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SHORT COMMUNICATION

OCIMUM CANUM SIMS- A LESSER KNOWN SOURCE OF VOLATILE OIL WITH TERPINEOL-4 AS THE MAJOR CONSTITUENT

Komla Sanda[1], Koffi Koba[1], Gnon Baba[1], Kokou A. Amouzouvi[1], Widi Tchala[1], Koffi Akpagana[2], Gerard Vilarem and Antoine Gaset[3]

[1]Universite du Benin, Ecole Superieure d'Agronomie, Jeune Equipe de Recherche Physico-chimie et substances Naturelles , BP, 20131, Lome, Togo
[2]Faculte des Sciences, Departement de Botanique, Univesite du Benin, BP, 1515 Lome, Togo
[3]Ecole Nationale Superieure de Chimie, Laboratoire de Chimie des Agroressourses, 118, route de Narbonne, 31077, Toulouse Cedex, France

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ABSTRACT. *Ocimum canum* Sims grown in Lome (Togo) was studied for volatile oil composition. GC and GC/MS analyses revealed that the oil in the herb (leaf and inflorescence) harvested at 3, 4 and 5 months after seeding contained terpineol-4 (21-30 %) as the major component although the percentage composition of the oil did noticeably vary throughout the cropping season. The two other most important constituents were linalool (17-19 %) and γ-terpinene (7-11 %). The oil composition found in this work has not been reported in the *Ocimum canum* species.

INTRODUCTION

Ocimum basilicum L. and *Ocimum gratissimum* L. species have been intensively studied. However, very little work has been done on the composition of the steam-volatile oil of *Ocimum canum* Sims, a species native to Africa. To date, *Ocimum canum* camphor type [1], *Ocimum canum* methyl cinnamate type [2], *Ocimum canum* linalool type [3] , *Ocimum canum citral* type [4] and *Ocimum canum eugenol* type [5] have been reported.

In Togo, *Ocimum canum* Sims (localy known as 'kalizonga' or 'ahame' grows wild or subspontaneously througthout the country [6]. It has been widely used for seasoning and folk medicine needs. Nevertheless, the composition of the oil from locally growing *Ocimum canum* in Togo is yet to be investigated.

In 1995 a screening of *Ocimum* species found in Togo revealed a variety of *Ocimum canum* Sims exhibiting terpineol-4 as the major compound. Because the terpineol-4 type in *Ocimum canum* species has not yet been reported to our knowledge, it prompted us to further investigate this apparently lesser known *canum* variety.

Our objective in the present work was to find whether the presence of terpineol-4 as the major compound in the volatile oil was just an occasional characteristic of the plant or a permanent one throughout the cropping season. For this purpose, the terpineol-4 rich variety of *Ocimum canum* was cultivated and at different development stages the oil in the herb was analyzed by GC and GC/MS.

EXPERIMENTAL

Plant material. Seeds of *Ocimum canum* Sims were collected in October 1995 in Lome suburbs (Togo) from a single plant. Voucher specimens are deposited in the herbarium of the Universite du Benin, Lome, Togo (Voucher No. 462 Brunel).

In 1996 (May, 2nd) at the beginning of the rainy season, the seeds were sowed in a nursery at the Ecole Superieure d'Agronomie, Universite du Benin, Lome. Three weeks after sowing, seedlings were transplanted (plant-to-plant spacing of 40 cm) and allowed to grow without fertilization or irrigation. But some weeding was necessary to keep the field clean.

In July, August and September, 3, 4, and 5 months after seeding, respectively, a representative sample of ten plants was harvested by cutting the stems at the soil level. After the stalks were discarded, the plant material (leaf and inflorescence) was allowed to dry for seven days in the laboratory at room temperature.

Volatile oil extraction. Essential oil was extracted from the dried plant material by steam distillation for 60 min according to the method previously described by Simard *et al.* [7].

Determination of the essential oil composition. GC analyses were performed on a 5890 A Hewlett Packard gas chromatograph equipped with a 50 m x 0.22 mm (film thickness: 0.25 μm) OV 101 nonpolar capillary column and a 50 m x 0.22 mm (film thickness: 0.22 μm) polar capillary column. The operating conditions were: injector and detector temperature: 200 °C and 220 °C, respectively, and held constant for 30 min. GC/MS analyses were carried out on a Hewlett Packard instrument (HP 5970 B GC/MSD system) equipped with a nonpolar OV 101 capillary column 25 m x 0.22 mm (film thickness: 0.25 μm). The operating conditions were: injector and detector temperature: 250 °C; oven temperature programming: 60 °C for min, then 5°C/min to 250 °C and held constant for 30 min. The constituents were identified by their retention indices and by GC/MS.

RESULTS AND DISCUSSION

The volatile oil in the herb (leaf and inflorescence) of the variety of *Ocimum canum* Sims investigated in this work exhibited oil yields of 1.5, 1.1, and 0.6 % at, respectively, 3, 4 and 5 months after seeding, with terpineol-4 (21-30 %) as the major component. The two other most important constituents were linalool (17-19 %) and γ-terpinene (7-11 %) (Table 1). According to literature reports [1-6], such a composition has not yet been found in the *Ocimum canum* Sims species.

The results of the present study support the idea that it would be quite possible to cultivate the *canum* variety investigated here in order to produce *canum* oil exhibiting terpineol-4 and linalool as the two major constituents. The percentage composition of *canum* oil as found here may denote the occurrence of *Ocimum canum* terpineol-4/linalool type. Further investigation would probably help to ascertain this.

Because linalool and terpineol-4 are naturally occurring substances reported to be endowed with pesticide properties [8] the *canum* variety studied here may advantageously serve as a valuable source of pesticide of natural origin which are potential alternatives to the chemical pesticide identified as persistent organic pollutants [8].

Table 1. Chemical composition (%) of the essential oil of *Ocimum canum* Sims grown in Togo.

Constituents identified on DB-5 column	Harvest period (months after seeding)		
	3	4	5
α-thujene	4.5	4.0	4.0
myrcene	3.5	3.9	2.4
α-pinene	-	0.7	-
sabinene	0.3	0.2	0.2
α-phellandrene	0.5	0.7	0.4
α-terpinene	2.0	2.6	1.4
limonene	4.1	4.7	4.1
γ-terpinene	10.2	11.3	7.2
terpinolene	1.7	1.9	-
β-caryophyllene	3.9	3.1	7.2
trans-α-bergamotene	4.3	4.4	8.5
α-caryophyllene	0.3	0.1	0.4
germacrene D	0.4	0.1	0.4
β-selinene	0.4	0.2	0.8
bicyclogermacrene	1.9	2.9	7.1
δ-cadinene	0.5	0.2	0.4
p-cymene	0.3	0.7	2.2
estragole	-	0.9	0.4
thymol	0.1	0.3	0.9
carvacrol	-	-	0.2
cis-sabinene hydrate	6.2	7.8	4.4
trans-sabinene hydrate	2.2	1.0	1.0
linalool	17.1	18.6	19.1
trans-pinan-2-ol	0.4	0.1	-
cis-p-menth-2-en-1-ol	-	0.1	-
camphor	0.6	0.5	0.5
terpineol-4	30.8	27.5	21.1
α-terpineol	0.3	0.2	-
sabinene hydrate acetate	-	-	0.2
bornyl acetate	-	0.2	0.5
geranate methyl	0.5	0.5	1.2
Total	97.0	99.4	96.2

Canum cultivation and breeding would very probably help to increase the concentration of terpineol-4 and/or linalool for increased bioactivity of the essential oil.

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