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ORIGINAL RESEARCH

Study the effect of Plectranthii amboinicii's tea in treatment of acute bronchitis

Etudier l'effet du thé de Plectranthii amboinicii dans le traitement de la bronchite aiguë

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ABSTRACT

Plectranthii amboinicii (Lour.) Speng - Lamiaceae (Mexican mint) is a plant used by Vietnamese people for eating and treating some illnesses.

This study is designed to quantify the oil content extraction of Folium Plectranthii amboinicii in different regions and seasons in Southern Viet Nam and its antimicrobial and antioxidant properties. The extract of Plectranthii amboinicii leaves were quantified for the active compounds and analyzed for antibacterial, antifungal and antioxidant effects.

Results showed that the use of Plectranthii amboinicii's tea has a positive effect in the treatment of acute respiratory infections. Besides, Plectranthii amboinicii's tea is also considered easy to use even with children and safe for everyone to use it.

KEYWORDS: **Plectranthii amboinicii; Mexican mint; Tea; Acute bronchitis.**

RÉSUMÉ

Plectranthii amboinicii (Lour.) Speng - Lamiaceae (Menthe mexicaine) est une plante utilisée par les Vietnamiens pour manger et traiter certaines maladies.

Cette étude vise à quantifier l'extraction de la teneur en huile de Folium Plectranthii amboinicii dans différentes régions et saisons dans le sud du Viet Nam, ainsi que ses propriétés antimicrobiennes et antioxydantes. Les extraits de feuilles de Plectranthii amboinicii ont été quantifiés pour les composés actifs et analysés pour déterminer leurs effets antibactériens, antifongiques et antioxydants.

Les résultats de cette étude montrent que l'utilisation du thé de Plectranthii amboinicii a un effet positif dans le traitement de bronchite non infectieuse aiguë. Par ailleurs, le thé de Plectranthii amboinicii est également considéré comme facile à utiliser même chez les enfants et sûr pour tout le monde.

MOTS CLÉS: **Plectranthii amboinicii; Menthe mexicain; Thé; Bronchite aigue.**

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INTRODUCTION

Plectranthii amboinicii (Lour.) Speng - Lamiaceae (Mexican mint) is another name *Coleus amboinicus*. it is a grass, tall about 30-50cm. The body of the tree grows close to the soil and is differentiated into wood. The leaves are opposite and succulent; leaf edges have teeth; the upper surface of the leaves has a single feather; the underside of leaves has more exudative hairs. It is a popular spice vegetable used by people. Plectranthii amboinicii leaf have essential oils, it has very pleasant fragrance [1]. According to traditional medicine, Plectranthii amboinicii have spicy, warm and fragrant having the effect in prevention of cold, reduce of sputum, and bacticide. It is usualy used to cure sore throats or treatment of flu [2-6]. The purpose of this work is to study the effect of Plectranthii amboinicii tea collected in Lam Dong in treating acute bronchitis.

METHODS

Materials

Plectranthii amboinicii leaves were collected in Da Lat to investigate the oil content to make tea filter bags. Sample preparation: Samples of Plectranthii amboinicii are collected in Lam Dong

Methods

Study of biological activity

The extracts of CPlectranthii amboinicii's leaves were tested for antibacterial and fungal resistance with *Baccillus subtilis* ATCC 6633, *Staphyllococcus aereus* ATCC 25923, *Escherichia coli* ATCC 6633, *Candida abicans* 25922 according to the method of Negi and colleagues [8].

Qualitative composition of compounds in Plectranthii amboinicii leaves

Qualitative of organic compounds in Lemon leaves with 2 methods:

- Chemical method with general reagents and thin layer chromatography. Process of analyzing plant chemical composition based on Ciuley process [6].
- Thin layer chromatography is carried out for the purpose of survey of solvent selection and ratio of solvent soluble essential oils.

Statistical analysis

Using statistical methods of ANOVA variance analysis, Statistical results are considered significant when p≤ 0,05 with confidence intervals ≥ 95%, The line is drawn by the regression equation with a value of ± SD, which is statistically significant.

RESULTS

Compare the amount of dry medicinal herbs obtained by natural and artificial drying methods with varying heat levels

A hypothesis set out when doing this research is based on supposing two drying methods: natural and artificial and used four levels of artificial drying. The volume of dried medicinal herbs is not much different; it means that the drying method does not affect the loss; the amount of dry medicinal materials obtained is not statistically significant.

With the volume of fresh medicinal materials, it is dried in two natural and man-made methods, and with different heat levels of artificial methods from 30^{0}C- 50^{0}C. The data of the experiment are shown in *Table 1.*

TABLE 1 The volume of dry medicinal herbs (in kg) is obtained through drying conditions

Days	Fresh volume (kg)	Volume of dry medicinal materials obtained at drying conditions (kg)									
		Quantify essential oils	Cold drying		35 ^{o}C		40 ^{o}C		45 ^{o}C		50 ^{o}C	
			Fresh	Dry	Fresh	Dry	Fresh	Dry	Fresh	Dry	Fresh	Dry
26/11/2018	38.00	3.00	7.00	0.325	7.00	0.325	7.00	0.330	7.00	0.330	7.00	0.325
29/11/2018	38.00	3.00	7.00	0.325	7.00	0.330	7.00	0.325	7.00	0.325	7.00	0.330
03/12/2018	38.00	3.00	7.00	0.330	7.00	0.325	7.00	0.320	7.00	0.330	7.00	0.330
10/12/2018	38.00	3.00	7.00	0.335	7.00	0.330	7.00	0.335	7.00	0.330	7.00	0.335
17/12/2018	38.00	3.00	7.00	0.320	7.00	0.335	7.00	0.325	7.00	0.325	7.00	0.320
04/01/2019	38.00	3.00	7.00	0.325	7.00	0.325	7.00	0.325	7.00	0.320	7.00	0.320
07/01/2019	38.00	3.00	7.00	0.330	7.00	0.325	7.00	0.330	7.00	0.325	7.00	0.325
14/01/2019	38.00	3.00	7.00	0.330	7.00	0.320	7.00	0.325	7.00	0.325	7.00	0.325
21/01/2019	38.00	3.00	7.00	0.330	7.00	0.335	7.00	0.335	7.00	0.330	7.00	0.335
	Average			0.327778		0.327778		0.327778		0.326667		0.327222
	P			0.00001		0.00001		0.00001		0.00001		0.00001

Concentration of essential oils

From the results in *Table 1*, we can see corresponding to 1 kg of fresh medicinal herbs we obtain 4.68±0.15 grams of dried medicinal herbs. Assuming that this study is done, the volatile content of volatile substances in pharmaceutical leaves is not significantly changed by two drying methods: natural and artificial with four levels of artificial drying; it does not affect the concentration of volatile substances in leaves after drying to stable hydrolysis. The results obtained are not significantly different.

With the volume of essential oil obtained by quantitative method according to the regulation of Pharmacopoeia' Vietnam in appendix number 274.

Through the data collected and after processing showed:

There is a difference in oil content obtained by methods and temperature of drying medicinal herbs. The concentration of essential oils lost significantly. In other words, drying conditions greatly affect the content of essential oils in medicinal materials through the drying process.

TABLE 2 The content of essential oils is obtained from dry medicinal herbs corresponding to the conditions

Volume of medicinal herbs (g)	The volume of essential oils obtained from medicinal materials after drying in the survey conditions														
	Cold drying			35 oC			40 oC			45 oC			50 oC		
	V1	V2	V3	V1	V2	V3	V1	V2	V3	V1	V2	V3	V1	V2	V3
140.14	0.16	0.17	0.17	0.12	0.10	0.11	0.18	0.20	0.21	0.34	0.33	0.33	0.18	0.17	0.17
140.14	0.14	0.15	0.14	0.10	0.10	0.11	0.17	0.18	0.17	0.30	0.31	0.30	0.14	0.15	0.14
140.14	0.17	0.16	0.15	0.12	0.13	0.13	0.22	0.21	0.21	0.35	0.35	0.36	0.19	0.18	0.20
142.71	0.16	0.17	0.17	0.12	0.10	0.11	0.18	0.20	0.21	0.34	0.33	0.33	0.18	0.17	0.17
139.29	0.14	0.15	0.14	0.10	0.10	0.11	0.17	0.18	0.17	0.30	0.31	0.30	0.14	0.15	0.14
138.43	0.17	0.16	0.15	0.12	0.13	0.13	0.22	0.21	0.21	0.35	0.35	0.36	0.19	0.18	0.20
140.14	0.15	0.17	0.17	0.12	0.10	0.11	0.18	0.20	0.21	0.34	0.33	0.33	0.18	0.17	0.17
139.29	0.14	0.15	0.14	0.10	0.10	0.11	0.17	0.18	0.17	0.30	0.31	0.30	0.14	0.15	0.14
142.71	0.17	0.16	0.15	0.12	0.13	0.13	0.22	0.21	0.21	0.35	0.35	0.36	0.19	0.18	0.20
Total	4.2200			3.0600			5.2500			8.9100			4.5600		

P<0.00001.

TABLE 3 Quantitative content of essential oils in fresh medicinal herbs

Volume of medicinal herbs (g)	The volume of essential oil obtained (mL)		
	V1	V2	V3
3.000	0.45	0.43	0.44
3.000	0.42	0.42	0.43
3.000	0.46	0.45	0.46
3.000	0.45	0.43	0.44
3.000	0.42	0.42	0.43
3.000	0.46	0.45	0.46
3.000	0.45	0.43	0.44
3.000	0.42	0.42	0.43
3.000	0.46	0.45	0.46
Total	11.88		

P<0.00001.

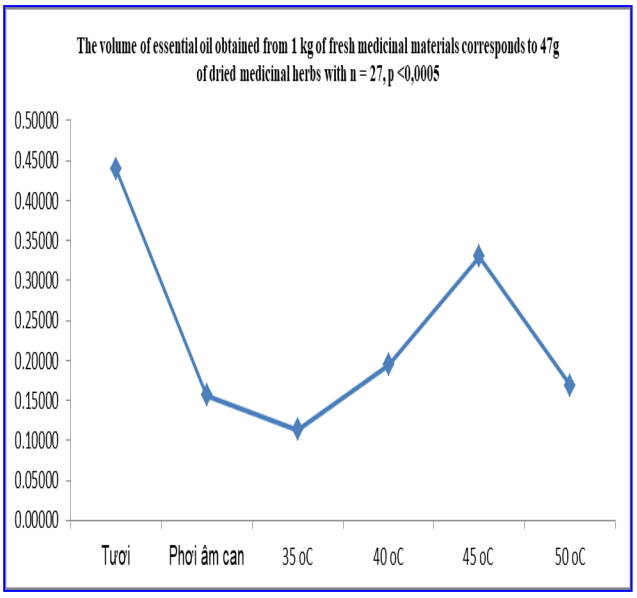

FIGURE 1. *Compare the variation of essential oil content in leaves to fresh and dry conditions.*

Through the results shown in *Tables 1 – 3* and *Figure 1*, it is easy to see that when drying with thermal program 45 oC, medicinal materials are quickly dried and the amount of essential oil lost with the evaporation of water in medicinal herbs is the least.

As we know in previous research results, essential oils in Plectranthii amboinicii's leaves are the most notable pharmacological ingredient. In other words, when drying Plectranthii amboinicii leaves at a temperature of 45 oC, the maximum amount of essential oil in medicinal herbs can be preserved, which means ensuring the ingredients with the necessary pharmacological effects of medicinal materials, including volatile compounds and water-soluble compounds. Therefore, the next step of the study must qualitatively identify compounds with pharmacological effects in Plectranthii amboinicii according to Vietnam Pharmacological Standards.

Qualification of Plectranthii amboinicii's oil obtained from medicinal herbs after drying according to the regulation of Vietnam Pharmacological Standards. Detecting the basic ingredients in essential oils of Plectranthii amboinicii by thin layer chromatography method; the results show that essential oils obtained from cold drying (II) has a dark color, many clearly separated and this shows that the drying process has many new substances being produced. Based on the properties of the essential oils, these new substances are probably made up of oxidation. Other, it is also possible that the slow drying process is a condition for active enzymes to change the active ingredient in essential oils. The marker VII showed the essential oil of medicinal herbs dried at 50 oC is lighter in color and smaller than the other spots. According to previous research and the properties of essential oils, when drying at high temperature in addition to reduced oil content, the main ingredient in essential oil also has a big change in the downward trend *(Figure 2)*.

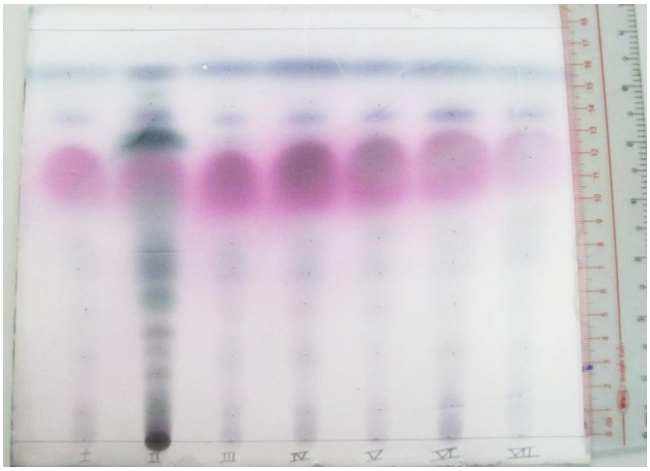

FIGURE 2. *Qualitative results of Plectranthii amboinicii's oil.*

I. Essential oil from fresh leaves;
II. Essential oil from dried leaves with cold drying;
III. Essential oil from dried leaves dried at 30 oC;
IV. Essential oil from dried leaves dried at 35 °C;
V. Essential oil from dried leaves dried at 40 °C;
VI. Essential oil from dried leaves dried at 45 °C;
VII. Essential oil from dried leaves dried at 50 °C.

Study results on acute bronchitis patients

Symptoms

There were 100 patients with acute bronchitis, of which 52% had symptoms of dry cough; 48% of patients have cough symptoms with mucus. About the sound of coughing; 17% of patients have a light cough sound; 61% of patients have an medium cough sound and 22% of patients have a loud cough sound *(Table 4)*.

TABLE 4 Symptoms

N	Symptoms of cough		The sound of coughing		
100	Dry cough	Pro-ductive cough	Small	Medi-um	Large
	52	48	17	61	22

Dosage and timing of tea use

In terms of dosage, the total number of tea days is 4.66 days; the average number of tea bags used is 2.79 packs per day; 1.16 bags of tea per use. There were 32 people taking tea before meals, 6 using tea with meals, 42 using after meals and 20 using them away from meals *(Tables 4-5)*.

TABLE 5 Dosage of tea use

Dosage used (N=100)		
Total tea days	Total tea bags used/day	Number of tea bags used/Time
4.66	2.79	1.16

TABLE 6 Timing of tea use

Time to use (n=100)			
Before meals	With meals	After meals	Far from meals
32	6	42	20

Effective after taking tea

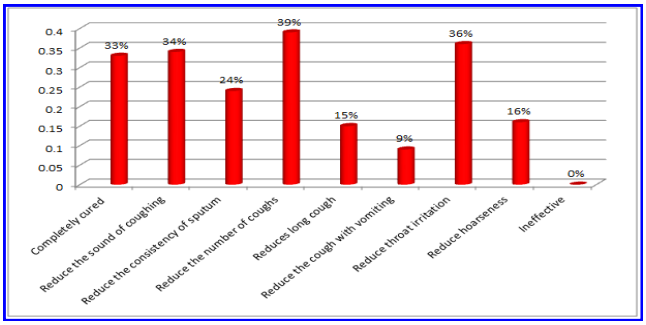

FIGURE 3. *Effective surveys after drinking tea.*

After using tea, the survey results showed that 33% of patients completely cured, 34% reduced cough sounds, 39% reduced the number of coughs, 39% reduced burning, 24% reduced the consistency of sputum and 0% not effective.

Side effects when using tea

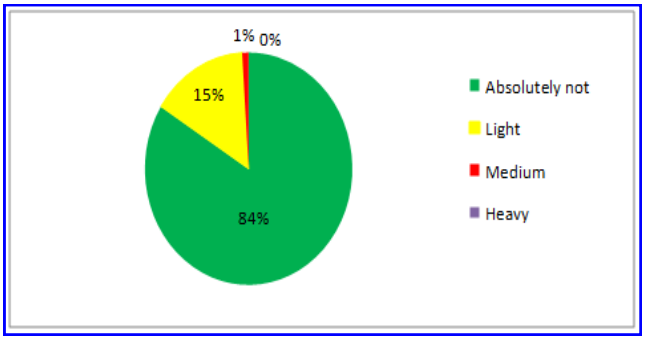

FIGURE 4. *Studied results of tea side effects.*

Results showed that up to 84% had absolutely no side effects after using tea, 15% had mild, 1% average, no serious side effects.

CONFLIT OF INTEREST

No potential conflicts of interest to disclose.

DISCUSSION

From the above study results showed that Plectranthii amboinicii's leaves are dried at a temperature of 45^{0}C, the oil content obtained is the highest *(Table 1)*, which means ensuring the ingredients with the necessary pharmacological effects of medicinal herbs, including both volatile compounds and water-soluble compounds. After being dried at 45^{o}C, Plectranthii amboinicii are tested for safety and packed into tea bags. For tea bag testing of 100 patients with acute bronchitis, up to 33% completely eliminated the initial symptoms, 39% reduced the number of coughs during the day, 36% recover with no disease. The results showed that only 2.79 tea packages used in a day and within 4.66 days, the symptoms of acute bronchitis decreased markedly. Besides, Plectranthii amboinicii's tea bag also shows that is safe for the users because the results also showed that up to 84% had no side effects when using tea, 15% had mild side effects and any subject with severe side effects of tea. This result supports the treatment effect of acute bronchitis of Plectranthii amboinicii's tea and suggesting its effect in reducing the initial symptoms of non infected cold flu with acute bronchitis.

CONCLUSION

The use of lemon basil tea to support the treatment of acute bronchitis despite the positive effect, however, to be widely applied, requires more research and more groups, to be able to once again confirming the effect that lemon basil tea provides support for treatment not only for acute bronchitis in particular and for respiratory diseases in general.

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