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Essential Oil of *Piper xylosteoides* (Kunth) Steud. from Federal District, Brazil

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Abstract

The essential oil from *Piper xylosteoides* leaves from Federal District was isolated by hydrodistillation and analyzed by a combination of gas chromatography and gas chromatography/mass spectrometry. *Piper xylosteoides* oil was found to contain a high oil yield (1.8% on dry weight basis). The oil obtained was characterized by being rich in myrcene (31%) and γ-terpinene (26%).

Key Word Index

Piper xylosteoides, Piperaceae, essential oil composition, myrcene, γ-terpinene.

Introduction

The Brazilian Cerrado contains a rich flora for medicinal use. Piperaceae is well established in tropical areas and contains several aromatic species used in Brazilian traditional medicine (1,2). *Piper* L. is the most representative genus in this family. In the Federal District area, 16 *Piper* species have been described (3), some containing essential oils.

Piper xylosteoides is a shrub frequent in gallery forests of the Cerrado in central Brazil. It flowers from May to December and produces fruits from February to April and also in September. The flowers have a weak odor and are visited by insects like Hymenoptera and Diptera (4). *Piper xylosteoides* was described as having the highest essential oil yield among the eight *Piper* species, rich in myrcene (31%) and γ-terpinene (26.1%) (5). This paper presents the complete essential oil composition reported for *P. xylosteoides*.

Experimental

Plant material: Leaves were collected in December 2003 at Fazenda Sucupira (Embrapa) in Brazil. Voucher specimens were identified and stored at Embrapa Genetic Resources and Biotechnology Herbarium (CEN).

Oil isolation: Leaves were harvested, weighted, placed in a paper bag and dried in a forced-air drier at 38ºC for three days for oil analysis. The oil was isolated by hydrodistillation in a modified Clevenger-type apparatus, in a 2 L flask for 1.5 h.

GC analysis: The oil composition was analyzed in an Agilent 6890N gas chromatograph fitted with a HP-5 (25 m x 0.32 mm x 0.25 μm) capillary column. The oven temperature was programmed from 60º-240ºC at 3ºC/min, and hydrogen was used as carrier gas (1.4 mL/min). Pure oil (0.05 μL) was injected in split mode (1:100; injector at 250ºC).

GC/MS analysis: Mass spectra were obtained in an Agilent 5973N system operating in electron impact mode (EIMS) at 70 eV, coupled to an Agilent 6890 gas chromatograph fitted with a HP-5 MS column (30 m x 0.25 mm x 0.25 μm), using the same injection procedure and oven temperature program as above. Helium was the carrier gas, at 1.0 mL/min. The identification was based on the mass spectra of the compounds compared with the data in Wiley 6th ed. library and by their calculated retentions indices (RI) compared with literature data.

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Table I. Chemical composition (%) of *Piper xylosteoides* leaf oil in Federal District, Brazil

RI[1]	Constituents	%
931	α-thujene	0.9
938	α-pinene	2.4
954	camphene	2.6
977	sabinene	1.7
981	β-pinene	0.4
993	myrcene	31.0
1008	α-phellandrene	0.5
1021	α-terpinene	11.3
1029	p-cymene	12.4
1033	β-phellandrene	2.1
1064	γ-terpinene	26.1
1091	terpinolene	1.4
1187	p-cymen-8-ol	0.4
1289	bornyl acetate	2.3
1423	β-caryophyllene	0.5
1485	germacrene D	2.8
1499	bicyclogermacrene	0.6
1581	spathulenol	0.6

[1]RI = Retention Indices

Results and Discussion

Piper xylosteoides showed a high oil yield (1.8%). Eighteen constituents were identified (Table I). Oil yield is variable in *Piper* species. The oil from leaves of *Piper nigrum* from commercial plantation produced 2.3-4.2% (6), while leaves of wild species, such as *P. capense, P. guineense* and *P. umbellatum*, showed a very low content of volatile oil, between 0.10-0.15% (7). *Piper aduncum* leaf oil from the Amazon region have yielded 1.43% (8) and from Cuba, 0.9% (9).

Among *P. xylosteoides* total oil content, 66.7% were monoterpenes, 11% were oxygenated monoterpenes, 16.7% were sequiterpenes and 5.6% were oxygenated sequiterpenes. The major constituent in *P. xylosteoides* oil was myrcene (31%), followed by γ-terpinene (26.1%), p-cymene (12.4%) and α-terpinene (11.2%).

Piper xylosteoides showed a higher oil yield and myrcene content (31%) when compared to other wild *Piper* species. The major constituent (myrcene) is used in food and cosmetic industries and is also known as analgesic and for antimicrobial properties (10). This species has potential for breeding to oil production with high myrcene content.

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