODUCTION

The *Salvia aratocensis* species belongs to the Lamiaceae family and grows in the Eastern Cordillera in the States of Santander and Boyacá, Colombia (Fernández-Alonso, 2003). *S. aratocensis* is a shrub with a height of up to 1.5 m, it spreads very on trails damaged by livestock and adapts to areas with a high nitrogen concentration (Fernández-Alonso, 2003).

The purpose of this work was to determine the chemical composition of the secondary metabolites present in the *S. aratocensis* essential oil (EO).



Salvia aratocensis
N° voucher: COL 566063

EXPERIMENTAL

The plant material was collected from an experimental plots at the CENIVAM research center (N 07° 08, 422' W 073° 06, 960'), in Bucaramanga, Colombia.

The essential oil was obtained by a Clevenger-type microwave-assisted distillation (MWH) apparatus, equipped with Dean-Stark trap.



GC 6890N and MSD-5973 (AT, Palo Alto, CA, U.S.A.)

GC/MS ANALYSIS

Injection: split 1:30 (vol. 1 μ L)

GC oven temperature: 50 °C (5 min) at 5 °C/min to 230 °C (30 min)

Carrier gas: helium (1 mL/min, constant flow)

Columns: DB-WAX, 60 m x 0.25 mm (ID), coated with PEG (0.25 μ m) and DB-5MS, 60 m x 0.25 mm (ID), coated with 5%-phenyl-polydimethylsiloxane (0.25 μ m).

Ionization: Electron ionization, (EI, 70 eV).

Mass range: m/z 30-350 u.

RESULTS

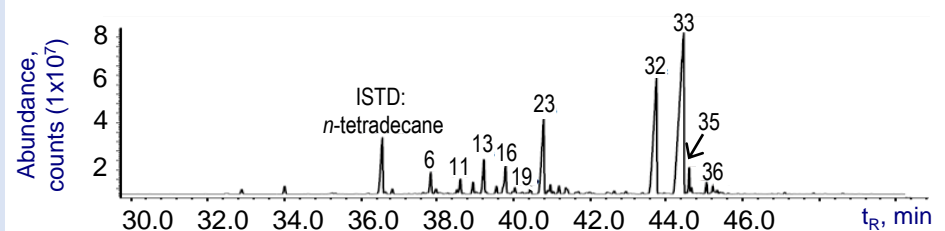


Figure 1. Chromatographic profile of the *S. aratocensis* EO, obtained by GC/MS. Column DB-5MS (60 m), EI (70 eV). See peak identification in Table 1.

Table 1. Main compounds of the *S. aratocensis* EO isolated by MWH.

Peak N° Fig. 1	Compound*	Linear Retention Indices (LRI)		Amount, mg/g (\pm s; n=3)		
		DB5-MS Exp	DB-WAX Lit*			
11	(E)-Muurolo-3,5-diene ^{a,b}	1457	1453	1650	1664	13.7 \pm 0.2
12	α -Humulene ^{a,b}	1468	1462	1658	1666	10.6 \pm 0.1
13	(E)-Muurolo-4,5-diene ^{a,b}	1475	1485	1686	1692	35.4 \pm 0.5
16	Germacrene D ^{a,b}	1494	1485	1722	1712	33.6 \pm 0.4
23	γ -Cadinene ^{a,b}	1526	1530	1771	1765	110 \pm 1
24	(E)-Calamenene ^{a,b}	1532	1532	1843	1839	7.9 \pm 1
32	1-10-di- <i>epi</i> -Cubenol ^{a,b}	1633	1633	2070	2074	221 \pm 6
33	Cadinol ^{a,b}	1661	1653	2181	2169	420 \pm 15

Identification criteria:

^aLinear retention indices (LRI) were calculated using the homologous series of n -C₆-C₂₅ alkanes and were compared with those from databases (Adams, 2017; NIST, 2014).

^bExperimental mass spectra (EI, 70 eV), study of fragmentation patterns and comparison with the mass spectra from the databases (Adams, 2017; NIST, 2014 and Wiley, 2008).

*LRI lit. were obtained from the databases Babushok *et al.*, 2009 and Adams, 2017.

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CONCLUSIONS

The *S. aratocensis* EO yield was 0.23%. The following were the major compounds identified by GC/MS in the EO: cadinol (420 \pm 15), 1-10-di-*epi*-cubenol (221 \pm 6), γ -cadinene (110 \pm 1), (*E*)-muurolo-4,5-diene (35.4 \pm 0.5) and germacrene D (33.6 \pm 0.4). Germacrene D has antimicrobial (Oztürk *et al.*, 2009), antifungal (Moreira *et al.*, 2010), antioxidant, and anti-inflammatory (Miguel, 2010) activities.

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