Satisfaction of Thai Traditional Medicine Students toward Eucalyptus Balm

Kraisri Srithupthai, Venika Thavichaigarn
and Parinya Thavichaigarn
Kraisri03@gmail.com

[1]Instructor, Department of Thai Traditional Medicine,
Rajamangala University of Technology Isan

Abstract

This study was conducted with objectives to assess satisfaction of Thai Traditional Medicine students toward the developed eucalyptus balm and to investigate the efficiency of using the balm for reducing muscular pain. The sample consisted of 71 third-year students of Thai Traditional Medicine Major, Rajamangala University of Technology Isan. This study was an extension of the previously developed eucalyptus extract by making eucalyptus balm from it. The balm was tested with the sample by letting them apply it to painful areas or any required places on their body. The assessment on their satisfaction toward the balm was made by using the paired t-test as the statistical analysis procedure. The results can be concluded that, among the sample of 71 students, most of them were female (87.3%), 21 years of age (84.5%), and all of them were undergraduate students (100.0%). The mean satisfaction scores of the students toward smell, color, and viscosity of the balm were 3.56, 3.46, and 3.39 points, respectively. Most of them felt relaxed after inhaling the balm (64.8%), followed by those who felt fresh (16.9%), those who felt dizzy (8.4%), and those who felt enchanted (7.0%). Most students perceived that the balm's color matched the smell (80.5%), its sticky level was at an appropriate level (84.5%), and the oily feeling on the skin was at a proper level (73.2%). None of the sampled students encountered any abnormalities on the skin from using the balm. Most students (63.3%) had intention to buy the eucalyptus balm when it is available on the market.

Keywords: satisfaction, eucalyptus, balm

บทคัดย่อ

การศึกษาครั้งนี้ มีวัตถุประสงค์เพื่อศึกษาผลความพึงพอใจประเมินคุณภาพของยาหม่องยูคาลิปตัสต่อนักศึกษาสาขาวิชาการแพทย์แผนไทยต่อยาหม่องยูคาลิปตัส และผลของยาหม่องในการลดความเจ็บปวดของกล้ามเนื้อ โดยมีกลุ่มตัวอย่างคือ นักศึกษาสาขาวิชาการแพทย์แผนไทย ชั้นปีที่ 3 มหาวิทยาลัยเทคโนโลยีราชมงคลอีสาน วิทยาเขตสกลนคร จำนวน 71 คนโดยนำน้ำมันหอมระเหยยูคาลิปตัสมาต่อยอดโดยการทำเป็นยาหม่องยูคาลิปตัส หลังจากนั้นให้กลุ่มตัวอย่างใช้ยาหม่องยูคาลิปตัสทาบริเวณที่มีอาการปวดหรือบริเวณที่ต้องการและทำการประเมินความพึงพอใจต่อการใช้ยาหม่องยูคาลิปตัสวิเคราะห์ข้อมูลโดยใช้สถิติ paired t-test สรุปผลได้ดังนี้จากการทายาหม่องยูคาลิปตัสในนักศึกษาสาขาวิชาการแพทย์แผนไทย ชั้นปีที่3 จำนวน 71 คน กลุ่มตัวอย่างส่วนใหญ่เป็นเพศหญิง คิดเป็นร้อยละ 87.3 อายุ 21 ปีเป็นส่วนใหญ่ คิดเป็นร้อยละ 84.5

กำลังศึกษาในระดับปริญญาตรี คิดเป็นร้อยละ 100.0 พบว่ากลุ่มตัวอย่างมีความพึงพอใจต่อกลิ่น สี ความข้นหนืด ค่าเฉลี่ยเท่ากับ 3.56, 3.46 และ 3.39 ตามลำดับและเมื่อกลุ่มตัวอย่างดมกลิ่นยาหม่องยูคาลิปตัสส่วนใหญ่รู้สึกผ่อนคลาย คิดเป็นร้อยละ 64.8 รองลงมากลุ่มตัวอย่างรู้สึกสดชื่น คิดเป็นร้อยละ 16.9 ถัดมากลุ่มตัวอย่างรู้สึกเคลิบเคลิ้ม คิดเป็นร้อยละ 7.0 และกลุ่มตัวอย่างเวียนศีรษะ คิดเป็นร้อยละ 8.4 สีมีความเหมาะสมกับกลิ่นคิดเป็นร้อยละ 80.5 รู้สึกว่ายาหม่องยูคาลิปตัสมีความเหนอะหนะในระดับพอดีคิดเป็นร้อยละ 84.5 รู้สึกว่าความมันบนผิวหนังมีความพอดีคิดเป็นร้อยละ 73.2 ความรู้สึกของกลุ่มตัวอย่างหลังการใช้ยาหม่องยูคาลิปตัสการใช้ยาหม่องยูคาลิปตัสไม่พบอาการผิดปกติที่ผิวหนังในกลุ่มตัวอย่างคนใดเลย กลุ่มตัวอย่างร้อยละ 63.3 มีความตั้งใจซื้อยาหม่องยูคาลิปตัสหากมีจำหน่ายในท้องตลาด

คำสำคัญ: ความพึงพอใจ, ยูคาลิปตัส, ยาหม่อง

Introduction

In the ancient time, Thailand received influences from India in terms of tradition, culture, lifestyle, religion, and medication. These influences arrived unnoticeably together with the propagation of Buddhism. As time goes by, Thai people started to mix the imported medical knowledge with their available resources to derive their own health wisdom and medical techniques called collectively as Thai traditional medicine (TTM). The abundant herbs grown around the country have been applied to cure diseases or relieve various symptoms of sickness. Moreover, the knowledge has been recorded and transferred over generations until the present. Each herb has its own benefits and properties, depending on the part, the method, and the form of utilization. When multiple herbs are used together, they become herbal medicine, which includes not only plants but also materials from animals and minerals. Herbal medicine can be made for both internal use and external use. Muscular pain exists in human beings since an ancient time. Thus herbal medicine has been developed continuously since a long time ago in order to relieve muscular pain, especially herbal medicine for external use such as balm, oil, gel, etc (Preeyanuch Daengdech, 2016).

Balm is considered as a common household drug, and has been used for a long time until it becomes a common personal drug. The use of balm may help people reduce reliance on oral drugs. There are many brands of balms in the market, and they are available in forms of wax and liquid. Ingredients and forms of each brand are different from others. However, most products contain volatile oil from herbs such as menthol, camphor, cinnamon, kitchen mint, etc. Some formulas of balm may contain methyl salicylate, which is a muscle relaxant, in order to relieve pain and fatigue (Kornchai Chantajiradham, 2009).

The formal scientific name of eucalyptus is *Eucalyptus globulus* Labill. It is in the Myrtaceae family. Its other names include Kot Chularot, Green oil, and Green fat (Mun Khiew). Regarding botanical characteristics, eucalyptus is a tall tree with height around 10 – 25 meters, dense and round canopy, straight and direct trunk, and smooth and shiny grayish to brownish bark. The outer bark usually turns into small sheets and breaks off the trunk,

and can be peeled off easily while being fresh. Eucalyptus has single alternate leaves with a spear shape measuring 3 – 12 inches in length and 0.5 – 0.8 inch in width. With a long leaf stalk, the leaf is pale green on both sides, points downward, and has clear veins. Eucalyptus' flower bouquets emerge along joints between a branch and a leaf. The flower stalk is tapering, and many sub stalks coexist. The fruit has a semi-sphere shape or a cup shape with hard outer skin. The green young fruit will turn brownish and has a split tip when getting old. The part used as medicine is fresh leaves, which can be extracted to derive the fragrant and spicy essential oil. The fresh leaves can also be crushed to produce fragrance that can cure a cold or a stuffed nose. Water from the boiled leaves can be drunk to nourish the body's elements, expel gas, discharge phlegm, and cure fever. Grinded leaves can be used for massaging to relieve pain, bruise, and swelling (Samunpridotcom, 2016).

Therefore, the researchers realize importance of developing herbal medicine in a form of balm from eucalyptus. The balm is expected to be efficient in relieving muscular pain and fatigue as an external-use drug. Findings from this research should be helpful for both the education on Thai traditional medicine and the value-added development of herbal products.

Research objectives

1. To produce and evaluate stability of the eucalyptus balm
2. To assess satisfaction of volunteers toward the eucalyptus balm
3. To investigate the result of using the balm for relieving muscular pain

Research scope

1. Set the production formula and test physical properties of the eucalyptus balm.
2. Examine satisfaction of users toward the eucalyptus balm.
3. Conduct the research during January – April 2018.

Research methodology

1. This study is a quasi-experimental research conducted with a one-group pretest post-test design. The sample was selected with a purposive sampling method. The sampled students used the eucalyptus balm for rubbing their skin. Their satisfaction toward the use of eucalyptus balm was then assessed.

2. The preparation and the quality assessment of the balm product

   2.1 Materials and equipment

      2.1.1 Eucalyptus oil

      2.1.2 Vaseline

      2.1.3 Paraffin

      2.1.4 Menthol

2.1.5 Camphor
2.1.6 Borneol
2.1.7 Stainless steel pot
2.1.8 Stirring stick
2.1.9 Hot plate
2.1.10 Chopping block
2.1.11 Knife
2.1.12 Weighing scale
2.1.13 Beaker
2.1.14 Bottle for storage

2.2 Balm preparation

The eucalyptus balm was obtained from eucalyptus oil with the formula of the Pharmacy Room, Rajamangala University of Technology Isan Sakonnakhon Campus. Ingredients in the formula were mixed as follows.

Table 1 Ingredients of the eucalyptus balm

No.	Ingredient	Quantity	Percentage
1.	Eucalyptus oil	100 ml	31.25%
2.	Vaseline	60 g	18.75%
3.	Paraffin	30 g	9.37%
4.	Menthol	50 g	15.62%
5.	Camphor	40 g	12.5%
6.	Borneol	40 g	12.5%
	Total		**100 %**

Remark This preparation can produce 30 pots of eucalyptus balm (10 grams in each pot).

Procedures of the eucalyptus balm production

2.2.1 Dissolve paraffin and Vaseline in the prepared stainless steel pot. Use a mild level of heat at about 50 degree Celsius until the two components have dissolved and mixed well. Reduce the heat down to 30 – 40 degree Celsius so that the paraffin and Vaseline do not accumulate and become solid.

2.2.2 Put menthol, camphor, borneol, and eucalyptus oil into another pot. Stir until these ingredients mix well together. Pour the solution into the pot of paraffin and Vaseline, which is still warm. Stir well until achieving a homogeneous texture of the ingredients. Pour the final solution (the balm) into the prepared bottles.

2.2.3 Wait for the balm to cool down. Close the lid and attach a label sticker.

2.3 Eucalyptus balm evaluation

2.3.1 Observe physical characteristics of the balm right after the production (color, odor, viscosity, stability, and other characteristics as observed with the naked eyes)

2.3.2 Evaluate results from the short-term stability test

Store some un-opened bottles of balm at temperature of 4 ± 2 degree Celsius for 24 hours. After that keep the sampled bottles at 30 ± 2 degree Celsius for 24 hours. Repeat this process for 3 rounds. Take the balm out of the bottles, and then check color, odor, viscosity, layer separation, and coherence of the balm.

2.3.3 Evaluate results from the real-condition test

Store some sampled eucalyptus balm at temperature of 30 ± 2 degree Celsius for 1 month. Then take the balm out of the bottles to assess its physical characteristics namely general characteristics, color and odor, utilization, and stability in terms of color, smell, viscosity, layer separation, and coherence, as compared to the initial condition. The assessment was based on the Community Product Standard No. 770/2015 (Table 2).

Table 2 The scale for evaluating quality of Thai wax based on the Community Product Standard No. 770/2015

Investigated characteristics	**Decision level**	**Explanation**
General characteristics	4	Must have a homogeneous texture; semi-hard; no separated layers or sediments
	3	Semi-hard; no layers; few sediments
	2	Semi-liquid; has separated layers; has some sediments
	1	Liquid; separated layers; lots of sediments
Color and smell	4	Must have natural color and nice smell of herbal wax
	3	Color and smell change slightly
	2	Color and smell change moderately
	1	Color and smell change greatly
Utilization	4	When applied on the skin, the wax must penetrate through the skin easily without stickiness, roughness, stain, or irritation on the skin. It is soft, smooth with skin, and easy to wipe off.
	3	It can penetrate through skin moderately with slight stickiness, roughness, stain, without irritation. It is smooth with skin and moderately easy to wipe off.
	2	It is difficult to penetrate through the skin with moderate stickiness, roughness, and stain, without

Investigated characteristics	Decision level	Explanation
		irritation; smooth with skin and difficult to wipe off.
	1	It is highly difficult to penetrate through skin. It causes stain or a sticky lump and irritation. It is not smooth with the skin and very difficult to wipe off.

Remark Stability, color, smell, viscosity, layer separation, and coherence must be at a good level without changes or degradation (Patcharee Sitthikityothin, 2008).

3. Data collection

Satisfaction assessment on the volunteers

The utilized tools

The consent form for voluntary participation with the project

The questionnaire was distributed by the researchers to the participants. Details in the questionnaire consist of:

- Personal data namely gender, age, education level, previous use of eucalyptus balm, and forms of the products used previously

- Levels of satisfaction toward the eucalyptus balm. This part of the questionnaire consists of questions asking about satisfaction toward various aspects of the balm including its physical characteristics, the feeling when inhaling it, satisfaction when using it, opinion after using it, and the overall satisfaction toward it. The satisfaction was assessed with 5 rating scales as follows (Boonchom Srisa-ard, 2002).

5 means the highest level of satisfaction.
4 means a high level of satisfaction.
3 means a moderate level of satisfaction.
2 means a low level of satisfaction.
1 means the lowest level of satisfaction.

The scores from the questionnaire were interpreted for the meaning by comparing with these following criteria.

4.51 – 5.00 is equal to the highest level of satisfaction.
3.51 – 4.50 is equal to a high level of satisfaction.
2.51 – 3.50 is equal to a moderate level of satisfaction.
1.51 – 2.50 is equal to a low level of satisfaction.
1.00 – 1.50 is equal to the lowest level of satisfaction.

4. The statistical data analysis was made by using SPSS version 14.0 application software with these following details.

The general data of the sample were analyzed to obtain frequency, percentage, mean, and standard deviation of each characteristic.

The hypothesis regarding satisfaction was tested and analyzed by using the paired sample t-test procedure.

Research results

Product quality evaluation

After completion of the production, the balm has turbid white color. The smell causes a fresh feeling. Regarding viscosity, it can penetrate through the skin easily without stickiness or irritation. In terms of stability, the balm's texture may change according to the room temperature.

Results from the short-term stability test

From the short-term stability test, it was found that, right after the production, the eucalyptus balm received the highest score in all aspects concerning general characteristics, color and smell, utilization, and stability in terms of color, odor, viscosity, layer separation and coherence. After 1 day of storage, it was found that the color and smell changed slightly. After 2 days of storage, the balm appeared to be semi-hard with no separated layer, but had a few sediments. The color and smell changed a little bit. The stability in terms of color also differed slightly from the original. After 3 days of storage, the balm was semi-hard, had no separated layer, and had a few sediments. Its color and smell changed slightly. The stability of its color was different from the original (Table 3).

Results from the real-condition stability test

The test on the balm's stability based on the real condition of usage revealed that, as compared between the just-finished balm and the 30-day-storage balm, the color and smell changed slightly. When being applied on the skin, the balm could penetrate through the skin moderately with a slight sticky feeling, some roughness, and some stain. It did not cause skin irritation. It was smooth with the skin and could be wiped off moderately. The stability in terms of color and odor did not differ (Table 4).

Table 3 Results of the short-term stability test

Physical characteristics	The rounds of stability test			
	Initial	Round 1	Round 2	Round 3
General characteristics	4	4	3	3
Color and smell	4	3	3	3
Utilization	4	4	4	4
Stability				
- Color	+	+	-	-
- Odor	+	+	+	+
- Viscosity	+	+	+	+
- Layer separation	+	+	+	+
- Coherence	+	+	+	+

***Remark** Stability (+ = same, - = different)

Table 4 Results of the real-condition stability test

Physical characteristics	Period of stability test (days)	
	0	30
General characteristics	4	4
Color and smell	4	2
Utilization	4	3
Stability		
- Color	+	-
- Viscosity	+	+
- Layer separation	+	+
- Coherence	+	+

***Remark** Stability (+ = same, - = different)

Satisfaction toward the eucalyptus balm

According to the analysis on personal data of the sample, namely gender, age, education level, previous eucalyptus balm use for muscular pain relief, and forms of eucalyptus balms used previously, it was found that most of the sampled students were female (87.3%), were 21 years of age (84.5%), and all of them studied at an undergraduate level (100.0%). Most of the sample (56.3%) had never used eucalyptus balm for relieving muscular pain. The forms of muscular pain relief products they had previously used were massage oil (59.2%), skin gel (11.3%), spray (16.9%), skin cream (5.6%), and pain relief pad (7.0%), as shown in Table 5.

Table 5 Personal data of the sample (n=71)

Characteristics	Frequency	Percentage
Gender		
Male	9	12.6
Female	62	87.3
Age		
19 years old	1	1.4
20 years old	6	8.5
21 years old	60	84.5
22 years old	3	4.2
23 years old	1	1.4
Third-year undergrad students	71	100.0
Previous use of muscular pain relief products		
Ever used	31	43.7
Never used	40	56.3
Forms of pain relief products used previously		
Massage oil	42	59.2
Skin gel	8	11.3
Spray	12	16.9
Skin cream	4	5.6
Pain relief pad	5	7.0

The analysis results regarding satisfaction toward physical characteristics of the balm

The sample had a high level and a moderate level of satisfaction toward smell and color of the eucalyptus balm, respectively (with the mean satisfaction percentages of 54.9% and 43.7%, respectively). In terms of viscosity, the balm received a moderate level of satisfaction (with the mean percentage of 42.3%), as shown in Table 6.

Table 6 Satisfaction of the sample toward physical characteristics of the eucalyptus balm (n=71)

Physical characteristics	Percentage of satisfaction					Mean ± SD*	Satisfaction level
	Highest	High	Moderate	Low	Lowest		
Smell of the balm	4.2	54.9	33.8	7.0	0	3.56±0.69	High
Color of the balm	7.0	43.7	38.0	11.3	0	3.46±0.78	Moderate
Viscosity of the balm	7.0	39.4	42.3	8.5	2.8	3.39±0.85	Moderate

The analysis results regarding feelings

Most of the sample felt relaxed, which accounted for 64.8% of the total. This is followed by those who felt fresh (16.9%), enchanted (7.0%), and dizzy (8.4%), as shown in Table 7.

Table 7 Feelings of the sample when inhaling the eucalyptus balm (n=71)

Feeling	Frequency	Percentage
Fresh	12	16.9
Relaxed	46	64.8
Vigorous	2	2.8
Enchanted	5	7.0
Dizzy	6	8.4

The analysis results regarding opinions

Most of the sampled students expressed opinions that the balm's color matched its smell (80.5%), the balm's stickiness was at an appropriate level (84.5%), and the oily feeling on the skin was at a proper level (73.2%). Regarding feelings of the sample after using the eucalyptus balm, most of them felt fresh and relaxed (47.9%), followed by those who felt vigorous (4.2%).

In addition, after using the eucalyptus balm, there was no abnormality found on the skin of any students at all. Most of the sample (63.3%) expressed their intention to buy eucalyptus balm when it is available on the market. See Table 8 for details.

Table 8 Opinions of the sample after using the eucalyptus balm (n=71)

Issues	Frequency	Percentage
Color of the balm matches its smell		
The color matches the smell	57	80.5
The color does not match the smell	14	19.7
Sticky feeling		
Highly sticky	9	12.7
Appropriately sticky	60	84.5
Little sticky	2	2.8
Oily feeling on the skin		
Highly oily	14	19.7
Properly oily	52	73.2
Little oily	5	7.0
Feeling after using the eucalyptus balm		
Fresh	34	47.9

Issues	Frequency	Percentage
Relaxed	34	47.9
Vigorous	3	4.2
Dizzy	0	0
Abnormalities on skin after using the balm		
No abnormalities	71	100.0
Some abnormalities	0	0
Intention to buy eucalyptus balm if it is available on the market		
Buy	47	66.2
Not buy	13	18.3
Uncertain	11	15.5.6

Discussion on the research results

The results from this study are in agreement with the research of Patcharee Sitthikityothin, 2008 on quality assessment of Thai wax supplemented with Thai herbs, namely Phlai (Cassumunar ginger), Phaya Yor (Clinacanthus nutans), and Turmeric mixed with Phlai. The assessment on quality of the Thai wax was made in terms of general characteristics, color, odor, viscosity, layer separation, coherence, degradation, and metamorphism. The results revealed that all the three formulas did not have different scores of their quality in terms of general characteristics, color, odor, viscosity, layer separation, coherence, degradation, and metamorphism ($p > 0.05$). In addition, the research also studied satisfaction of users in using eucalyptus balm for relieving muscular pain and for relaxation. It was found that eucalyptus balm could reduce pain and promote relaxation and freshness. Thus it is considered as an alternative for muscular pain relief. The findings are also in accord with the research of Maitree Kunlabut (2015) who studied the results and the satisfaction toward the use of a mixed volatile oil formula for relieving muscular pain. The 35 sampled individuals were assessed on their pain levels before and after applying the product on their skin where the pain occurred. The pain levels were assessed with a pain assessment scale that measures the pain into numeric values (0-10). The users' satisfaction toward the product was also assessed with a questionnaire asking about various aspects. The study found that the sample's muscular pain reduced statistically significantly ($p < 0.001$) after using the product. In this current research, although the developed eucalyptus balm had some changes in its color and smell, the changes are still at an acceptable level.

Therefore, it can be seen that the use of eucalyptus balm can be another option of using topical products for relaxation. The smell of eucalyptus balm can promote freshness and relaxation against fatigue from work. It can be inhaled when getting dizzy or rubbed on the nose when having a cold to facilitate breathing. However, the product's viscosity may

need improvement due to excessive stickiness. More hot-taste herbs may be added for additional efficiency in muscular pain relief.

Recommendations

1. Products should be further studied and developed to create a product that is more different from those in the market.

2. Further research is needed to raise the quality level and add more value to Thai herbs onwards.

References

Kornchai Chantajiradham (2009). Balsum. Retrieved on 21 March 2018 from http://www.pharmacy.com

Boonchom Srisa-ard (2002). Criteria for satisfaction assessment. Retrieved on 29 March 2018 from http://www.med.cmu.ac.th

Preeyanuch Daengdech (2016). Factors affecting the decision to buy herbal pain relief products of consumers in Bangkok (Thesis). Bangkok: Bangkok University

Patcharee Sitthikityothin (2008). Quality assessment of Thai wax supplemented with herbs. Academic journal. University of the Thai Chamber of Commerce. 28(3), 115-126.

Maitree Kunlabut (2015). Results and satisfaction toward the use of a mixed volatile oil formula for relieving muscular pain. Journal of Srinakharinwirot University (Science and Technology), 7(13), 50-64.

Samunpridotcom. (2016). Eucalyptus. Retrieved on 21 March 2018 from http://www.samunpri.com