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Chemical composition of essential oil of *Machilus Japonica* Siebold & Zucc. (Lauraceae) from Vietnam

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Abstract. Chemical composition of essential oil of *Machilus Japonica* Siebold & Zucc. (Lauraceae) from Vietnam were studied. The essential oil were obtained from the leaves of young plants (3-4 years) by hydrodistillation. The identification of the components was performed using GC, GC/MS. The main components in this species identified were α-phellandrene (60.2%), β-phellandrene (10.5%), p-cymene (20.3%), β-myrcene (3.7%), terpineole (0.9%), trans-β-ocimene (0.7%), 11-dodecenol (0.3), β-Caryophyllene (0,5%). This result were not reported in any of previously investigated species of Lauraceae family in Vietnam. This was a new species of Lauraceae family in Vietnam. The name of this species was *Machilus japonica* Siebold & Zucc.

Keywords: Lauraceae; *Machilus japonica;* leaves; essential oil; phellandrene; p-cymene.

Introduction

Lauraceae is lager family that includes 32 genera and more than 2500 species. it is known about 256 species (21 genera) in Vietnam has been described. In this paper, the chemical composition of essential oil of *Machilus Japonica* Siebold & Zucc. (Lauraceae) from Vietnam will be discussed. The essential oil composition of the different species of Lauraceae family in Vietnam have been reported by many authors [1-8]. These varieties are morphologically similar, but they show different chemical compositions of essential oil. Therefore, the chemical composition of essential oil can be use to identify the species of Lauraceae family.

Materials and methods

Plant material. The leaves of young plants of Lauraceae family (3-4 years) were collected in October 1991 and 2007 at around Ba Vi mountain, in Northern Vietnam. The essential oils of leaves were obtained with a yield of 1.23% (w/w) by a 1 hour hydrodistillation in a Clevenger-type apparatus, and dried over anhydrous Na_2SO_4.

Analytical. GC analysis were performed on a Hewlett Packard 5890 Series equipped with a split/splitless injector; flame ionization detector (FID); capillary column HP-5 (30 m x 320 μm

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i.d., film thickness 0.25 μm); column temperature, 60°C for 3 min, 5°C/min to 230°C and kept at 230°C for 10 min; injector temperature 250°C; split ratio 1:40; detector temperature 260°C; carrier gas N2 0.9 ml/min; volume injected 1 μL. GC/MS analysis was performed on a Hewlett Packard 5890 Series equipped with HP5971A mass selective detector; capillary column HP-5MS (30 m x 250 μm i.d., film thickness 0.25 μm); column temperature, 60°C for 3 min, 5°C/min to 230°C and kept at 230°C for 10 min; injector temperature 250°C; split ratio 1:50; detector temperature 260°C; carrier gas He 0.9 ml/min; volume injected 1μL; interface temperature 280ºC; acquisition mass range 40-400. Identification of the constituents of essential oil was made by comparison of their mass spectra with nbs75l library spectra data. Relative percentage amounts were calculated from FID peak areas [9-12].

Results and discussion

The essential oil was light yellow and the total yield of 1.23%. The chemical composition of the leaf essential oils of investigated species collected in October 1991 and 2007 were not different and included 18 components (table 1). As it is shown in table 1, the leaf essential oil of investigated species from Vietnam was characterized by large amount of α- and β-phellandrene (70.7%) and the ratio of α-phellandrene and β-phellandrene was 5.73.

Table 1. The composition of leaf essential oil of *Machilus japonica* Siebold & Zucc. (Lauraceae) fromVietnam

Peak	Identification	KI	Percent
1	α-Thujene	931	trace
2	α-Pinene	939	0.2
3	Sabinene	976	trace
4	β-Pinene	980	trace
5	β-Myrcene	990	3.7
6	α-Phellandrene	1006	60.2
7	p-Cymene	1028	20.3
8	β-Phellandrene	1031	10.5
9	cis–β-Ocimene	1042	0.2
10	trans–β-Ocimene	1053	0.7
11	Linalool	1100	trace
12	Camphor	1145	trace
13	α-Terpineol	1189	0.9
14	α-Phellandrene ocide	1192	0.1
15	(Z)–β-Carvotancetol	1210	0.1
16	11-Dodecenol	1369	0.3
17	Carvarol	1371	0.2
18	β-Caryophyllene	1414	0.5
Total			97.8

The main components in the leaf essential oil were α-phellandrene (60.2%), β-phellandrene (10.5%), p-cymene (20.3%). Other notable constituents were β-myrcene (3.7%), α-terpineol (0.9%), trans-β-ocimen (0.7%), 11-Dodecenol (0.3), β-Caryophyllene (0,5%). The high content of α-phellandrene, β-phellandrene and p-cymene were detected in the leaf essential oil, which were not reported in any of previously investigated species of Lauraceae family in Vietnam. To the best of our knowledge, this was a new species of Lauraceae family in Vietnam. The name of this species was *Machilus japonica* Siebold & Zucc.

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Thành phần hóa học của tinh dầu cây *Machilus Japonica* Siebold & Zucc. (Lauraceae) ở Việt Nam

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Thành phần hóa học của cây *Machilus Japonica* Siebold & Zucc. (Lauraceae) ở Việt Nam đã được nghiên cứu. Tinh dầu thu được từ lá cây 3-4 năm tuổi bằng phương pháp cất lôi cuốn hơi nước. Thành phần hóa học của tinh dầu được xác định bằng phương pháp sắc ký khí và sắc ký khí khối phổ. Thành phần chất chính có mặt trong tinh dầu là α-phellandrene (60,2%), β-phellandrene (10,5%), p-cymene (20,3%), β-myrcene (3,7%), terpineole (0,9%), trans-β-ocimene (0,7%), 11-dodecenol (0,3), β-Caryophyllene (0,5%). Thành phần tinh dầu của loài cây lấy nghiên cứu chưa thấy có trong các công trình công bố trước đây ở Việt Nam. Kết quả nghiên cứu đã chỉ ra rằng đây là loài thuộc họ Lauraceae và có tên khoa học là *Machilus japonica* Siebold & Zucc.