

Manuskrip yang dilampirkan sebagai berikut:

## Ethnomedicine On The Use Of Aromatic Plants In Batimung Tradition In North Banjarmasin Sub-District Banjarmasin City Indonesia

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## Abstract

Ethnomedicine studies scientifically proven local ethnic group knowledge in maintaining health, such as the Banjar's *Batimung* tradition of using aromatic plants steam bath mixed by therapists. Therefore, this study aimed to identify the plants and the aromatic parts used for the treatment. The data was collected through observations with purposive and quota sampling techniques from 5 therapists and 98 patients. The results showed that although 26 plant species were used, 24 contained terpenoids. The used parts included leaves, flowers, barks, rhizomes, roots, fruits, stems, and cobs. Furthermore, *Batimung* was utilized for body treatment and curing diseases using boiled plant stems. The dosage included 1 to 2 handfuls, 1 to 10 fruits, 5 to 17 pieces, ¼ to 1 stem, and 1 tablespoon. Therefore, the most used aromatic plant was *Citrus hystrix* DC, specifically the leaves and flowers.

**Keywords:** Ethnomedicine, *Batimung*, Therapists, Banjarmasin, Aromatic plants, Sauna

## Introduction

Indonesia is one of the megabio-diversity countries with more than 25,000-30,000 plant species (1), though 160-200 produce essential oils (2). According to Central Statistics Agency, Indonesia had 1,300 ethnic groups, including Banjar, with diverse cultures such as *Batimung* that fulfill all aspects of people's lives in 2010. *Batimung* tradition originated from South Kalimantan and was performed by a Banjar descendant before marriage to eliminate body odor and excessive sweating. Additionally, it is used for the wisa disease treatment (3). The Banjar community believes that wisa is caused by supernatural beings that make the patient's body color turn yellow (4). *Batimung* is traditionally performed by mixing plants with a distinctive aroma. Ideham *et al* (3) explained that this tradition has been passed down from generation to generation.

The study showed minimal previous exploration and information of the used aromatic plant species diversity in *Batimung* tradition (5), and therefore aimed to document and gather more information. Generally, ethnomedicine is a field of ethnobotanical studies that explains a scientifically proven local's knowledge in maintaining their health or medical systems (1). The aromatic plants used contain essential oils mostly with terpenoids compounds that should be identified (6).

This study was conducted in Banjarmasin city the origin of the ethnic Banjar (7). Furthermore, the selection of North Banjarmasin was influenced by the Central Statistics Agency (2010) (8), population census data, which recorded most of Banjar ethnic. Moreover, the study aimed to identify aromatic plants and the percentage of parts used.

## Materials and Methods

### Study Time and Place

This study was conducted from February–March 2019 in North Banjarmasin Sub-district, Banjarmasin City.

### **Tools and Materials**

Data was collected using informed consent sheets, respondent demographics, a list of questions, and questionnaires, while the plants terpenoid test used mortar, stemper, beaker glass, test tube, tube rack, and drop pipette. In addition, the test used methanol, chloroform, and Lieberman Buchard reagent (acetic anhydrous acid and sulfuric acid).

### **Field Data Collection Method**

The therapist's data was collected through semi-structural interviews following questions from the list and improvised questions according to their needs, whereas the plant samples were taken, captured, and collected. The plants taken were identified species and terpenoid compounds tested using plant methanol extract with Lieberman Burchard reagent (9,10). In general, user data was collected by distributing study instruments.

### **Population**

The population in this study were people in North Banjarmasin Sub-district who practiced *Batimung* tradition.

### **Sample**

The sample was divided into 2, such as therapists and patients in North Banjarmasin Sub-district who fulfilled the following criteria:

1. Inclusion criteria for the therapists were from Banjar ethnicity, were accustomed to the plants used, procedure knowledge (using traditional equipment), introducing *Batimung* practice to the public, and willingness to respond.
2. The inclusion criteria for the patients was have performed *Batimung* tradition in February 2019 in the North Banjarmasin sub-district and willingness to respond.
3. Unfilled questionnaire and therapists using modern equipment was excluded from the study.

## Sampling method

The purposive and quota sampling methods were used in this study (11,12).

## Number of samples

The samples included 5 therapists recommended by liaisons (community leaders, hamlet heads, village heads, and other trusted sources) and matched the inclusion criteria (13,14). Furthermore, 96 users were sampled using Snedecor and Cochran calculations.

## Data analysis

The data were analyzed by descriptive analysis.

## Results

### Demographics of Respondents in North Banjarmasin Sub-district

The results showed that female patients were dominant (Table 1) because they value beauty and body treatment more than male (5). The patients were dominated by housewives at 47.96%. Furthermore, most patients were aged between 26-35 at 48.98% and included senior high school students who are more aware of the benefits for beauty and body treatment not only as a cultural practice (5). Additionally, the users included housewives, private employees, traders, student entrepreneurs, students, and others.

Table 1. Characteristics of Batimung Users

Characteristics	Total	Percentage (%)
Gender		
Man	14	14,29
Woman	84	85,71
Age		
15-25	22	22,45
26-35	48	48,98
36-45	17	17,35
46-55	7	7,14
>55	4	4,08
Education		
Not completed in primary school	1	1,02
SD	5	5,10
Middle School/Equivalent	19	19,39
High School/Equivalent	58	59,18
Academy/College	15	15,31
Work		
Not working/IRT	47	47,96
Private employees	27	27,55
Student/Student	8	8,16
civil servant	1	1,02

Entrepreneur/Trader	14	14,29
Etc	1	1,02
<b>Total</b>	<b>98</b>	<b>100</b>

Table 2. Characteristics of the Therapist Respondents in Batimung

No	Gender	Age	Education	Ethnicity	The Origin of Knowledge in Batimung
1	Woman	64	Junior High School	Banjar	Hereditary
2	Woman	55	Elementary School	Banjar	Training
3	Woman	55	Junior High School	Mix of Banjar and Dayak	Hereditary
4	Woman	55	Senior High School	Banjar	Hereditary
5	Woman	53	Elementary School	Banjar	Hereditary

The results in Table 2 show that all therapists are female because of the high number of female patients. It also showed that most of the therapists are old which threatens *Batimung* sustainability. Therefore, young people should be trained to preserve and share this tradition for future practice (5,15). The educational level of therapists varied from Elementary, Junior, and Senior High Schools.

## Ethnomedicine of Aromatic Plants in *Batimung*

### *Batimung* plant species

The study showed 26 species from 15 families (Table 3). The most used plants are kaffir lime (12.29%) and pandanus (8.78%), while Zingiberaceae is the largest plant family (19.30%).

Table 3. Types of Batimung Plants

No	Plant Name	Latin name	Family	Local Name	Total	Percentage (%)
1	Orange	<i>Citrus hystrix</i> DC.	Rutaceae	Limau purut	7	12,29
2	Pandan	<i>Pandanus amaryllifolius</i> Roxb.	Pandanaceae	Pudak	5	8,78
3	Pulosari	<i>Alyxia reinwardtii</i> Bl.	Apocynaceae	Pulosantan	4	7,03
4	Curcuma	<i>Curcuma xanthorrhiza</i> Roxb.	Zingiberaceae	Temulawak	4	7,03
5	Rose	<i>Rosa</i> sp.	Rosaceae	Mawar	4	7,03
6	Ylang Flower	<i>Cananga odorata</i> .	Annonaceae	Kenanga	4	7,03
7	Jasmine	<i>Jasminum sambac</i> .	Oleaceae	Melati	3	5,26
8	Temugiring	<i>Curcuma heyneana</i> .	Zingiberaceae	Temugiring	3	5,26
9	Vetiver	<i>Vetiveria zizanioides</i> L.	Gramineae	Akar sariwangi	3	5,26
10	Cinnamon	<i>Cinnamomum burmanii</i> Bl.	Lauraceae	Kayu manis	2	3,51
11	Ganti	<i>Ligustrum indicum aiton f.</i>	Oleaceae	Ganti	2	3,51
12	Lemongrass	<i>Cymbopogon citratus</i> DC.	Gramineae	Sarai	2	3,51

13	Lemongrass scented	<i>Cymbopogon nardus</i> L.	Gramineae	Sarai wangi	1	1,75
14	Cempaka	<i>Michelia</i> sp.	Magnollaceae	Cempaka	1	1,75
15	Ginger	<i>Zingiber officinale</i> .	Zingiberaceae	Tipakan	1	1,75
16	Aromatic ginger	<i>Kaempferia galangal</i> L.	Zingiberaceae	Kencur	1	1,75
17	Turmeric	<i>Curcuma domestica</i> .	Zingiberaceae	Janar	1	1,75
18	Galangal	<i>Alpinia purpurata</i> K.Schum.	Zingiberaceae	Laos	1	1,75
19	Sappan wood	<i>Caesalpinia sappan</i> L.	Fabaceae	Secang	1	1,75
20	Patchouli	<i>Pogostemon cablin</i> .	Lamiaceae	Nilam	1	1,75
21	Yellow root	<i>Arcangelisia flava</i> Merr.	Ranunculaceae	Kayu kuning	1	1,75
22	Mesoyi	<i>Massoia aromatica</i> Becc.	Lauraceae	Mesoyi	1	1,75
23	Coconut	<i>Cocos nucifera</i> L.	Arecaceae	Niur	1	1,75
24	Lemon	<i>Citrus limon</i> Burm.	Rutaceae	Lemon	1	1,75
25	Sugarcane	<i>Saccharum officinarum</i> .	Gramineae	Niran habang	1	1,75
26	Corn	<i>Zea mays</i> .	Poaceae	Jagung	1	1,75
Total					57	100



Figure 1. (A) Mix of plants in the batimung tradition; (B) Wooden bench, pot, and wooden spoon; (C) Example of a mat used for Batimung.

### Batimung Application

Batimung is a steam bath using plants that have a distinctive aroma carried out by the Banjar ethnic group. Batimung utilizes hot steam from boiled plants to make the user sweat. The results of the survey in the field, the implementation of batimung begins with preparing the necessary materials and tools. The materials used are adjusted to the user's goals in utilizing batimung. The tools needed in batimung are a pot, wooden bench, purun mat, wooden spoon and blanket or cloth cover as shown in Figures 1A and 1B.

The therapist mixes and boils the prepared plants using water until it boils. After boiling, the user sits on a wooden bench provided and a pot filled with batimung is placed in front of him in a closed state. The position of the pan is placed between the user's feet. The purun mat is then formed conical or circular to cover

the user's body. A blanket is placed on or around the mat to cover the open space as shown in Figure 1C. After the user's entire body is tightly closed, slowly open the lid of the pot so that the hot steam from the boiled plants comes out. A wooden spoon is useful for stirring the plant mixture. After the stew begins to cool, the kaffir lime mat and blanket can be removed. The decoction can be used to boil two to three more times for one batch of batimung. After the implementation of the bathimung, the user is advised to drink water or sweet drinks to restore the fluids that come out of the body. The tradition of bathimung observed by researchers is not much different from the procedure described by Ideham et al (2005). However, in the practice of batimung with the aim of curing disease, there is a special mantra that is pronounced by the therapist during its implementation.

### Terpenoid Test on *Batimung* Plants

The terpenoid test showed that 25 out of the 27 samples were positive and the other 2 were negative indicated by lack of color or a brownish ring (corn & coconut). Additionally, the sugarcane sample using the Lieberman-Buchard test showed a brownish ring and turned green which indicated the presence of sterpenoid and steroid compounds (16–18).

### *Batimung* plant parts

The study showed that the most used parts for disease healing (Table 4) are rhizomes (42.68%), and leaves and flowers for body treatment (24%) (Table 5). Furthermore, the treatment is used to cure *wisa* believed to be caused by jinn which turns the body yellow and weak, by adding and processing hair and nail pieces into the plant mixture. Therefore, the therapists use it to warm the body to encourage sweat, aimed to remove the jinn or evil spirit.

Table 4. Parts of the *Batimung* Plant for Healing Diseases

No	Plant Parts	Plants Name	Total	Percentage (%)
1	Rhizome	Galangal ( <i>Alpinia purpurata</i> K.Schum.) Ginger ( <i>Zingiber officinale</i> ) Aromatic ginger ( <i>Kaempferia galangal</i> L.)	3	42,86
2	Stem	Sugarcane ( <i>Saccharum officinarum</i> ) Lemongrass ( <i>Cymbopogon citratus</i> DC.)	2	28,56
3	Shell	Coconut ( <i>Cocos nucifera</i> L.)	1	14,29
4	Cob	Corn ( <i>Zea mays</i> )	1	14,29
Total			7	100

Table 5. Parts of the *Batimung* Plant for Body Care

No	Plant Parts	Plant Name	Total	Percentage (%)
1	Flower	Pandan ( <i>Pandanus amaryllifolius</i> Roxb.) Kaffir lime ( <i>Citrus hystrix</i> DC.) Turmeric ( <i>Curcuma domestica</i> ) Lemongrass ( <i>Cymbopogon nardus</i> L.)	12	24

2	Stem Bark	Patchouli ( <i>Pagostemon cablin</i> .)	12	24
		Jasmine ( <i>Jasminum sambac</i> )		
		Ylang ( <i>Cananga odorata</i> L.)		
		Roses ( <i>Rosa</i> sp.)		
		Cempaka ( <i>Michelia</i> sp.)		
3	Rhizome	Cinnamon ( <i>Cinnamomum burmanii</i> Bl.)	8	16
		Mesoyi ( <i>Massoia aromatica</i> Becc.)		
		Sappan ( <i>Caesalpinia sappan</i> L.)		
4	Root	Pulosari ( <i>Alyxia reinwardtii</i> Bl.)	7	14
		Curcuma ( <i>Curcuma xanthorrhiza</i> Roxb.)		
5	Fruit	Temugiring ( <i>Curcuma heyneana</i> )	4	8
		Vetiver ( <i>Vetiveria zizanioides</i> L.)		
6	Flower	Yellow Root ( <i>Arcangelisia flava</i> Merr.)	4	8
		Lemon ( <i>Citrus limon</i> Burm.)		
7	Stem	Kaffir lime ( <i>Citrus hystrix</i> DC.)	3	6
		Lemongrass ( <i>Cymbopogon citratus</i> DC.)		
		Ganti ( <i>Ligustrum indicum aiton f.</i> )		
Total			50	100

Removing leaves does not damage the plant because they can easily grow back and used continuously (19). The flowers are constantly used for various traditional rituals such as funeral ceremonies, *batapung tawar*, bathing, weddings, and others (20). Additionally, flowers are used by therapists because they are easily obtained and have a distinctive aroma beneficial for body treatment.

### Batimung plant processing method

All aromatic plants are processed by boiling. However, some plants need to be processed before boiling (Table 6).

Table 6. Methods of Processing Batimung Plants

No	Cara pengolahan	Total	Percentage (%)
1	Boiled straight away	38	66,67
2	Chopped and boiled	7	12,28
3	Kneaded and boiled	7	12,28
4	Squeezed and boiled	3	5,26
5	Grated and boiled	2	3,51
Total		57	100

In *Batimung*, the aromatic plants are boiled and the steam is used for bathing. However, some plants need to be chopped, kneaded, squeezed, and grated before boiling. Generally, direct boiling at (66.67%) is the highest processing method where the plant is boiled in a covered pot. Boiling releases the fragrant smell, thereby producing an effect on the body. Batubara et al (2017) (21) stated that the herb boils for 20 – 40 minutes or until it boils and the boiling water changes color, and the plants wither.

### The dosage of *Batimung* plant use



*Batimung* herb uses 5 – 12 species of plants boiled together. The dosage is based on the therapist's experience (Table 7).

Table 7. The dose of the use of the *Batimung* plant

Plant Name	Plant Parts	The intended use	Total
Lime	Leaf	Caring for the body	1 handful (18,11-23,66 g)
Lime	Fruit	Caring for the body	½ -2 fruits (40,12 – 179,12 g)
Pandan	Leaf	Caring for the body	11-17 sheets (22,68-36,37 g)
Pulosari	Bark	Caring for the body	1 tablespoon (8 – 12,1 g)
Curcuma	Rhizome	Caring for the body	¼ – 1 part (17,21 -32,34 g)
Rose	Flower	Caring for the body	1-3 flowers (2,68 – 9,21 g)
Ylang Flower	Flower	Caring for the body	1 – 5 flowers (2,31-7,71 g)
Jasmine	Flower	Caring for the body	4-10 flowers (1,83-4,26 g)
Temugiring	Rhizome	Caring for the body	3 – 1 rhizome (3,41- 30 g)
Vetiver	Root	Caring for the body	2-5 root (4,6 – 15,6 (4g)
Cinnamon	Bark	Caring for the body	¼ - 1 bark (2-10,14 g)
Ganti	Stem	Caring for the body	1 tablespoon (1-3,41 g)
Lemongrass	Stem	Cure disease	1 stem (8-17,78 g)
Cempaka	Flower	Caring for the body	2 flowers(5-8,21 g)
Turmeric	Leaf	Caring for the body	5 sheet (12,1 -15,21 g)
Galangal	Rhizome	Cure disease	1 rizhome (74,68 g)
Ginger	Rhizome	Cure disease	1 rizhome (26,34 g)
Sappan wood	Bark	Caring for the body	2 handheld (16,17 -18 g)
Lemongrass scented	Leaf	Caring for the body	8 sheet (14,21 – 18,11 g)
Patchouli	Leaf	Caring for the body	10 sheet (4,19-6,12 g)
Yellow root	Root	Caring for the body	1 handheld (50,12 – 60,71 g)
Aromatic Ginger	Rhizome	Cure disease	1 rizhome (18,01 g)
Mesoyi	Bark	Caring for the body	1 part bark (2 -5,21 g)
Coconut	Shell	Cure disease	1 shell (25,21 g)
Lemon	Fruit	Caring for the body	½ fruit (40,17-51,15 g)
Sugarcane	Stem	Cure disease	¼ part bark (20,87 g)
Corn	Hump	Cure disease	1 hump (7,12 g)

### The purpose of using *Batimung*

*Batimung* is used for body treatment and to cure diseases as shown in the findings that 98.98% is used for body treatment and 1.02% for curing disease. The body treatments prevent or eliminate body odor, provide relaxation, reduces excessive sweat, eliminates fatigue, enhances natural body smell, and are used in traditional wedding performance (22). Thermotherapy soothes symptoms such as muscular strain, heaviness in the limbs, edema, loss of appetite, and constipation, whereas the essential oils of the plants used have an immunostimulant, antiseptic, and antiphlogistic effect (23–25). Whereas the healing practices are used to cure the *wisa* disease. However, the use of *Batimung* to cure disease is less desirable due to easier and affordable access to health services in Banjarmasin. Therefore, *Batimung* is an alternative option recommended by therapists.

### Discussion

Plants used for body care purposes mostly contain essential oils. Plants used such as roses, jasmine, ylang flower, kaffir lime, vetiver and others. The results of research by Ardela et al (2017) (26), the aroma of

roses can reduce the intensity of pain in primary dysmenorrhea (menstrual pain) from moderate pain with a scale of 5 to mild pain with a scale of 0.9. In addition, in the Hongratanaworakit study (2009) (27), rose essential oil absorbed transdermally was shown to significantly reduce respiratory rate, systolic blood pressure, blood oxygen saturation and emotionally in the study subject group felt calmer, relaxed and less alert than the control group. Therefore, it is concluded that the use of roses in aromatherapy can reduce stress and depression in humans. The use of essential oils is not limited to just relaxation, essential oils from ylang and lemon can also be useful in overcoming insomnia (28).

The use of steam baths in other areas such as West Kalimantan (Betagas), the purpose of its use is used for relaxation media and customs before marriage (5). However, in contrast to the purpose of using steam baths in the Karo Batak (Oukup) community, the people there use steam baths to treat diseases such as vertigo, diabetes, gout, colds, skin pain, insomnia, fatigue and post-natal pain (21). Steam baths in Minahasa (Bakera), are predominantly used to restore or recover the body after childbirth (23). The difference in the purpose of use in each region is influenced by customs, habits and mixtures of ingredients used in each region.

The period of use of batimung depends on the purpose of its use. If the purpose is for body care, the user must use batimung continuously so that the use of 1 year is the most. Uses < 1 year are new users who are trying batimung for body care. Continuous use will provide maximum benefits. Users for 3 days aim to follow Banjar wedding customs while users for 1 day are users who aim to treat diseases. According to the therapist, pre-marriage is done 3 days before the wedding and does batimung two to three times in a row. The use for pre-wedding aims to reduce sweat so that bridal makeup is more durable and makes the body more fragrant. The use for disease only needs to be done one to two times and in succession because the effect will be felt immediately.

The duration of one use of batimung is adjusted to the strength of the user, according to the therapist, it is recommended that the use of batimung be 15-60 minutes or until the decoction of the plant begins to cool. The difference in duration of use is due to the different resistance of each individual. The duration of single-use batimung is in line with the results of research from Hannuksela & Ellahham (2001) (29,30) the use of steam baths will start to sweat after about 15 minutes. The results of the study of Batubara et al (2017) (21), users of steam baths in Batak Karo can withstand hot steam for 15 minutes after using it 3-5 times before.

## **Conclusion**

There are 26 species of aromatic plants used in *Batimung* tradition where 24 tested positive for terpenoids. The plant parts used for body treatment are leaves (24%), flowers (24%), bark (16%), rhizomes (14%), roots (8%), fruits (8%), and stems (6%). Whereas, the parts used to cure disease are rhizomes (42.86%), stems (28.56%), shells and cobs (14.29%).

### **Acknowledgement**

The author would like to thank the Dean of the Faculty of Mathematics and Natural Sciences, Head of Study Program of Pharmacy at Lambung Mangkurat University for the support of laboratory facilities.

### **Authors contributions**

ARN collects data, analyzes, and compiles manuscripts, NIL collects data, literature, and prepares manuscripts, NRL performs data analysis, manuscript reviews, STM results analysis, manuscript reviews for submission to web journals.

### **Conflict of interests**

The author says that there is no conflict of interest, the author will be fully responsible for the content and writing of this article.

### **Ethical consideration**

All authors have checked for errors and falsifications related to the manuscript.

### **Funding/Support**

This research is supported by Lambung Mangkurat University through research support to lecturers with all laboratory facilities.

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**Title: Ethnomedicine On The Use Of Aromatic Plants In Batimung Tradition In North Banjarmasin Sub-District Banjarmasin City Indonesia**

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**Ethnomedicine On The Use Of Aromatic Plants In**

**Batimung Tradition In North Banjarmasin Sub-**

**District, Banjarmasin City, Indonesia**

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**Journal:** Tropical Journal of Natural Product Research [www.tjnpr.org](http://www.tjnpr.org)

**Corresponding Author:** Arnida Arnida

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# Ethnomedicine on the use of aromatic plants in Batimung tradition in north Banjarmasin sub-district Banjarmasin City Indonesia

## Abstract

Ethnomedicine studies scientifically proven local ethnic group knowledge in maintaining health, such as the Banjar's *Batimung* tradition of using aromatic plants steam bath mixed by therapists. Therefore, this study aimed to identify the plants and the aromatic parts used for the treatment. The data was collected through observations with purposive and quota sampling techniques from 5 therapists and 98 patients. The results showed that although 26 plant species were used, 24 contained terpenoids. The used parts included leaves, flowers, barks, rhizomes, roots, fruits, stems, and cobs. Furthermore, *Batimung* was utilized for body treatment and curing diseases using boiled plant stems. The dosage included 1 to 2 handfuls, 1 to 10 fruits, 5 to 17 pieces, ¼ to 1 stem, and 1 tablespoon. Therefore, the most used aromatic plant was *Citrus hystrix* DC, specifically the leaves and flowers.

**Keywords:** Ethnomedicine, *Batimung*, Therapists, Banjarmasin, Aromatic plants, Sauna

## Introduction

Indonesia is one of the mega bio-diversity countries with more than 25,000-30,000 plant species (1), though 160-200 produce essential oils (2). According to Central statistics agency, Indonesia had 1,300 ethnic groups, including Banjar, with diverse cultures such as *Batimung* that fulfill all aspects of people's lives in 2010. *Batimung* tradition originated from South Kalimantan and was performed by a Banjar descendant before marriage to eliminate body odor and excessive sweating. Additionally, it is used for the wisa disease treatment (3). The Banjar community believes that wisa is caused by supernatural beings that make the patient's body color turn yellow (4). *Batimung* is traditionally performed by mixing plants with a distinctive aroma. Ideham *et al* (3) explained that this tradition has been passed down from generation to generation.

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Journal	<b>Tropical Journal of Natural Product Research</b>
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Name of Authors	ARN, NIL, NRL, STM

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Conclusion	In the results, the positive was 25 out of 27, while at the conclusion there were 24 out of 26 plants. Which one is true?
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## Ethnomedicine On Use Of Aromatic Plants In Batimung Tradition In North Banjarmasin

### Sub-District Banjarmasin City Indonesia

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## Abstract

Ethnomedicine is a study that reveals local knowledge of an ethnic or ethnic group in the field of Health. The unique behaviour of the Banjar people is to use aromatic plants mixed by herbalists to cure diseases. It is called Batimung. The purpose of this study was to identify plants and the parts of aromatic plants used. This research is a descriptive study with prospective observational data collection with purposive sampling and quota sampling techniques. The number of therapist respondents is 5 people and the number of users of Batimung is 98 people. The results of the study stated that there were 26 types of plants used. The results of the terpenoid test stated that 24 types of plants contained terpenoids. The plant parts used are leaves, flowers, bark, rhizomes, roots, fruit, stems and cobs. The purpose of using Batimung is body care and cure disease. The method of processing plants mostly by boiling the ingredients and utilizing the steam produced is called Batimung. Therefore, it can be concluded that the most widely used aromatic plant for Batimung is *Citrus hystrix* DC. and the most widely used plant parts are leaves and flowers.

**Keywords:** Ethnomedicine, *Batimung*, Therapists, Banjarmasin, Aromatic plants, Sauna

## Introduction

Indonesia is one of the mega bio-diversity countries with more than 25,000-30,000 plant species,<sup>1</sup> though 160-200 produce essential oils.<sup>2</sup> According to the Central Statistics Agency, Indonesia had 1,300 ethnic groups, including Banjar, with diverse cultures such as *Batimung* that fulfilled all aspects of people's lives in 2010. *Batimung* tradition originated from South Kalimantan and was performed by a Banjar descendant before marriage to eliminate body odor and excessive sweating. Additionally, it is used for the *wisa* disease treatment.<sup>3</sup> The Banjar community believes that *wisa* is caused by supernatural beings that make the patient's body color turn yellow.<sup>4</sup> *Batimung* is traditionally performed by mixing plants with a distinctive aroma. Ideham *et al*<sup>3</sup> explained that this tradition has been passed down from generation to generation. Exploration of the types and uses of aromatic plants in the *Batimung* tradition is currently still very minimal. Written information about the diversity of aromatic plants used in the *Batimung* tradition is also still lacking. In the future, it is feared that knowledge about the *Batimung* tradition could be lost in society. Therefore, extracting information and documentation needs to be carried out on the aromatic plants of the *Batimung* tradition which are owned by the Banjar ethnic who is the original ethnic group of South Kalimantan

5.

Generally, ethnomedicine is a field of ethnobotanical studies that explains a scientifically proven local's knowledge in maintaining their health or medical systems<sup>1</sup>. The aromatic plants used contain essential oils mostly with terpenoids compounds that should be identified<sup>6</sup>. This study was conducted in Banjarmasin city the origin of the ethnic Banjar<sup>7</sup>. Furthermore, the selection of North Banjarmasin was influenced by the Central Statistics Agency<sup>8</sup>, population census data, which recorded most of Banjar ethnic. Moreover, the study aimed to identify aromatic

plants and the percentage of parts used.

## Methods

### Study Time and Place

This study was conducted from February–March 2019 in North Banjarmasin Sub-district, Banjarmasin City (Figure 1).

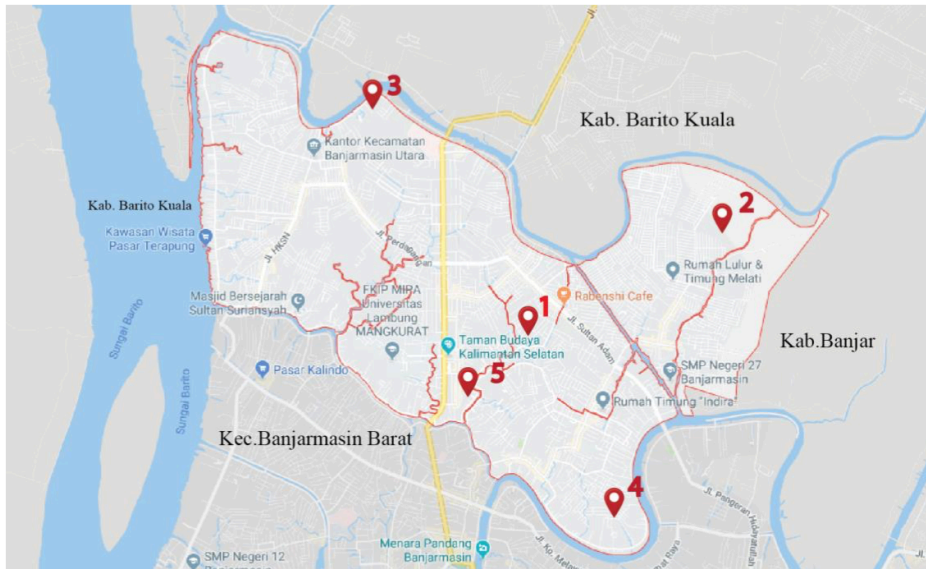


Figure 1. The map of the research site (own collection)

### Tools and Materials

Data was collected using informed consent sheets, respondent demographics, a list of questions, and questionnaires, while the plants terpenoid test used mortar, stempor, beaker glass, test tube, tube rack, and drop pipette. In addition, the test used methanol, chloroform, and Lieberman Buchard reagent (acetic anhydrous acid and sulfuric acid).

### Field Data Collection Method

The therapist's data was collected through semi-structural interviews following questions from the list and improvised questions according to their needs, whereas the plant samples were taken, captured, and collected. The plants taken were identified species and terpenoid compounds tested using plant methanol extract with Lieberman Burchard reagent <sup>9,10</sup>. In general, user data was collected by distributing study instruments.

### Population

The population in this study were people in North Banjarmasin Sub-district who practiced *Batimung* tradition. Recommendations for research permits are carried out at the National Unity Agency 072/109-Sekr/Bakesbapol. Research has been declared ethically worthy by the Faculty of Health Research Ethics Commission and Banjarmasin Politics with the number Lambung Mangkurat University Medicine with number 82/KEPK-FK UNLAM/EC/III/2019.

### **Sample**

The sample was divided into 2, such as therapists and patients in North Banjarmasin Sub-district who fulfilled the following criteria:

4. Inclusion criteria for the therapists were from Banjar ethnicity, were accustomed to the plants used, procedure knowledge (using traditional equipment), introducing *Batimung* practice to the public, and willingness to respond.
5. The inclusion criteria for the patients was have performed *Batimung* tradition in February 2019 in the North Banjarmasin sub-district and willingness to respond.
6. Unfilled questionnaire and therapists using modern equipment was excluded from the study ([https://docs.google.com/document/d/1yQtfqGNYv\\_Qum1fqIa75psyx-L5CofSj/edit?usp=sharing&oid=103724232807822707227&rtpof=true&sd=true](https://docs.google.com/document/d/1yQtfqGNYv_Qum1fqIa75psyx-L5CofSj/edit?usp=sharing&oid=103724232807822707227&rtpof=true&sd=true)).

### **Sampling method**

The purposive and quota sampling methods were used in this study.<sup>11,12</sup>

### **Number of samples**

The samples included 5 therapists recommended by liaisons (community leaders, hamlet heads, village heads, and other trusted sources) and matched the inclusion criteria.<sup>13,14</sup> Furthermore, 98 users were sampled using Snedecor and Cochran calculations.

### **Data analysis**

The data were by descriptive analysis. Descriptive analysis was carried out by calculating the percentage value (%) of each variable which included identification of the aromatic plant used, consisting of the part of the aromatic plant used, the method of use, and the purpose of its use.

## Results and Discussion

### Demographics of Respondents in North Banjarmasin Sub-district

The results showed that female patients were dominant (Table 1) because they value beauty and body treatment more than male.<sup>5</sup> The patients were dominated by housewives at 47.96%. Furthermore, most patients were aged between 26-35 at 48.98% and included senior high school students were aged 15-19 who are more aware of the benefits for beauty and body treatment not only as a cultural practice<sup>5</sup>. Additionally, the users included housewives, private employees, traders, student entrepreneurs, students, and others.

Table 1. Characteristics of Batimung Users

Characteristics	Total	Percentage (%)
Gender		
Man	14	14,29
Woman	84	85,71
Age		
15-25	22	22,45
26-35	48	48,98
36-45	17	17,35
46-55	7	7,14
>55	4	4,08
Education		
Not completed in primary school	1	1,02
SD	5	5,10
Middle School/Equivalent	19	19,39
High School/Equivalent	58	59,18
Academy/College	15	15,31
Work		
Not working/IRT	47	47,96
Private employees	27	27,55
Student/Student	8	8,16
civil servant	1	1,02
Entrepreneur/Trader	14	14,29
Etc	1	1,02
<b>Total</b>	<b>98</b>	<b>100</b>

Table 2. Characteristics of the Therapist Respondents in Batimung

No	Initials	Gender	Age	Education	Ethnicity	The Origin of Knowledge in Batimung
1	A	Woman	64	Junior High School	Banjar	Hereditary
2	J	Woman	55	Elementary School	Banjar	Training
3	K	Woman	55	Junior High School	Mix of Banjar and Dayak	Hereditary



4	N	Woman	55	Senior High School	Banjar	Hereditary
5	AA	Woman	53	Elementary School	Banjar	Hereditary

The results in Table 2 show that all therapists are female because of the high number of female patients. It also showed that most of the therapists are old which threatens *Batimung* sustainability. Therefore, young people should be trained to preserve and share this tradition for future practice <sup>5,15</sup>. The educational level of therapists varied from Elementary, Junior, and Senior High Schools.

## Ethnomedicine of Aromatic Plants in *Batimung*

### *Batimung* plant species

The study showed 26 species from 15 families (Table 3). The most used plants are kaffir lime (12.29%) and pandanus (8.78%), while Zingiberaceae is the largest plant family (19.30%).

Table 3. Types of *Batimung* Plants

No	Plant Name	Latin name	Family	Local Name	Total	Percentage (%)
1	Orange	<i>Citrus hystrix</i> DC.	Rutaceae	Limau purut	7	12,29
2	Pandan	<i>Pandanus amaryllifolius</i> Roxb.	Pandanaceae	Pudak	5	8,78
3	Pulosari	<i>Alyxia reinwardtii</i> Bl.	Apocynaceae	Pulosantan	4	7,03
4	Curcuma	<i>Curcuma xanthorrhiza</i> Roxb.	Zingiberaceae	Temulawak	4	7,03
5	Rose	<i>Rosa</i> sp.	Rosaceae	Mawar	4	7,03
6	Ylang Flower	<i>Cananga odorata</i> .	Annonaceae	Kenanga	4	7,03
7	Jasmine	<i>Jasminum sambac</i> .	Oleaceae	Melati	3	5,26
8	Temugiring	<i>Curcuma heyneana</i> .	Zingiberaceae	Temugiring	3	5,26
9	Vetiver	<i>Vetiveria zizanioides</i> L.	Gramineae	Akar sariwangi	3	5,26
10	Cinnamon	<i>Cinnamomum burmanii</i> Bl.	Lauraceae	Kayu manis	2	3,51
11	Ganti	<i>Ligustrum indicum aiton</i> f.	Oleaceae	Ganti	2	3,51
12	Lemongrass	<i>Cymbopogon citratus</i> DC.	Gramineae	Sarai	2	3,51
13	Lemongrass scented	<i>Cymbopogon nardus</i> L.	Gramineae	Sarai wangi	1	1,75
14	Cempaka	<i>Michelia</i> sp.	Magnollaceae	Cempaka	1	1,75
15	Ginger	<i>Zingiber officinale</i> .	Zingiberaceae	Tipakan	1	1,75
16	Aromatic ginger	<i>Kaempferia galangal</i> L.	Zingiberaceae	Kencur	1	1,75
17	Turmeric	<i>Curcuma domestica</i> .	Zingiberaceae	Janar	1	1,75
18	Galangal	<i>Alpinia purpurata</i> K.Schum.	Zingiberaceae	Laos	1	1,75
19	Sappan wood	<i>Caesalpinia sappan</i> L.	Fabaceae	Secang	1	1,75
20	Patchouli	<i>Pagostemon cablin</i> .	Lamiaceae	Nilam	1	1,75

21	Yellow root	<i>Arcangelisia flava</i> Merr.	Ranunculaceae	Kayu kuning	1	1,75
22	Mesoyi	<i>Massoia aromatica</i> Becc.	Lauraceae	Mesoyi	1	1,75
23	Coconut	<i>Cocos nucifera</i> L.	Arecaceae	Niur	1	1,75
24	Lemon	<i>Citrus limon</i> Burm.	Rutaceae	Lemon	1	1,75
25	Sugarcane	<i>Saccharum officinarum</i> .	Gramineae	Niran habang	1	1,75
26	Corn	<i>Zea mays</i> .	Poaceae	Jagung	1	1,75
Total					57	100



Figure 2. (A)

Mix of plants in the *Batimung* tradition; (B) Wooden bench, pot, and wooden spoon; (C) Example of a mat used for *Batimung*.

### ***Batimung* Application**

*Batimung* is a steam bath using plants that have a distinctive aroma carried out by the Banjar ethnic group. *Batimung* utilizes hot steam from boiled plants to make the user sweat. The results of the survey in the field, the implementation of *Batimung* begins with preparing the necessary materials and tools. The materials used are adjusted to the user's goals in utilizing *Batimung*. The tools needed in *Batimung* are a pot, wooden bench, purun mat, wooden spoon and blanket or cloth cover as shown in Figures 2A and 2B.

The therapist mixes and boils the prepared plants using water until it boils. After boiling, the user sits on a wooden bench provided and a pot filled with *Batimung* is placed in front of him in a closed state. The position of the pan is placed between the user's feet. The purun mat is then formed conical or circular to cover the user's body. A blanket is placed on or around the mat to cover the open space as shown in Figure 1C. After the user's entire body is tightly closed, slowly open the lid of the pot so that the hot steam from the boiled plants comes out. A wooden spoon is useful for stirring the plant mixture. After the stew begins to cool, the kaffir lime mat and blanket can be removed. The decoction can be used to boil two to three more times for one batch of *Batimung*. After the implementation of the *Batimung*, the user is advised to drink water or sweet drinks to restore the fluids that come out of the body. The tradition of *Batimung*, observed

by researchers is not much different from the procedure described by Ideham<sup>3</sup>. However, in the practice of *Batimung* with the aim of curing disease, there is a special mantra that is pronounced by the therapist during its implementation.

### Terpenoid Test on *Batimung* Plants

The terpenoid test showed that 25 out of the 27 samples were positive and the other 2 were negative indicated by lack of color or a brownish ring (corn & coconut). Positive terpenoids from samples include *Citrus hystrix*

DC., *Amaryllifolius* Roxb., *Alyxia reinwardtii* Bl., *Curcuma xanthorrhiza* Roxb., *Rosa* sp., *Cananga*

*odorata*, *Jasminum samba*, *Curcuma heyneana*, *Vetiveria zizanioides* L., *Cinnamomum burmanii* Bl.,

*Ligustrum indicumaiton*, *Cymbopogon citratus* DC., *Cymbopogon nardus* L., *Michelia* sp., *Zingiber*

*officinale*, *Kaempferia galangal* L., *Curcuma domestica*, *Alpinia purpurata* K.Schum., *Caesalpinia sappan*

L., *Pagostemon cablin*, *Arcangelisia flava* Merr., *Massoia aromatica* Becc., *Citrus limon* Burm., *Cocos*

*nucifera* L., and *Saccharum officinarum*. Additionally, the sugarcane sample using the Lieberman-Buchard

test showed a brownish ring and turned green which indicated the presence of sterpenoid and steroid

compounds<sup>16-18</sup>. Terpenoids are compounds composed of an isoprene (C<sub>5</sub>) skeleton, which is a chain

composed of five methyls branched carbons on carbon number 2 or multiples thereof. Many of these

compounds are contained in plants with a distinctive or aromatic smell, which is classified as monoterpenes.

### *Batimung* plant parts

The study showed that the most used parts for disease healing (Table 4) are rhizomes (42.68%), and leaves and flowers for body treatment (24%) (Table 5). Furthermore, the treatment is used to cure *wisa* believed to be caused by jinn which turns the body yellow and weak, by adding and processing hair and nail pieces into the plant mixture. Therefore, the therapists use it to warm the body to encourage sweat, aimed to remove the jinn or evil spirit.

Table 4. Parts of the *Batimung* Plant for Healing Diseases

No	Plant Parts	Plants Name	Total	Percentage (%)
1	Rhizome	Galangal ( <i>Alpinia purpurata</i> K.Schum.) Ginger ( <i>Zingiber officinale</i> ) Aromatic ginger ( <i>Kaempferia galangal</i> L.)	3	42,86
2	Stem	Sugarcane ( <i>Saccharum officinarum</i> ) Lemongrass ( <i>Cymbopogon citratus</i> DC.)	2	28,56
3	Shell	Coconut ( <i>Cocos nucifera</i> L.)	1	14,29
4	Cob	Corn ( <i>Zea mays</i> )	1	14,29
Total			7	100

Table 5. Parts of the *Batimung* Plant for Body Care

No	Plant Parts	Plant Name	Total	Percentage (%)
1	Flower	Pandan ( <i>Pandanus amaryllifolius</i> Roxb.) Kaffir lime ( <i>Citrus hystrix</i> DC.) Turmeric ( <i>Curcuma domestica</i> .) Lemongrass ( <i>Cymbopogon nardus</i> L.) Patchouli ( <i>Pogostemon cablin</i> .)	12	24
2	Stem Bark	Jasmine ( <i>Jasminum sambac</i> ) Ylang ( <i>Cananga odorata</i> L.) Roses ( <i>Rosa</i> sp.) Cempaka ( <i>Michelia</i> sp.)	12	24
3	Rhizome	Cinnamon ( <i>Cinnamomum burmanii</i> Bl.) Mesoyi ( <i>Massoia aromatica</i> Becc.) Sappan ( <i>Caesalpinia sappan</i> L.) Pulosari ( <i>Alyxia reinwardtii</i> Bl.)	8	16
4	Root	Curcuma ( <i>Curcuma xanthorrhiza</i> Roxb.) Temugiring ( <i>Curcuma heyneana</i> )	7	14
5	Fruit	Vetiver ( <i>Vetiveria zizanioides</i> L.) Yellow Root ( <i>Arcangelisia flava</i> Merr.)	4	8
6	Flower	Lemon ( <i>Citrus limon</i> Burm.) Kaffir lime ( <i>Citrus hystrix</i> DC.)	4	8
7	Stem	Lemongrass ( <i>Cymbopogon citratus</i> DC.) Ganti ( <i>Ligustrum indicum aiton f.</i> )	3	6
Total			50	100

Removing leaves does not damage the plant because they can easily grow back and used continuously <sup>19</sup>. The flowers are constantly used for various traditional rituals such as funeral ceremonies, *batapung tawar*, bathing, weddings, and others <sup>20</sup>. Additionally, flowers are used by therapists because they are easily obtained and have a distinctive aroma beneficial for body treatment.

Plants used for body care purposes mostly contain essential oils. Plants used such as roses, jasmine, ylang flower, kaffir lime, vetiver and others. The results of research by Ardela et al <sup>21</sup>, the aroma of roses can reduce the intensity of pain in primary dysmenorrhea (menstrual pain) from moderate pain with a scale of 5 to mild pain with a scale of 0.9. In addition, in the Hongratanaworakit study <sup>22</sup>, rose essential oil absorbed transdermally was shown to significantly reduce respiratory rate, systolic blood pressure, blood oxygen saturation and emotionally in the study subject group felt calmer, relaxed and less alert than the control group. Therefore, it is concluded that the use of roses in aromatherapy can reduce stress and depression in humans. The use of essential oils is not limited to just relaxation, essential oils from ylang and lemon can also be useful in overcoming insomnia <sup>23</sup>.

### **Batimung plant processing method**

All aromatic plants are processed by boiling. However, some plants need to be processed before boiling (Table 6).

Table 6. Methods of Processing Batimung Plants

No	Cara pengolahan	Total	Percentage (%)
1	Boiled straight away	38	66,67
2	Chopped and boiled	7	12,28
3	Kneaded and boiled	7	12,28
4	Squeezed and boiled	3	5,26
5	Grated and boiled	2	3,51
Total		57	100

In *Batimung*, the aromatic plants are boiled and the steam is used for bathing. However, some plants need to be chopped, kneaded, squeezed, and grated before boiling. Generally, direct boiling at (66.67%) is the highest processing method where the plant is boiled in a covered pot. Boiling the fragrant smell, thereby producing an effect on the body. Batubara et al (2017)<sup>24</sup> stated that the herb boils for 20 – 40 minutes or until it boils and the boiling water changes color, and the plants wither.

### The dosage of *Batimung* plant use

*Batimung* herb uses 5 – 12 species of plants boiled together. The dosage is based on the therapist's experience (Table 7).

Table 7. The dose of the use of the *Batimung* plant

Plant Name	Plant Parts	The intended use	Total
Lime	Leaf	Caring for the body	1 handful (18,11-23,66 g)
Lime	Fruit	Caring for the body	½ -2 fruits (40,12 – 179,12 g)
Pandan	Leaf	Caring for the body	11-17 sheets (22,68-36,37 g)
Pulosari	Bark	Caring for the body	1 tablespoon (8 – 12,1 g)
Curcuma	Rhizome	Caring for the body	¼ – 1 part (17,21 -32,34 g)
Rose	Flower	Caring for the body	1-3 flowers (2,68 – 9,21 g)
Ylang Flower	Flower	Caring for the body	1 – 5 flowers (2,31-7,71 g)
Jasmine	Flower	Caring for the body	4-10 flowers (1,83-4,26 g)
Temugiring	Rhizome	Caring for the body	3 – 1 rhizome (3,41- 30 g)
Vetiver	Root	Caring for the body	2-5 root (4,6 – 15,6 (4g)
Cinnamon	Bark	Caring for the body	¼ - 1 bark (2-10,14 g)
Ganti	Stem	Caring for the body	1 tablespoon (1-3,41 g)
Lemongrass	Stem	Cure disease	1 stem (8-17,78 g)
Cempaka	Flower	Caring for the body	2 flowers(5-8,21 g)
Turmeric	Leaf	Caring for the body	5 sheet (12,1 -15,21 g)
Galangal	Rhizome	Cure disease	1 rizhome (74,68 g)
Ginger	Rhizome	Cure disease	1 rizhome (26,34 g)
Sappan wood	Bark	Caring for the body	2 handheld (16,17 -18 g)
Lemongrass scented	Leaf	Caring for the body	8 sheet (14,21 – 18,11 g)
Patchouli	Leaf	Caring for the body	10 sheet (4,19-6,12 g)
Yellow root	Root	Caring for the body	1 handheld (50,12 – 60,71 g)
Aromatic Ginger	Rhizome	Cure disease	1 rizhome (18,01 g)
Mesoyi	Bark	Caring for the body	1 part bark (2 -5,21 g)
Coconut	Shell	Cure disease	1 shell (25,21 g)
Lemon	Fruit	Caring for the body	½ fruit (40,17-51,15 g)
Sugarcane	Stem	Cure disease	¼ part bark (20,87 g)
Corn	Hump	Cure disease	1 hump (7,12 g)

The use of steam baths in other areas such as West Kalimantan (Betagas), the purpose of its use is used for relaxation media and customs before marriage<sup>5</sup>. However, in contrast to the purpose of using steam

baths in the Karo Batak (Oukup) community, the people there use steam baths to treat diseases such as vertigo, diabetes, gout, colds, skin pain, insomnia, fatigue and post-natal pain <sup>24</sup>. Steam baths in Minahasa (Bakera), are predominantly used to restore or recover the body after childbirth <sup>25</sup>. The difference in the purpose of use in each region is influenced by customs, habits and mixtures of ingredients used in each region.

### **The purpose of using *Batimung***

*Batimung* is used for body treatment and to cure diseases as shown in the findings that 98.98% is used for body treatment and 1.02% for curing disease. The body treatments prevent or eliminate body odor, provide relaxation, reduces excessive sweat, eliminates fatigue, enhances natural body smell, and are used in traditional wedding performance <sup>26</sup>. Thermotherapy soothes symptoms such as muscular strain, heaviness in the limbs, edema, loss of appetite, and constipation, whereas the essential oils of the plants used have an immuno-stimulant, antiseptic, and antiphlogistic effect <sup>25,27,28</sup>. Whereas the healing practices are used to cure the *wisa* disease. However, the use of *Batimung* to cure disease is less desirable due to easier and affordable access to health services in Banjarmasin. Therefore, *Batimung* is an alternative option recommended by therapists.

The period of use of batimung depends on the purpose of its use. If the purpose is for body care, the user must use batimung continuously so that the use of 1 year is the most. Uses < 1 year are new users who are trying batimung for body care. Continuous use will provide maximum benefits. Users for 3 days aim to follow Banjar wedding customs while users for 1 day are users who aim to treat diseases. According to the therapist, pre-marriage is done 3 days before the wedding and does batimung two to three times in a row. The use for pre-wedding aims to reduce sweat so that bridal makeup is more durable and makes the body more fragrant. The use for disease only needs to be done one to two times and in succession because the effect will be felt immediately.

The duration of one use of batimung is adjusted to the strength of the user, according to the therapist, it is recommended that the use of batimung be 15-60 minutes or until the decoction of the plant begins to cool. The difference in duration of use is due to the different resistance of each individual. The duration of single-use batimung is in line with the results of research from Hannuksela & Ellahham,<sup>29,30</sup> the use of steam

baths will start to sweat after about 15 minutes. The results of the study of Batubara et al <sup>24</sup>, users of steam baths in Batak Karo can withstand hot steam for 15 minutes after using it 3-5 times before.

## **Conclusion**

There are 27 species of aromatic plants used in *Batimung* tradition where 25 tested positive for terpenoids. The plant parts used for body treatment are leaves (24%), flowers (24%), bark (16%), rhizomes (14%), roots (8%), fruits (8%), and stems (6%). Whereas, the parts used to cure disease are rhizomes (42.86%), stems (28.56%), shells and cobs (14.29%).

## **Acknowledgement**

The author would like to thank the Dean of the Faculty of Mathematics and Natural Sciences, Head of Study Program of Pharmacy at Lambung Mangkurat University for the support of laboratory facilities.

## **Authors contributions**

ARN collects data, analyzes, and compiles manuscripts, NIL collects data, literature, and prepares manuscripts, NRL performs data analysis, manuscript reviews, STM results analysis, manuscript reviews for submission to web journals.

## **Conflict of interests**

The author says that there is no conflict of interest, the author will be fully responsible for the content and writing of this article.

## **Ethical consideration**

All authors have checked for errors and falsifications related to the manuscript.

## **Funding/Support**

This research is supported by Lambung Mangkurat University through research support to lecturers with all laboratory facilities.

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Thanks for the revised manuscript

Best regards

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Page 10, line 4; Kindly explain the two terms, as much as possible with references.  
**In-text references should appear after punctuations.**  
The discussion only contains about batimung, but none of them discusses the terpenoid content that has been tested.  
How is the relationship between the terpenoid content and the plants used for this batimung?

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## Ethnomedicine On Use Of Aromatic Plants In Batimung Tradition In North Banjarmasin

### Sub-District Banjarmasin City Indonesia

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## Abstract

Ethnomedicine is a study that reveals local knowledge of an ethnic or ethnic group in the field of Health. The unique behaviour of the Banjar people is to use aromatic plants mixed by herbalists to cure diseases. It is called Batimung. The purpose of this study was to identify plants and the parts of aromatic plants used. This research is a descriptive study with prospective observational data collection with purposive sampling and quota sampling techniques. The number of therapist respondents is 5 people and the number of users of Batimung is 98 people. The results of the study stated that there were 26 types of plants used. The results of the terpenoid test stated that 24 types of plants contained terpenoids. The plant parts used are leaves, flowers, bark, rhizomes, roots, fruit, stems and cobs. The purpose of using Batimung is body care and cure disease. The method of processing plants mostly by boiling the ingredients and utilizing the steam produced is called Batimung. Therefore, it can be concluded that the most widely used aromatic plant for Batimung is *Citrus hystrix* DC. and the most widely used plant parts are leaves and flowers.

**Keywords:** Ethnomedicine, *Batimung*, Therapists, Banjarmasin, Aromatic plants, Sauna

## Introduction

Indonesia is one of the mega bio-diversity countries with more than 25,000-30,000 plant species,<sup>1</sup> though 160-200 produce essential oils.<sup>2</sup> According to the Central Statistics Agency, Indonesia had 1,300 ethnic groups, including Banjar, with diverse cultures such as *Batimung* that fulfilled all aspects of people's lives in 2010. *Batimung* tradition originated from South Kalimantan and was performed by a Banjar descendant before marriage to eliminate body odor and excessive sweating. Additionally, it is used for the *wisa* disease treatment.<sup>3</sup> The Banjar community believes that *wisa* is caused by supernatural beings that make the patient's body color turn yellow.<sup>4</sup> *Batimung* is traditionally performed by mixing plants with a distinctive aroma. Ideham *et al*<sup>3</sup> explained that this tradition has been passed down from generation to generation. Exploration of the types and uses of aromatic plants in the *Batimung* tradition is currently still very minimal. Written information about the diversity of aromatic plants used in the *Batimung* tradition is also still lacking. In the future, it is feared that knowledge about the *Batimung* tradition could be lost in society. Therefore, extracting information and documentation needs to be carried out on the aromatic plants of the *Batimung* tradition which are owned by the Banjar ethnic who is the original ethnic group of South Kalimantan.<sup>5</sup>

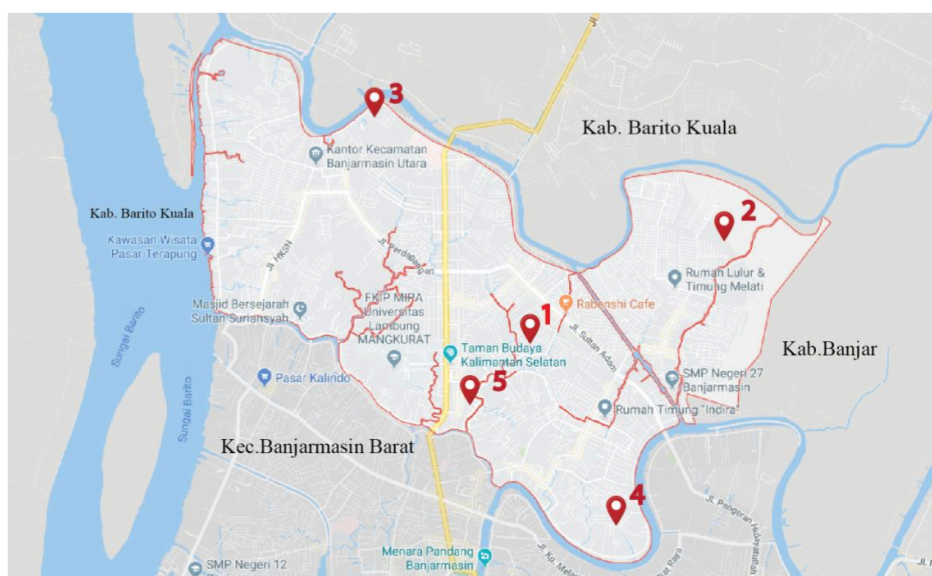
Generally, ethnomedicine is a field of ethnobotanical studies that explains a scientifically proven local's knowledge in maintaining their health or medical systems.<sup>1</sup> The aromatic plants used contain essential oils mostly

with terpenoids compounds that should be identified.<sup>6</sup> This study was conducted in Banjarmasin city the origin of the ethnic Banjar.<sup>7</sup> Furthermore, the selection of North Banjarmasin was influenced by the Central Statistics Agency,<sup>8</sup> population census data, which recorded most of Banjar ethnic. Moreover, the study aimed to identify aromatic plants and the percentage of parts used.

## Methods

### Study Time and Place

This study was conducted from February–March 2019 in North Banjarmasin Sub-district, Banjarmasin City (Figure 1).



**Figure 1: The map of the research site (own collection)**

### Tools and Materials

Data was collected using informed consent sheets, respondent demographics, a list of questions, and questionnaires, while the plants terpenoid test used mortar, stemper, beaker glass, test tube, tube rack, and drop pipette. In addition, the test used methanol, chloroform, and Lieberman Buchard reagent (acetic anhydrous acid and sulfuric acid).

### Field Data Collection Method

The therapist's data was collected through semi-structural interviews following questions from the list and improvised questions according to their needs, whereas the plant samples were taken, captured, and collected. The plants taken were identified species and terpenoid compounds tested using plant methanol extract with Lieberman Burchard reagent.<sup>9,10</sup> In general, user data was collected by distributing study instruments.

## Population

The population in this study were people in North Banjarmasin Sub-district who practiced *Batimung* tradition. Recommendations for research permits are carried out at the National Unity Agency 072/109-Sekr/Bakesbapol. Research has been declared ethically worthy by the Faculty of Health Research Ethics Commission and Banjarmasin Politics with the number Lambung Mangkurat University Medicine with number 82/KEPK-FK UNLAM/EC/III/2019.

## Sample

The sample was divided into 2, such as therapists and patients in North Banjarmasin Sub-district who fulfilled the following criteria:

7. Inclusion criteria for the therapists were from Banjar ethnicity, were accustomed to the plants used, procedure knowledge (using traditional equipment), introducing *Batimung* practice to the public, and willingness to respond.
8. The inclusion criteria for the patients was have performed *Batimung* tradition in February 2019 in the North Banjarmasin sub-district and willingness to respond.
9. Unfilled questionnaire and therapists using modern equipment were excluded from the study ([https://docs.google.com/document/d/1yQtfgGNYv\\_Qum1fqIa75psyx-L5CofSj/edit?usp=sharing&ouid=103724232807822707227&rtpof=true&sd=true](https://docs.google.com/document/d/1yQtfgGNYv_Qum1fqIa75psyx-L5CofSj/edit?usp=sharing&ouid=103724232807822707227&rtpof=true&sd=true)).

## Sampling method

The purposive and quota sampling methods were used in this study.<sup>11,12</sup>

## Number of samples

The samples included 5 therapists recommended by liaisons (community leaders, hamlet heads, village heads, and other trusted sources) and matched the inclusion criteria.<sup>13,14</sup> Furthermore, 98 users were sampled using Snedecor and Cochran calculations.

## Data analysis

**The data were by descriptive analysis.** Descriptive analysis was carried out by calculating the percentage value (%) of each variable which included identification of the aromatic plant used, consisting of the part of the aromatic plant used, the method of use, and the purpose of its use.

## Results and Discussion

### Demographics of Respondents in North Banjarmasin Sub-district

The results showed that female patients were dominant (Table 1) because they value beauty and body treatment more than males.<sup>5</sup> The patients were dominated by housewives at 47.96%. Furthermore, most patients were aged between 26-35 at 48.98% and included senior high school students were aged 15-19 who are more aware of the benefits for beauty and body treatment not only as a cultural practice.<sup>5</sup> Additionally, the users included housewives, private employees, traders, student entrepreneurs, students, and others.

**Table 1:** Characteristics of Batimung Users

Characteristics	Total	Percentage (%)
Gender		
Man	14	14,29
Woman	84	85,71
Age		
15-25	22	22,45
26-35	48	48,98
36-45	17	17,35
46-55	7	7,14
>55	4	4,08
Education		
Not completed in primary school	1	1,02
SD	5	5,10
Middle School/Equivalent	19	19,39
High School/Equivalent	58	59,18
Academy/College	15	15,31
Work		
Not working/IRT	47	47,96
Private employees	27	27,55
Student/Student civil servant	8	8,16
Entrepreneur/Trader	14	14,29
Etc	1	1,02
<b>Total</b>	<b>98</b>	<b>100</b>

**Table 2:** Characteristics of the Therapist Respondents in Batimung

No	Initials	Gender	Age	Education	Ethnicity	The Origin of Knowledge in Batimung
1	A	Woman	64	Junior High School	Banjar	Hereditary
2	J	Woman	55	Elementary School	Banjar	Training

3	K	Woman	55	Junior High School	Mix of Banjar and Dayak	Hereditary
4	N	Woman	55	Senior High School	Banjar	Hereditary
5	AA	Woman	53	Elementary School	Banjar	Hereditary

The results in Table 2 show that all therapists are female because of the high number of female patients. It also showed that most of the therapists are old which threatens *Batimung* sustainability. Therefore, young people should be trained to preserve and share this tradition for future practice.<sup>5,15</sup> The educational level of therapists varied from Elementary, Junior, and Senior High Schools.

### Ethnomedicine of Aromatic Plants in *Batimung*

#### *Batimung* plant species

The study showed 26 species from 15 families (Table 3). The most used plants are kaffir lime (12.29%) and pandanus (8.78%), while Zingiberaceae is the largest plant family (19.30%).

**Table 3:** Types of *Batimung* Plants

No	Plant Name	Latin name	Family	Local Name	Total	Percentage (%)
1	Orange	<i>Citrus hystrix</i> DC.	Rutaceae	Limau purut	7	12,29
2	Pandan	<i>Pandanus amaryllifolius</i> Roxb.	Pandanaceae	Pudak	5	8,78
3	Pulosari	<i>Alyxia reinwardtii</i> BI.	Apocynaceae	Pulosantan	4	7,03
4	Curcuma	<i>Curcuma xanthorrhiza</i> Roxb.	Zingiberaceae	Temulawak	4	7,03
5	Rose	<i>Rosa</i> sp.	Rosaceae	Mawar	4	7,03
6	Ylang Flower	<i>Cananga odorata</i> .	Annonaceae	Kenanga	4	7,03
7	Jasmine	<i>Jasminum sambac</i> .	Oleaceae	Melati	3	5,26
8	Temugiring	<i>Curcuma heyneana</i> .	Zingiberaceae	Temugiring	3	5,26
9	Vetiver	<i>Vetiveria zizanioides</i> L.	Gramineae	Akar sariwangi	3	5,26
10	Cinnamon	<i>Cinnamomum burmanii</i> BI.	Lauraceae	Kayu manis	2	3,51
11	Ganti	<i>Ligustrum indicum aiton f.</i>	Oleaceae	Ganti	2	3,51
12	Lemongrass	<i>Cymbopogon citratus</i> DC.	Gramineae	Sarai	2	3,51
13	Lemongrass scented	<i>Cymbopogon nardus</i> L.	Gramineae	Sarai wangi	1	1,75
14	Cempaka	<i>Michelia</i> sp.	Magnollaceae	Cempaka	1	1,75
15	Ginger	<i>Zingiber officinale</i> .	Zingiberaceae	Tipakan	1	1,75
16	Aromatic ginger	<i>Kaempferia galangal</i> L.	Zingiberaceae	Kencur	1	1,75
17	Turmeric	<i>Curcuma domestica</i> .	Zingiberaceae	Janar	1	1,75
18	Galangal	<i>Alpinia purpurata</i> K.Schum.	Zingiberaceae	Laos	1	1,75
19	Sappan wood	<i>Caesalpinia sappan</i> L.	Fabaceae	Secang	1	1,75



20	Patchouli	<i>Pagostemon cablin.</i>	Lamiaceae	Nilam	1	1,75
21	Yellow root	<i>Arcangelisia flava</i> Merr.	Ranunculaceae	Kayu kuning	1	1,75
22	Mesoyi	<i>Massoia aromatica</i> Becc.	Lauraceae	Mesoyi	1	1,75
23	Coconut	<i>Cocos nucifera</i> L.	Arecaceae	Niur	1	1,75
24	Lemon	<i>Citrus limon</i> Burm.	Rutaceae	Lemon	1	1,75
25	Sugarcane	<i>Saccharum officinarum.</i>	Gramineae	Niran habang	1	1,75
26	Corn	<i>Zea mays.</i>	Poaceae	Jagung	1	1,75
Total					57	100



Figure 2: (A)

Mix of plants in the *Batimung* tradition; (B) Wooden bench, pot, and wooden spoon; (C) Example of a mat used for *Batimung*.

### ***Batimung* Application**

*Batimung* is a steam bath using plants that have a distinctive aroma carried out by the Banjar ethnic group. *Batimung* utilizes hot steam from boiled plants to make the user sweat. The results of the survey in the field, the implementation of *Batimung* begins with preparing the necessary materials and tools. The materials used are adjusted to the user's goals in utilizing *Batimung*. The tools needed in *Batimung* are a pot, wooden bench, purun mat, wooden spoon and blanket or cloth cover as shown in Figures 2A and 2B.

The therapist mixes and boils the prepared plants using water until it boils. After boiling, the user sits on a wooden bench provided and a pot filled with *Batimung* is placed in front of him in a closed state. The position of the pan is placed between the user's feet. The purun mat is then formed conical or circular to cover the user's body. A blanket is placed on or around the mat to cover the open space as shown in Figure 1C. After the user's entire body is tightly closed, slowly open the lid of the pot so that the hot steam from the boiled plants comes out. A wooden spoon is useful for stirring the plant mixture. After the stew begins to cool, the kaffir lime mat and blanket can be removed. The decoction can be used to boil two to three more times for one batch of *Batimung*. After the implementation of the *Batimung*, the user is advised to drink

water or sweet drinks to restore the fluids that come out of the body. The tradition of *Batimung*, observed by researchers is not much different from the procedure described by Ideham.<sup>3</sup> However, in the practice of *Batimung* with the aim of curing disease, there is a special mantra that is pronounced by the therapist during its implementation.

### Terpenoid Test on *Batimung* Plants

The terpenoid test showed that 25 out of the 27 samples were positive and the other 2 were negative indicated by lack of color or a brownish ring (corn & coconut). Positive terpenoids from samples include *Citrus hystrix*

DC., *Amaryllifolius* Roxb., *Alyxia reinwardtii* Bl., *Curcuma xanthorrhiza* Roxb., *Rosa* sp., *Cananga odorata*, *Jasminum samba*, *Curcuma heyneana*, *Vetiveria zizanioides* L., *Cinnamomum burmanii* Bl., *Ligustrum indicumaiton*, *Cymbopogon citratus* DC., *Cymbopogon nardus* L., *Michelia* sp., *Zingiber officinale*, *Kaempferia galangal* L., *Curcuma domestica*, *Alpinia purpurata* K.Schum., *Caesalpinia sappan* L., *Pagostemon cablin*, *Arcangelisia flava* Merr., *Massoia aromatica* Becc., *Citrus limon* Burm., *Cocos nucifera* L., and *Saccharum officinarum*.

Additionally, the sugarcane sample using the Lieberman-Buchard test showed a brownish ring and turned green which indicated the presence of sterpenoid and steroid compounds.<sup>16-18</sup> Terpenoids are compounds composed of an isoprene (C<sub>5</sub>) skeleton, which is a chain composed of five methyls branched carbons on carbon number 2 or multiples thereof. Many of these compounds are contained in plants with a distinctive or aromatic smell, which is classified as monoterpenes.

### *Batimung* plant parts

The study showed that the most used parts for disease healing (Table 4) are rhizomes (42.68%), and leaves and flowers for body treatment (24%) (Table 5). Furthermore, the treatment is used to cure *wisa* believed to be caused by jinn which turns the body yellow and weak, by adding and processing hair and nail pieces into the plant mixture. Therefore, the therapists use it to warm the body to encourage sweat, aimed to remove the jinn or evil spirit.

**Table 4:** Parts of the *Batimung* Plant for Healing Diseases

No	Plant Parts	Plants Name	Total	Percentage (%)
1	Rhizome	Galangal ( <i>Alpinia purpurata</i> K.Schum.) Ginger ( <i>Zingiber officinale</i> ) Aromatic ginger ( <i>Kaempferia galangal</i> L.)	3	42,86
2	Stem	Sugarcane ( <i>Saccharum officinarum</i> ) Lemongrass ( <i>Cymbopogon citratus</i> DC.)	2	28,56
3	Shell	Coconut ( <i>Cocos nucifera</i> L.)	1	14,29
4	Cob	Corn ( <i>Zea mays</i> )	1	14,29
Total			7	100

**Table 5: Parts of the Batimung Plant for Body Care**

No	Plant Parts	Plant Name	Total	Percentage (%)
1	Flower	Pandan ( <i>Pandanus amaryllifolius</i> Roxb.) Kaffir lime ( <i>Citrus hystrix</i> DC.) Turmeric ( <i>Curcuma domestica</i> .) Lemongrass ( <i>Cymbopogon nardus</i> L.) Patchouli ( <i>Pogostemon cablin</i> .)	12	24
2	Stem Bark	Jasmine ( <i>Jasminum sambac</i> ) Ylang ( <i>Cananga odorata</i> L.) Roses ( <i>Rosa</i> sp.) Cempaka ( <i>Michelia</i> sp.)	12	24
3	Rhizome	Cinnamon ( <i>Cinnamomum burmanii</i> Bl.) Mesoyi ( <i>Massoia aromatica</i> Becc.) Sappan ( <i>Caesalpinia sappan</i> L.) Pulosari ( <i>Alyxia reinwardtii</i> Bl.)	8	16
4	Root	Curcuma ( <i>Curcuma xanthorrhiza</i> Roxb.) Temugiring ( <i>Curcuma heyneana</i> )	7	14
5	Fruit	Vetiver ( <i>Vetiveria zizanioides</i> L.) Yellow Root ( <i>Arcangelisia flava</i> Merr.)	4	8
6	Flower	Lemon ( <i>Citrus limon</i> Burm.) Kaffir lime ( <i>Citrus hystrix</i> DC.)	4	8
7	Stem	Lemongrass ( <i>Cymbopogon citratus</i> DC.) Ganti ( <i>Ligustrum indicum aiton f.</i> )	3	6
Total			50	100

Removing leaves does not damage the plant because they can easily grow back and used continuously.<sup>19</sup>

The flowers are constantly used for various traditional rituals such as funeral ceremonies, *batapung tawar*, bathing, weddings, and others.<sup>20</sup> Additionally, flowers are used by therapists because they are easily obtained and have a distinctive aroma beneficial for body treatment.

Plants used for body care purposes mostly contain essential oils. Plants used such as roses, jasmine, ylang flower, kaffir lime, vetiver and others. The results of research by Ardela *et al*,<sup>21</sup> the aroma of roses can reduce the intensity of pain in primary dysmenorrhea (menstrual pain) from moderate pain with a scale of 5 to mild pain with a scale of 0.9. In addition, in the Hongratanaworakit study,<sup>22</sup> rose essential oil absorbed transdermally was shown to significantly reduce respiratory rate, systolic blood pressure, blood oxygen saturation and emotionally in the study subject group felt calmer, relaxed and less alert than the control group. Therefore, it is concluded that the use of roses in aromatherapy can reduce stress and depression in humans. The use of essential oils is not limited to just relaxation, essential oils from ylang and lemon can also be useful in overcoming insomnia.<sup>23</sup>

### **Batimung plant processing method**

All aromatic plants are processed by boiling. However, some plants need to be processed before boiling (Table 6).

**Table 6: Methods of Processing Batimung Plants**

No	Cara pengolahan	Total	Percentage (%)
1	Boiled straight away	38	66,67
2	Chopped and boiled	7	12,28
3	Kneaded and boiled	7	12,28
4	Squeezed and boiled	3	5,26
5	Grated and boiled	2	3,51
Total		57	100

In *Batimung*, the aromatic plants are boiled and the steam is used for bathing. However, some plants need to be chopped, kneaded, squeezed, and grated before boiling. Generally, direct boiling at (66.67%) is the highest processing method where the plant is boiled in a covered pot. Boiling the fragrant smell, thereby producing an effect on the body. Batubara et al (2017) <sup>24</sup> stated that the herb boils for 20 – 40 minutes or until it boils and the boiling water changes color, and the plants wither.

### The dosage of *Batimung* plant use

*Batimung* herb uses 5 – 12 species of plants boiled together. The dosage is based on the therapist's experience (Table 7).

**Table 7: The dose of the use of the Batimung plant**

Plant Name	Plant Parts	The intended use	Total
Lime	Leaf	Caring for the body	1 handful (18,11-23,66 g)
Lime	Fruit	Caring for the body	½ -2 fruits (40,12 – 179,12 g)
Pandan	Leaf	Caring for the body	11-17 sheets (22,68-36,37 g)
Pulosari	Bark	Caring for the body	1 tablespoon (8 – 12,1 g)
Curcuma	Rhizome	Caring for the body	¼ – 1 part (17,21 -32,34 g)
Rose	Flower	Caring for the body	1-3 flowers (2,68 – 9,21 g)
Ylang Flower	Flower	Caring for the body	1 – 5 flowers (2,31-7,71 g)
Jasmine	Flower	Caring for the body	4-10 flowers (1,83-4,26 g)
Temugiring	Rhizome	Caring for the body	3 – 1 rhizome (3,41- 30 g)
Vetiver	Root	Caring for the body	2-5 root (4,6 – 15,6 (4g)
Cinnamon	Bark	Caring for the body	¼ - 1 bark (2-10,14 g)
Ganti	Stem	Caring for the body	1 tablespoon (1-3,41 g)
Lemongrass	Stem	Cure disease	1 stem (8-17,78 g)
Cempaka	Flower	Caring for the body	2 flowers(5-8,21 g)
Turmeric	Leaf	Caring for the body	5 sheet (12,1 -15,21 g)
Galangal	Rhizome	Cure disease	1 rizhome (74,68 g)
Ginger	Rhizome	Cure disease	1 rizhome (26,34 g)
Sappan wood	Bark	Caring for the body	2 handheld (16,17 -18 g)
Lemongrass scented	Leaf	Caring for the body	8 sheet (14,21 – 18,11 g)
Patchouli	Leaf	Caring for the body	10 sheet (4,19-6,12 g)
Yellow root	Root	Caring for the body	1 handheld (50,12 – 60,71 g)
Aromatic Ginger	Rhizome	Cure disease	1 rizhome (18,01 g)
Mesoyi	Bark	Caring for the body	1 part bark (2 -5,21 g)
Coconut	Shell	Cure disease	1 shell (25,21 g)
Lemon	Fruit	Caring for the body	½ fruit (40,17-51,15 g)
Sugarcane	Stem	Cure disease	¼ part bark (20,87 g)
Corn	Hump	Cure disease	1 hump (7,12 g)

The use of steam baths in other areas such as West Kalimantan (Betagas), the purpose of its use is used for relaxation media and customs before marriage<sup>5</sup>. However, in contrast to the purpose of using steam baths in the Karo Batak (Oukup) community, the people there use steam baths to treat diseases such as vertigo, diabetes, gout, colds, skin pain, insomnia, fatigue and post-natal pain<sup>24</sup>. Steam baths in Minahasa (Bakera), are predominantly used to restore or recover the body after childbirth<sup>25</sup>. The difference in the purpose of use in each region is influenced by customs, habits and mixtures of ingredients used in each region.

### **The purpose of using *Batimung***

*Batimung* is used for body treatment and to cure diseases as shown in the findings that 98.98% is used for body treatment and 1.02% for curing disease. The body treatments prevent or eliminate body odor, provide relaxation, reduces excessive sweat, eliminates fatigue, enhances natural body smell, and are used in traditional wedding performance<sup>26</sup>. Thermotherapy soothes symptoms such as muscular strain, heaviness in the limbs, edema, loss of appetite, and constipation, whereas the essential oils of the plants used have an immuno-stimulant, antiseptic, and antiphlogistic effect<sup>25,27,28</sup>. Whereas the healing practices are used to cure the *wisa* disease. However, the use of *Batimung* to cure disease is less desirable due to easier and affordable access to health services in Banjarmasin. Therefore, *Batimung* is an alternative option recommended by therapists.

The period of use of batimung depends on the purpose of its use. If the purpose is for body care, the user must use batimung continuously so that the use of 1 year is the most. Uses < 1 year are new users who are trying batimung for body care. Continuous use will provide maximum benefits. Users for 3 days aim to follow Banjar wedding customs while users for 1 day are users who aim to treat diseases. According to the therapist, pre-marriage is done 3 days before the wedding and does batimung two to three times in a row. The use for pre-wedding aims to reduce sweat so that bridal makeup is more durable and makes the body more fragrant. The use for disease only needs to be done one to two times and in succession because the effect will be felt immediately.

The duration of one use of batimung is adjusted to the strength of the user, according to the therapist, it is recommended that the use of batimung be 15-60 minutes or until the decoction of the plant begins to cool. The difference in duration of use is due to the different resistance of each individual. The duration of

single-use batimung is in line with the results of research from Hannuksela & Ellahham,<sup>29,30</sup> the use of steam baths will start to sweat after about 15 minutes. The results of the study of Batubara et al<sup>24</sup>, users of steam baths in Batak Karo can withstand hot steam for 15 minutes after using it 3-5 times before.

## **Conclusion**

There are 27 species of aromatic plants used in *Batimung* tradition where 25 tested positive for terpenoids. The plant parts used for body treatment are leaves (24%), flowers (24%), bark (16%), rhizomes (14%), roots (8%), fruits (8%), and stems (6%). Whereas, the parts used to cure disease are rhizomes (42.86%), stems (28.56%), shells and cobs (14.29%).

## **Acknowledgement**

The author would like to thank the Dean of the Faculty of Mathematics and Natural Sciences, Head of Study Program of Pharmacy at Lambung Mangkurat University for the support of laboratory facilities.

## **Authors contributions**

ARN collects data, analyzes, and compiles manuscripts, NIL collects data, literature, and prepares manuscripts, NRL performs data analysis, manuscript reviews, STM results analysis, manuscript reviews for submission to web journals.

## **Conflict of interests**

The author says that there is no conflict of interest, the author will be fully responsible for the content and writing of this article.

## **Ethical consideration**

All authors have checked for errors and falsifications related to the manuscript.

## **Funding/Support**

This research is supported by Lambung Mangkurat University through research support to lecturers with all laboratory facilities.

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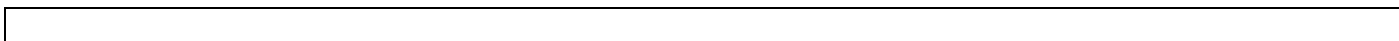
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# Ethnomedicine On Use Of Aromatic Plants In Batimung Tradition In North Banjarmasin

## Sub-District Banjarmasin City Indonesia

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## Abstract

Ethnomedicine is a study that reveals local knowledge of an ethnic or ethnic group in the field of Health. The unique behaviour of the Banjar people is to use aromatic plants mixed by herbalists to cure diseases. It is called Batimung. The purpose of this study was to identify plants and the parts of aromatic plants used. This research is a descriptive study with prospective observational data collection with purposive sampling and quota sampling techniques. The number of therapist respondents is 5 people and the number of users of Batimung is 98 people. The results of the study stated that there were 26 types of plants used. The results of the terpenoid test stated that 24 types of plants contained terpenoids. The plant parts used are leaves, flowers, bark, rhizomes, roots, fruit, stems and cobs. The purpose of using Batimung is body care and cure disease. The method of processing plants mostly by boiling the ingredients and utilizing the steam produced is called

Batimung. Therefore, it can be concluded that the most widely used aromatic plant for Batimung is *Citrus hystrix* DC. and the most widely used plant parts are leaves and flowers.

**Keywords:** Ethnomedicine, *Batimung*, Therapists, Banjarmasin, Aromatic plants, Sauna

## Introduction

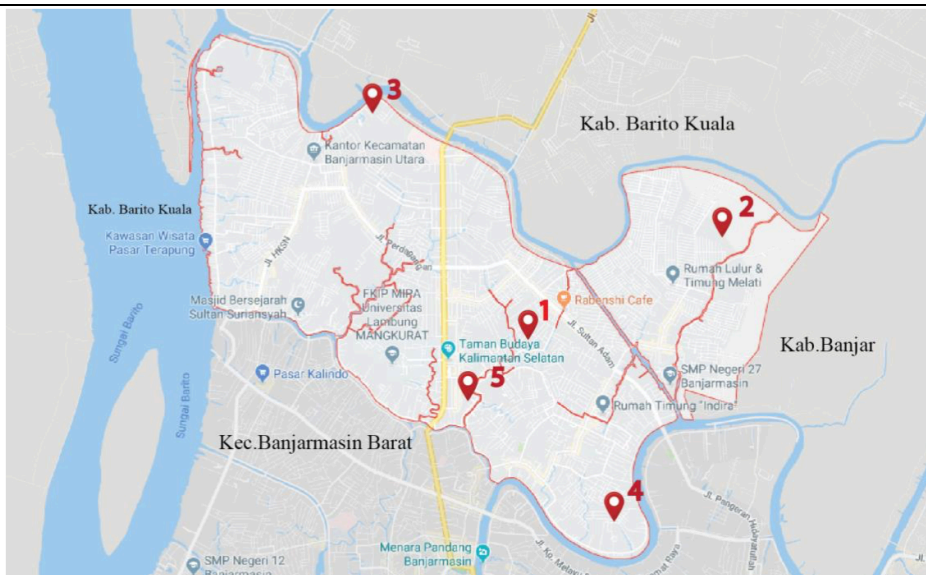
Indonesia is one of the mega bio-diversity countries with more than 25,000-30,000 plant species,<sup>1</sup> though 160-200 produce essential oils.<sup>2</sup> According to the Central Statistics Agency, Indonesia had 1,300 ethnic groups, including Banjar, with diverse cultures such as *Batimung* that fulfilled all aspects of people's lives in 2010. *Batimung* tradition originated from South Kalimantan and was performed by a Banjar descendant before marriage to eliminate body odor and excessive sweating. Additionally, it is used for the *wisa* disease treatment.<sup>3</sup> The Banjar community believes that *wisa* is caused by supernatural beings that make the patient's body color turn yellow.<sup>4</sup> *Batimung* is traditionally performed by mixing plants with a distinctive aroma. Ideham *et al*<sup>3</sup> explained that this tradition has been passed down from generation to generation. Exploration of the types and uses of aromatic plants in the *Batimung* tradition is currently still very minimal. Written information about the diversity of aromatic plants used in the *Batimung* tradition is also still lacking. In the future, it is feared that knowledge about the *Batimung* tradition could be lost in society. Therefore, extracting information and documentation needs to be carried out on the aromatic plants of the *Batimung* tradition which are owned by the Banjar ethnic who is the original ethnic group of South Kalimantan.<sup>5</sup>

Generally, ethnomedicine is a field of ethnobotanical studies that explains a scientifically proven local's knowledge in maintaining their health or medical systems.<sup>1</sup> The aromatic plants used contain essential oils mostly with terpenoids compounds that should be identified.<sup>6</sup> This study was conducted in Banjarmasin city the origin of the ethnic Banjar.<sup>7</sup> Furthermore, the selection of North Banjarmasin was influenced by the Central Statistics Agency,<sup>8</sup> population census data, which recorded most of Banjar ethnic. Moreover, the study aimed to identify aromatic plants and the percentage of parts used.

## Methods

### Study Time and Place

This study was conducted from February–March 2019 in North Banjarmasin Sub-district, Banjarmasin City (Figure 1).



**Figure 1: The map of the research site (own collection)**

## Tools and Materials

Data was collected using informed consent sheets, respondent demographics, a list of questions, and questionnaires, while the plants terpenoid test used mortar, stemper, beaker glass, test tube, tube rack, and drop pipette. In addition, the test used methanol, chloroform, and Lieberman Buchard reagent (acetic anhydrous acid and sulfuric acid).

## Field Data Collection Method

The therapist's data was collected through semi-structural interviews following questions from the list and improvised questions according to their needs, whereas the plant samples were taken, captured, and collected. The plants taken were identified species and terpenoid compounds tested using plant methanol extract with Lieberman Burchard reagent.<sup>9,10</sup> In general, user data was collected by distributing study instruments.

## Population

The population in this study were people in North Banjarmasin Sub-district who practiced *Batimung* tradition. Recommendations for research permits are carried out at the National Unity Agency 072/109-Sekr/Bakesbapol. Research has been declared ethically worthy by the Faculty of Health Research Ethics Commission and Banjarmasin Politics with the number Lambung Mangkurat University Medicine with number 82/KEPK-FK UNLAM/EC/III/2019.

## Sample

The sample was divided into 2, such as therapists and patients in North Banjarmasin Sub-district who fulfilled the following criteria:

10. Inclusion criteria for the therapists were from Banjar ethnicity, were accustomed to the plants used, procedure knowledge (using traditional equipment), introducing *Batimung* practice to the public, and willingness to respond.

11. The inclusion criteria for the patients was have performed *Batimung* tradition in February 2019 in the North Banjarmasin sub-district and willingness to respond.

12. Unfilled questionnaire and therapists using modern equipment were excluded from the study ([https://docs.google.com/document/d/1yQtfqGNYv\\_Qum1fqIa75psyx-L5CofSj/edit?usp=sharing&oid=103724232807822707227&rtpof=true&sd=true](https://docs.google.com/document/d/1yQtfqGNYv_Qum1fqIa75psyx-L5CofSj/edit?usp=sharing&oid=103724232807822707227&rtpof=true&sd=true)).

### **Sampling method**

The purposive and quota sampling methods were used in this study.<sup>11,12</sup>

### **Number of samples**

The samples included 5 therapists recommended by liaisons (community leaders, hamlet heads, village heads, and other trusted sources) and matched the inclusion criteria.<sup>13,14</sup> Furthermore, 98 users were sampled using Snedecor and Cochran calculations.

### **Data analysis**

The data were by descriptive analysis. Descriptive analysis was carried out by calculating the percentage value (%) of each variable which included identification of the aromatic plant used, consisting of the part of the aromatic plant used, the method of use, and the purpose of its use.

## **Results and Discussion**

### **Demographics of Respondents in North Banjarmasin Sub-district**

The results showed that female patients were dominant (Table 1) because they value beauty and body treatment more than males.<sup>5</sup> The patients were dominated by housewives at 47.96%. Furthermore, most patients were aged between 26-35 at 48.98% and included senior high school students were aged 15-

19 who are more aware of the benefits for beauty and body treatment not only as a cultural practice.<sup>5</sup>

Additionally, the users included housewives, private employees, traders, student entrepreneurs, students, and others.

**Table 1:** Characteristics of Batimung Users

Characteristics	Total	Percentage (%)
Gender		
Man	14	14,29
Woman	84	85,71
Age		
15-25	22	22,45
26-35	48	48,98
36-45	17	17,35
46-55	7	7,14
>55	4	4,08
Education		
Not completed in primary school	1	1,02
SD	5	5,10
Middle School/Equivalent	19	19,39
High School/Equivalent	58	59,18
Academy/College	15	15,31
Work		
Not working/IRT	47	47,96
Private employees	27	27,55
Student/Student	8	8,16
civil servant	1	1,02
Entrepreneur/Trader	14	14,29
Etc	1	1,02
<b>Total</b>	<b>98</b>	<b>100</b>

**Table 2:** Characteristics of the Therapist Respondents in Batimung

No	Initials	Gender	Age	Education	Ethnicity	The Origin of Knowledge in Batimung
1	A	Woman	64	Junior High School	Banjar	Hereditary
2	J	Woman	55	Elementary School	Banjar	Training
3	K	Woman	55	Junior High School	Mix of Banjar and Dayak	Hereditary
4	N	Woman	55	Senior High School	Banjar	Hereditary
5	AA	Woman	53	Elementary School	Banjar	Hereditary

The results in Table 2 show that all therapists are female because of the high number of female patients. It also showed that most of the therapists are old which threatens *Batimung* sustainability. Therefore, young people should be trained to preserve and share this tradition for future practice.<sup>5,15</sup> The educational level of therapists varied from Elementary, Junior, and Senior High Schools.

## Ethnomedicine of Aromatic Plants in *Batimung*

### *Batimung* plant species

The study showed 26 species from 15 families (Table 3). The most used plants are kaffir lime (12.29%) and pandanus (8.78%), while Zingiberaceae is the largest plant family (19.30%).

**Table 3:** Types of *Batimung* Plants

No	Plant Name	Latin name	Family	Local Name	Total	Percentage (%)
1	Orange	<i>Citrus hystrix</i> DC.	Rutaceae	Limau purut	7	12,29
2	Pandan	<i>Pandanus amaryllifolius</i> Roxb.	Pandanaceae	Pudak	5	8,78
3	Pulosari	<i>Alyxia reinwardtii</i> Bl.	Apocynaceae	Pulosantan	4	7,03
4	Curcuma	<i>Curcuma xanthorrhiza</i> Roxb.	Zingiberaceae	Temulawak	4	7,03
5	Rose	<i>Rosa</i> sp.	Rosaceae	Mawar	4	7,03
6	Ylang Flower	<i>Cananga odorata</i> .	Annonaceae	Kenanga	4	7,03
7	Jasmine	<i>Jasminum sambac</i> .	Oleaceae	Melati	3	5,26
8	Temugiring	<i>Curcuma heyneana</i> .	Zingiberaceae	Temugiring	3	5,26
9	Vetiver	<i>Vetiveria zizanioides</i> L.	Gramineae	Akar sariwangi	3	5,26
10	Cinnamon	<i>Cinnamomum burmanii</i> Bl.	Lauraceae	Kayu manis	2	3,51
11	Ganti	<i>Ligustrum indicum aiton</i> f.	Oleaceae	Ganti	2	3,51
12	Lemongrass	<i>Cymbopogon citratus</i> DC.	Gramineae	Sarai	2	3,51
13	Lemongrass scented	<i>Cymbopogon nardus</i> L.	Gramineae	Sarai wangi	1	1,75
14	Cempaka	<i>Michelia</i> sp.	Magnollaceae	Cempaka	1	1,75
15	Ginger	<i>Zingiber officinale</i> .	Zingiberaceae	Tipakan	1	1,75
16	Aromatic ginger	<i>Kaempferia galangal</i> L.	Zingiberaceae	Kencur	1	1,75
17	Turmeric	<i>Curcuma domestica</i> .	Zingiberaceae	Janar	1	1,75
18	Galangal	<i>Alpinia purpurata</i> K.Schum.	Zingiberaceae	Laos	1	1,75
19	Sappan wood	<i>Caesalpinia sappan</i> L.	Fabaceae	Secang	1	1,75
20	Patchouli	<i>Pogostemon cablin</i> .	Lamiaceae	Nilam	1	1,75
21	Yellow root	<i>Arcangelisia flava</i> Merr.	Ranunculaceae	Kayu kuning	1	1,75
22	Mesoyi	<i>Massoia aromatica</i> Becc.	Lauraceae	Mesoyi	1	1,75
23	Coconut	<i>Cocos nucifera</i> L.	Arecaceae	Niur	1	1,75
24	Lemon	<i>Citrus limon</i> Burm.	Rutaceae	Lemon	1	1,75
25	Sugarcane	<i>Saccharum officinarum</i> .	Gramineae	Niran habang	1	1,75
26	Corn	<i>Zea mays</i> .	Poaceae	Jagung	1	1,75
Total					57	100



**Figure 2:** (A)

Mix of plants in the *Batimung* tradition; (B) Wooden bench, pot, and wooden spoon; (C) Example of a mat used for *Batimung*.

### ***Batimung* Application**

*Batimung* is a steam bath using plants that have a distinctive aroma carried out by the Banjar ethnic group. *Batimung* utilizes hot steam from boiled plants to make the user sweat. The results of the survey in the field, the implementation of *Batimung* begins with preparing the necessary materials and tools. The materials used are adjusted to the user's goals in utilizing *Batimung*. The tools needed in *Batimung* are a pot, wooden bench, purun mat, wooden spoon and blanket or cloth cover as shown in Figures 2A and 2B.

The therapist mixes and boils the prepared plants using water until it boils. After boiling, the user sits on a wooden bench provided and a pot filled with *Batimung* is placed in front of him in a closed state. The position of the pan is placed between the user's feet. The purun mat is then formed conical or circular to cover the user's body. A blanket is placed on or around the mat to cover the open space as shown in Figure 1C. After the user's entire body is tightly closed, slowly open the lid of the pot so that the hot steam from the boiled plants comes out. A wooden spoon is useful for stirring the plant mixture. After the stew begins to cool, the kaffir lime mat and blanket can be removed. The decoction can be used to boil two to three more times for one batch of *Batimung*. After the implementation of the *Batimung*, the user is advised to drink water or sweet drinks to restore the fluids that come out of the body. The tradition of *Batimung*, observed by researchers is not much different from the procedure described by Ideham.<sup>3</sup> However, in the practice of *Batimung* with the aim of curing disease, there is a special mantra that is pronounced by the therapist during its implementation.

### **Terpenoid Test on *Batimung* Plants**

The terpenoid test showed that 25 out of the 27 samples were positive and the other 2 were negative indicated by lack of color or a brownish ring (corn & coconut). Positive terpenoids from samples include *Citrus hystrix*



DC., *Amaryllifolius* Roxb., *Alyxia reinwardtii* Bl., *Curcuma xanthorrhiza* Roxb., *Rosa* sp., *Cananga odorata*, *Jasminum samba*, *Curcuma heyneana*, *Vetiveria zizanioides* L., *Cinnamomum burmanii* Bl., *Ligustrum indicumaiton*, *Cymbopogon citratus* DC., *Cymbopogon nardus* L., *Michelia* sp., *Zingiber officinale*, *Kaempferia galangal* L., *Curcuma domestica*, *Alpinia purpurata* K.Schum., *Caesalpinia sappan* L., *Pagostemon cablin*, *Arcangelisia flava* Merr., *Massoia aromatica* Becc., *Citrus limon* Burm., *Cocos nucifera* L., and *Saccharum officinarum*.

Additionally, the sugarcane sample using the Lieberman-Buchard test showed a brownish ring and turned green which indicated the presence of sterpenoid and steroid compounds.<sup>16-18</sup> Terpenoids are compounds composed of an isoprene (C<sub>5</sub>) skeleton, which is a chain composed of five methyls branched carbons on carbon number 2 or multiples thereof. Many of these compounds are contained in plants with a distinctive or aromatic smell, which is classified as monoterpenes.

### Batimung plant parts

The study showed that the most used parts for disease healing (Table 4) are rhizomes (42.68%), and leaves and flowers for body treatment (24%) (Table 5). Furthermore, the treatment is used to cure *wisa* believed to be caused by jinn which turns the body yellow and weak, by adding and processing hair and nail pieces into the plant mixture. Therefore, the therapists use it to warm the body to encourage sweat, aimed to remove the jinn or evil spirit.

**Table 4:** Parts of the Batimung Plant for Healing Diseases

No	Plant Parts	Plants Name	Total	Percentage (%)
1	Rhizome	Galangal ( <i>Alpinia purpurata</i> K.Schum.) Ginger ( <i>Zingiber officinale</i> ) Aromatic ginger ( <i>Kaempferia galangal</i> L.)	3	42,86
2	Stem	Sugarcane ( <i>Saccharum officinarum</i> ) Lemongrass ( <i>Cymbopogon citratus</i> DC.)	2	28,56
3	Shell	Coconut ( <i>Cocos nucifera</i> L.)	1	14,29
4	Cob	Corn ( <i>Zea mays</i> )	1	14,29
Total			7	100

**Table 5:** Parts of the Batimung Plant for Body Care

No	Plant Parts	Plant Name	Total	Percentage (%)
1	Flower	Pandan ( <i>Pandanus amaryllifolius</i> Roxb.) Kaffir lime ( <i>Citrus hystrix</i> DC.) Turmeric ( <i>Curcuma domestica</i> ) Lemongrass ( <i>Cymbopogon nardus</i> L.) Patchouli ( <i>Pagostemon cablin</i> )	12	24
2	Stem Bark	Jasmine ( <i>Jasminum sambac</i> ) Ylang ( <i>Cananga odorata</i> L.) Roses ( <i>Rosa</i> sp.) Cempaka ( <i>Michelia</i> sp.)	12	24
3	Rhizome	Cinnamon ( <i>Cinnamomum burmanii</i> Bl.) Mesoyi ( <i>Massoia aromatica</i> Becc.) Sappan ( <i>Caesalpinia sappan</i> L.) Pulosari ( <i>Alyxia reinwardtii</i> Bl.)	8	16

4	Root	Curcuma ( <i>Curcuma xanthorrhiza</i> Roxb.) Temugiring ( <i>Curcuma heyneana</i> )	7	14
5	Fruit	Vetiver ( <i>Vetiveria zizanioides</i> L.) Yellow Root ( <i>Arcangelisia flava</i> Merr.)	4	8
6	Flower	Lemon ( <i>Citrus limon</i> Burm.) Kaffir lime ( <i>Citrus hystrix</i> DC.)	4	8
7	Stem	Lemongrass ( <i>Cymbopogon citratus</i> DC.) Ganti ( <i>Ligustrum indicum aiton f.</i> )	3	6
Total			50	100

Removing leaves does not damage the plant because they can easily grow back and used continuously.<sup>19</sup>

The flowers are constantly used for various traditional rituals such as funeral ceremonies, *batapung tawar*, bathing, weddings, and others.<sup>20</sup> Additionally, flowers are used by therapists because they are easily obtained and have a distinctive aroma beneficial for body treatment.

Plants used for body care purposes mostly contain essential oils. Plants used such as roses, jasmine, ylang flower, kaffir lime, vetiver and others. The results of research by Ardela *et al*,<sup>21</sup> the aroma of roses can reduce the intensity of pain in primary dysmenorrhea (menstrual pain) from moderate pain with a scale of 5 to mild pain with a scale of 0.9. In addition, in the Hongratanaworakit study,<sup>22</sup> rose essential oil absorbed transdermally was shown to significantly reduce respiratory rate, systolic blood pressure, blood oxygen saturation and emotionally in the study subject group felt calmer, relaxed and less alert than the control group. Therefore, it is concluded that the use of roses in aromatherapy can reduce stress and depression in humans. The use of essential oils is not limited to just relaxation, essential oils from ylang and lemon can also be useful in overcoming insomnia.<sup>23</sup>

### Batimung plant processing method

All aromatic plants are processed by boiling. However, some plants need to be processed before boiling (Table 6).

**Table 6:** Methods of Processing Batimung Plants

No	Cara pengolahan	Total	Percentage (%)
1	Boiled straight away	38	66,67
2	Chopped and boiled	7	12,28
3	Kneaded and boiled	7	12,28
4	Squeezed and boiled	3	5,26
5	Grated and boiled	2	3,51
Total		57	100

In *Batimung*, the aromatic plants are boiled and the steam is used for bathing. However, some plants need to be chopped, kneaded, squeezed, and grated before boiling. Generally, direct boiling at (66.67%) is the highest processing method where the plant is boiled in a covered pot. Boiling the fragrant smell, thereby producing an effect on the body. Batubara et al (2017) <sup>24</sup> stated that the herb boils for 20 – 40 minutes or until it boils and the boiling water changes color, and the plants wither.

### The dosage of *Batimung* plant use

*Batimung* herb uses 5 – 12 species of plants boiled together. The dosage is based on the therapist's experience (Table 7).

**Table 7:** The dose of the use of the *Batimung* plant

Plant Name	Plant Parts	The intended use	Total
Lime	Leaf	Caring for the body	1 handful (18,11-23,66 g)
Lime	Fruit	Caring for the body	½ -2 fruits (40,12 – 179,12 g)
Pandan	Leaf	Caring for the body	11-17 sheets (22,68-36,37 g)
Pulosari	Bark	Caring for the body	1 tablespoon (8 – 12,1 g)
Curcuma	Rhizome	Caring for the body	¼ – 1 part (17,21 -32,34 g)
Rose	Flower	Caring for the body	1-3 flowers (2,68 – 9,21 g)
Ylang Flower	Flower	Caring for the body	1 – 5 flowers (2,31-7,71 g)
Jasmine	Flower	Caring for the body	4-10 flowers (1,83-4,26 g)
Temugiring	Rhizome	Caring for the body	3 – 1 rhizome (3,41- 30 g)
Vetiver	Root	Caring for the body	2-5 root (4,6 – 15,6 (4g)
Cinnamon	Bark	Caring for the body	¼ - 1 bark (2-10,14 g)
Ganti	Stem	Caring for the body	1 tablespoon (1-3,41 g)
Lemongrass	Stem	Cure disease	1 stem (8-17,78 g)
Cempaka	Flower	Caring for the body	2 flowers(5-8,21 g)
Turmeric	Leaf	Caring for the body	5 sheet (12,1 -15,21 g)
Galangal	Rhizome	Cure disease	1 rizhome (74,68 g)
Ginger	Rhizome	Cure disease	1 rizhome (26,34 g)
Sappan wood	Bark	Caring for the body	2 handheld (16,17 -18 g)
Lemongrass scented	Leaf	Caring for the body	8 sheet (14,21 – 18,11 g)
Patchouli	Leaf	Caring for the body	10 sheet (4,19-6,12 g)
Yellow root	Root	Caring for the body	1 handheld (50,12 – 60,71 g)
Aromatic Ginger	Rhizome	Cure disease	1 rizhome (18,01 g)
Mesoyi	Bark	Caring for the body	1 part bark (2 -5,21 g)
Coconut	Shell	Cure disease	1 shell (25,21 g)
Lemon	Fruit	Caring for the body	½ fruit (40,17-51,15 g)
Sugarcane	Stem	Cure disease	¼ part bark (20,87 g)
Corn	Hump	Cure disease	1 hump (7,12 g)

The use of steam baths in other areas such as West Kalimantan (Betagas), the purpose of its use is used for relaxation media and customs before marriage <sup>5</sup>. However, in contrast to the purpose of using steam baths in the Karo Batak (Oukup) community, the people there use steam baths to treat diseases such as vertigo, diabetes, gout, colds, skin pain, insomnia, fatigue and post-natal pain <sup>24</sup>. Steam baths in Minahasa (Bakera), are predominantly used to restore or recover the body after childbirth <sup>25</sup>. The difference in the

purpose of use in each region is influenced by customs, habits and mixtures of ingredients used in each region.

### **The purpose of using *Batimung***

*Batimung* is used for body treatment and to cure diseases as shown in the findings that 98.98% is used for body treatment and 1.02% for curing disease. The body treatments prevent or eliminate body odor, provide relaxation, reduces excessive sweat, eliminates fatigue, enhances natural body smell, and are used in traditional wedding performance<sup>26</sup>. Thermotherapy soothes symptoms such as muscular strain, heaviness in the limbs, edema, loss of appetite, and constipation, whereas the essential oils of the plants used have an immuno-stimulant, antiseptic, and antiphlogistic effect<sup>25,27,28</sup>. Whereas the healing practices are used to cure the *wisa* disease. However, the use of *Batimung* to cure disease is less desirable due to easier and affordable access to health services in Banjarmasin. Therefore, *Batimung* is an alternative option recommended by therapists.

The period of use of batimung depends on the purpose of its use. If the purpose is for body care, the user must use batimung continuously so that the use of 1 year is the most. Uses < 1 year are new users who are trying batimung for body care. Continuous use will provide maximum benefits. Users for 3 days aim to follow Banjar wedding customs while users for 1 day are users who aim to treat diseases. According to the therapist, pre-marriage is done 3 days before the wedding and does batimung two to three times in a row. The use for pre-wedding aims to reduce sweat so that bridal makeup is more durable and makes the body more fragrant. The use for disease only needs to be done one to two times and in succession because the effect will be felt immediately.

The duration of one use of batimung is adjusted to the strength of the user, according to the therapist, it is recommended that the use of batimung be 15-60 minutes or until the decoction of the plant begins to cool. The difference in duration of use is due to the different resistance of each individual. The duration of single-use batimung is in line with the results of research from Hannuksela & Ellahham,<sup>29,30</sup> the use of steam baths will start to sweat after about 15 minutes. The results of the study of Batubara et al<sup>24</sup>, users of steam baths in Batak Karo can withstand hot steam for 15 minutes after using it 3-5 times before.

### **Conclusion**

There are 27 species of aromatic plants used in *Batimung* tradition where 25 tested positive for terpenoids. The plant parts used for body treatment are leaves (24%), flowers (24%), bark (16%), rhizomes (14%), roots (8%), fruits (8%), and stems (6%). Whereas, the parts used to cure disease are rhizomes (42.86%), stems (28.56%), shells and cobs (14.29%).

### **Acknowledgement**

The author would like to thank the Dean of the Faculty of Mathematics and Natural Sciences, Head of Study Program of Pharmacy at Lambung Mangkurat University for the support of laboratory facilities.

### **Authors contributions**

ARN collects data, analyzes, and compiles manuscripts, NIL collects data, literature, and prepares manuscripts, NRL performs data analysis, manuscript reviews, STM results analysis, manuscript reviews for submission to web journals.

### **Conflict of interests**

The author says that there is no conflict of interest, the author will be fully responsible for the content and writing of this article.

### **Ethical consideration**

All authors have checked for errors and falsifications related to the manuscript.

### **Funding/Support**

This research is supported by Lambung Mangkurat University through research support to lecturers with all laboratory facilities.







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## An Ethnomedicine Approach to Aromatic Plant Use in *Batimung* Tradition of North Banjarmasin Subdistrict Banjarmasin, Indonesia

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[sutomo01@ulm.ac.id](mailto:sutomo01@ulm.ac.id)<https://orcid.org/0000-0002-5456-1714>**Abstract**

Ethnomedicine is the study of the health-related indigenous knowledge of a particular ethnic group. Unique to the Banjar people is their use of fragrant plants blended by herbalists to treat illness, and the process is known as *Batimung*. Therefore, this study aimed to identify plants and the parts of aromatic plants used for practicing *Batimung*. It is a descriptive study with prospective observational data collection using purposive and quota sampling techniques. The number of therapist and user respondents was 5 and 98 people, respectively. The results showed that 26 types of plants were used, where 24 contained terpenoids. The plant parts used are leaves, flowers, bark, rhizomes, roots, fruit, stems and cobs. The approach entails boiling the plant materials and utilizing the resulting steam in the processing. In conclusion, the

most widely used aromatic plant parts are the leaves and flowers of *Citrus hystrix* DC.

**Keywords:** Ethnomedicine, *Batimung*, Therapists, Banjarmasin, Aromatic plants, Sauna

### Introduction

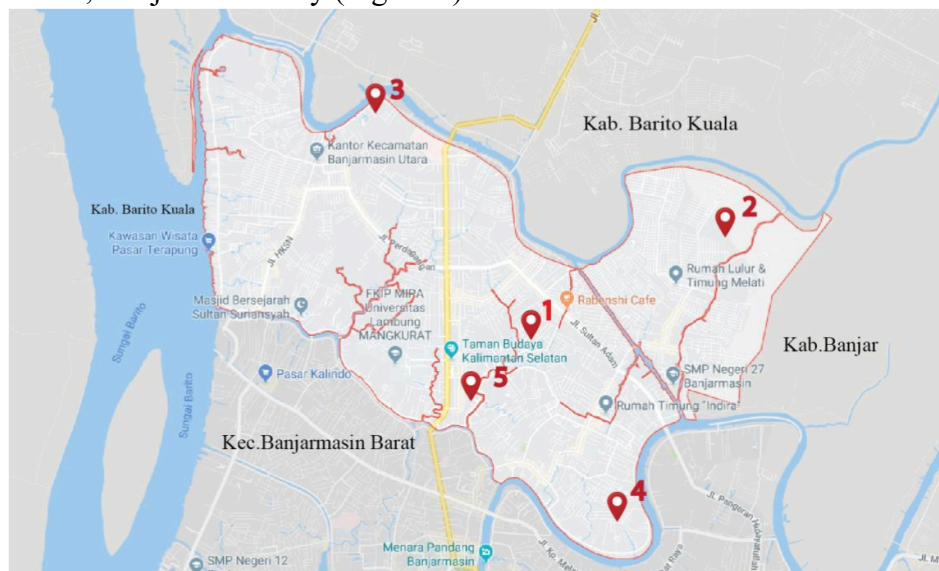
Indonesia is one of the mega bio-diversity countries with more than 25,000-30,000 plant species,<sup>1</sup> with 160-200, producing essential oils.<sup>2</sup> According to the Central Statistics Agency, the country had 1,300 ethnic groups, including Banjar, with diverse cultures such as *Batimung* that fulfilled all aspects of people's lives in 2010. The tradition originated from South Kalimantan and was performed by a Banjar descendant before marriage to eliminate body odor and excessive sweating. Additionally, it is used for *wisa* treatment<sup>3</sup> since the Banjar community believes that the disease is caused by supernatural beings capable of turning the patient's body color yellow.<sup>4</sup> *Batimung* is traditionally performed by mixing plants with a distinctive aroma. Ideham *et al.*<sup>3</sup> explained that this tradition had been passed down from several generations. Exploration of the types and uses of aromatic plants in this tradition is still minimal. Meanwhile, written information about the diversity of aromatic plants used is still lacking. In the future, it is feared that knowledge about the tradition could be lost in society, hence extracting information and documentation needs to be carried out on the aromatic plants.<sup>5</sup>

Ethnomedicine is an area of ethnobotanical studies that discusses scientifically validated indigenous practices for preserving health or medical systems.<sup>1</sup> The aromatic plants contain essential oils, mostly terpenoid compounds that should be identified.<sup>6</sup> This study was conducted in Banjarmasin, the origin of the ethnic Banjar.<sup>7</sup> Furthermore, the selection of North Banjarmasin was influenced by the Central Statistics Agency,<sup>8</sup> population census data, which recorded most of Banjar ethnic. Moreover, the study aimed to identify aromatic plants and the percentage of the different parts used.

### Methods

#### Study Time and Place

This study was conducted from February–March 2019 in North Banjarmasin Sub-district, Banjarmasin City (Figure 1).



**Figure 1:** The map of the research site (own collection)

#### Tools and Materials

Data collection was conducted using informed consent sheets, respondent demographics, a list of questions, and questionnaires. In contrast, the plants' terpenoid test used mortar, stempor, beaker glass, test tube, tube rack, and drop pipette. The test used methanol, chloroform, and Liebermann Buchard reagent of anhydrous acetic and sulfuric acids.

#### Field Data Collection Method

The therapist's data was collected through semi-structural interviews following questions from the list according to their needs. In contrast, the plant

samples were taken, captured, and collected. Species of the collected plants were recognized, and terpenoid components were analysed using plant methanol extract and Lieberman Burchard reagent.<sup>9,10</sup>

### Population

The population were people in North Banjarmasin Sub-district who practised the tradition, and the recommendations for research permits are carried out at the National Unity Agency 072/109-Sekr/Bakesbapol. Ethical clearance has been declared worthy by the Faculty of Health Research Ethics Commission and Banjarmasin Politics, and Lambung Mangkurat University Medicine with number 82/KEPK-FK UNLAM/EC/III/2019.

### Sample

The sample was divided into therapists and patients that fulfilled the following criteria:

1. The therapists should come originally from Banjar ethnicity, be accustomed to the plants used, possess sufficient procedure knowledge (using traditional equipment), *Batimung* practice awareness creator to the public, and possess the willingness to participate.
2. The patients should have performed the tradition in February 2019 and provided willingness to participate.
3. Incomplete or unfilled questionnaires as well as therapists using modern equipment were eliminated from the study.

### Sampling method

The purposive and quota sampling methods were used.<sup>11,12</sup>

### Number of samples

The samples included 5 therapists recommended by liaisons and matched the inclusion criteria,<sup>13,14</sup> while 98 users were sampled using Snedecor and Cochran calculations.

### Data analysis

The data - aromatic plant species, parts, methods employed, and function of *Batimung* were gathered and analysed using percentages.

### Results and Discussion

#### Demographics of Respondents in North Banjarmasin Sub-district

The results revealed that females predominated as indicated in Table 1 because they place a higher importance on appearance and body care,<sup>5</sup> and housewives dominated the patients at 47.96%. Furthermore, they were mostly between 26-35 at 48.98% and included senior high school students aged 15-19 who are more aware of the benefits of beauty and body treatment.<sup>5</sup> Additionally, the users included housewives, private employees, traders, student entrepreneurs, and others.

**Table 1:** Characteristics of *Batimung* Users

Characteristics	Total	Percentage (%)
Gender		
Man	14	14,29
Woman	84	85,71
Age		
15-25	22	22,45
26-35	48	48,98
36-45	17	17,35
46-55	7	7,14
>55	4	4,08
Education		
Not completed in primary school	1	1,02
SD	5	5,10
Middle School/Equivalent	19	19,39
High School/Equivalent	58	59,18
Academy/College	15	15,31
Work		

Not working/IRT	47	47,96
Private employees	27	27,55
Student/Student	8	8,16
civil servant	1	1,02
Entrepreneur/Trader	14	14,29
Etc	1	1,02
<b>Total</b>	<b>98</b>	<b>100</b>

**Table 2:** Characteristics of the Therapist Respondents in *Batimung*

No	Initials	Gender	Age	Education	Ethnicity	The Origin of Knowledge in Batimung
1	A	Woman	64	Junior High School	Banjar	Hereditary
2	J	Woman	55	Elementary School	Banjar	Training
3	K	Woman	55	Junior High School	Mix of Banjar and Dayak	Hereditary
4	N	Woman	55	Senior High School	Banjar	Hereditary
5	AA	Woman	53	Elementary School	Banjar	Hereditary

Table 2 demonstrates that all therapists were female due to their preponderance, and they were mostly old, threatening *Batimung's* sustainability. Therefore, young people should be trained to preserve and share this tradition for future practice.<sup>5,15</sup> The educational level of therapists varied from Elementary, Junior, and Senior High Schools.

### **Ethnomedicine of Aromatic Plants in *Batimung***

#### ***Batimung* plant species**

The study showed 26 species from 15 families as shown in detail in Table 3. The most used plants are kaffir lime and pandanus at 12.29% and 8.78%, while Zingiberaceae is the most prominent plant family at 19.30%.

**Table 3:** Types of *Batimung* Plants

No	Plant Name	Latin name	Family	Local Name	Total	Percentage (%)
1	Orange	<i>Citrus hystrix</i> DC.	Rutaceae	Limau purut	7	12,29
2	Pandan	<i>Pandanus amaryllifolius</i> Roxb.	Pandanaceae	Pudak	5	8,78
3	Pulosari	<i>Alyxia reinwardtii</i> Bl.	Apocynaceae	Pulosantan	4	7,03
4	Curcuma	<i>Curcuma xanthorrhiza</i> Roxb.	Zingiberaceae	Temulawak	4	7,03
5	Rose	<i>Rosa</i> sp.	Rosaceae	Mawar	4	7,03
6	Ylang Flower	<i>Cananga odorata</i> .	Annonaceae	Kenanga	4	7,03
7	Jasmine	<i>Jasminum sambac</i> .	Oleaceae	Melati	3	5,26
8	Temugiring	<i>Curcuma heyneana</i> .	Zingiberaceae	Temugiring	3	5,26
9	Vetiver	<i>Vetiveria zizanioides</i> L.	Gramineae	Akar sariwangi	3	5,26
10	Cinnamon	<i>Cinnamomum burmanii</i> Bl.	Lauraceae	Kayu manis	2	3,51
11	Ganti	<i>Ligustrum indicum</i> aiton f.	Oleaceae	Ganti	2	3,51
12	Lemongrass	<i>Cymbopogon citratus</i> DC.	Gramineae	Sarai	2	3,51
13	Lemongrass scented	<i>Cymbopogon nardus</i> L.	Gramineae	Sarai wangi	1	1,75
14	Cempaka	<i>Michelia</i> sp.	Magnollaceae	Cempaka	1	1,75
15	Ginger	<i>Zingiber officinale</i> .	Zingiberaceae	Tipakan	1	1,75

16	Aromatic ginger	<i>Kaempferia galangal</i> L.	Zingiberaceae	Kencur	1	1,75
17	Turmeric	<i>Curcuma domestica</i> .	Zingiberaceae	Janar	1	1,75
18	Galangal	<i>Alpinia purpurata</i> K.Schum.	Zingiberaceae	Laos	1	1,75
19	Sappan wood	<i>Caesalpinia sappan</i> L.	Fabaceae	Secang	1	1,75
20	Patchouli	<i>Pagostemon cablin</i> .	Lamiaceae	Nilam	1	1,75
21	Yellow root	<i>Arcangelisia flava</i> Merr.	Ranunculaceae	Kayu kuning	1	1,75
22	Mesoyi	<i>Massoia aromatica</i> Becc.	Lauraceae	Mesoyi	1	1,75
23	Coconut	<i>Cocos nucifera</i> L.	Arecaceae	Niur	1	1,75
24	Lemon	<i>Citrus limon</i> Burm.	Rutaceae	Lemon	1	1,75
25	Sugarcane	<i>Saccharum officinarum</i> .	Gramineae	Niran habang	1	1,75
26	Corn	<i>Zea mays</i> .	Poaceae	Jagung	1	1,75
Total					57	100



**Figure 2:** (A) Mix of plants in the tradition; (B) Wooden bench, pot, and wooden spoon; (C) Example of a mat used

### **Batimung Application**

*Batimung* is a steam bath employing aromatic plants that is used by the Banjar ethnic group, and it utilizes hot steam from boiled plants to make the user sweat. The results of the survey in the field, and the implementation begins with preparing the necessary materials and tools. The materials used are adjusted to the user's goals in utilizing *Batimung*, and the tools needed are pot, wooden bench, purun mat, wooden spoon and blanket or cloth cover, as shown in Figures 2A and 2B.

The therapist mixes and boils the prepared plants using water until it boils. After boiling, the user sits on a wooden bench provided, and a pot filled with *Batimung* is placed in a closed state between the user's feet. The purun mat is conical or circular to cover the user's body, and a blanket is placed around the mat to cover the open space, as shown in Figure 1C. After the user's entire body is tightly closed, the pot's lid is slowly opened, allowing the hot steam from the boiled plants to move out. A wooden spoon is useful for stirring the plant mixture, and after sometimes, the kaffir lime mat and blanket can be removed. The decoction can be used to boil two to three more times for one batch of *Batimung*. After the implementation, the user is advised to drink water or sweet drinks to restore the lost body fluids. The tradition of is not much different from the procedure described by Ideham.<sup>3</sup> However, in the

practice to cure disease, there is a special mantra that the therapist pronounces during its implementation.

### Terpenoid Test on *Batimung* Plants

The terpenoid test showed that 25 of the 27 samples were positive, while the remaining 2 were negative, indicated by a lack of colour or a brownish ring (corn & coconut). Positive terpenoids include *Citrus hystrix* DC., *Amaryllifolius* Roxb., *Alyxia reinwardtii* Bl., *Curcuma xanthorrhiza* Roxb., *Rosa* sp., *Cananga odorata*, *Jasminum samba*, *Curcuma heyneana*, *Vetiveria zizanioides* L., *Cinnamomum burmanii* Bl., *Ligustrum indicumaiton*, *Cymbopogon citratus* DC., *Cymbopogon nardus* L., *Michelia* sp., *Zingiber officinale*, *Kaempferia galangal* L., *Curcuma domestica*, *Alpinia purpurata* K.Schum., *Caesalpinia sappan* L., *Pagostemon cablin*, *Arcangelisia flava* Merr., *Massoia aromatica* Becc., *Citrus limon* Burm., *Cocos nucifera* L., and *Saccharum officinarum*. Additionally, the sugarcane sample using the Lieberman-Buchard test showed a brownish ring and turned green which indicated the presence of terpenoid and steroid compounds.<sup>16-18</sup> Terpenoids are compounds composed of an isoprene (C5) skeleton, a chain composed of five methyl branched carbons on number 2. Many of these compounds are contained in plants with a distinctive or aromatic smell, classified as monoterpenes.

Traditionally, aromatherapy has also been used for anxiety relief and mood improvement. In alleviating anxiety and depression, essential oils have no drawbacks associated with conventional medication therapy. In-vivo studies on animal models have verified these essential oils' anxiolytic effects and their significant components' interactions with central nervous system receptors. Therefore, it seems reasonable to argue that the modulation of glutamate and GABA neurotransmitter systems are likely to be the critical mechanisms responsible for the sedative, anxiolytic, and anticonvulsant properties of linalool and essential oils. Popular anxiolytic essential oils are rich in terpenoid alcohols, such as linalool, geraniol, citronellol, and monoterpene limonene or citral. Other formulations that contain these terpenoids as major components may serve as important aromatherapeutic.<sup>19</sup>

### *Batimung* plant parts

The study showed that the 42.68% of people use the rhizomes for disease healing as shown in Table 4, while 24% utilize the leaves and flowers for body treatment as described in Table 5. Furthermore, the treatment is used to treat wisa caused by jinn, which weakens and yellows the body. The therapists use it to warm the body and induce perspiration to expel the jinn or evil spirit. The Banjar people linked the "wisa sickness" with malaria, dengue fever, hepatitis or depression.

**Table 4:** Parts of the *Batimung* Plant for Healing Diseases

No	Plant Parts	Plants Name	Total	Percentage (%)
1	Rhizome	Galangal ( <i>Alpinia purpurata</i> K.Schum.) Ginger ( <i>Zingiber officinale</i> ) Aromatic ginger ( <i>Kaempferia galangal</i> L.)	3	42,86
2	Stem	Sugarcane ( <i>Saccharum officinarum</i> ) Lemongrass ( <i>Cymbopogon citratus</i> DC.)	2	28,56
3	Shell	Coconut ( <i>Cocos nucifera</i> L.)	1	14,29
4	Cob	Corn ( <i>Zea mays</i> )	1	14,29
Total			7	100

**Table 5:** Parts of the *Batimung* Plant for Body Care

No	Plant Parts	Plant Name	Total	Percentage (%)
1	Flower	Pandan ( <i>Pandanus amaryllifolius</i> Roxb.) Kaffir lime ( <i>Citrus hystrix</i> DC.) Turmeric ( <i>Curcuma domestica</i> .) Lemongrass ( <i>Cymbopogon nardus</i> L.) Patchouli ( <i>Pagostemon cablin</i> .)	12	24
2	Stem Bark	Jasmine ( <i>Jasminum sambac</i> ) Ylang ( <i>Cananga odorata</i> L.) Roses ( <i>Rosa</i> sp.) Cempaka ( <i>Michelia</i> sp.)	12	24

3	Rhizome	Cinnamon ( <i>Cinnamomum burmanii</i> BI.) Mesoyi ( <i>Massoia aromatica</i> Becc.) Sappan ( <i>Caesalpinia sappan</i> L.) Pulosari ( <i>Alyxia reinwardtii</i> BI.)	8	16
4	Root	Curcuma ( <i>Curcuma xanthorrhiza</i> Roxb.) Temugiring ( <i>Curcuma heyneana</i> )	7	14
5	Fruit	Vetiver ( <i>Vetiveria zizanioides</i> L.) Yellow Root ( <i>Arcangelisia flava</i> Merr.)	4	8
6	Flower	Lemon ( <i>Citrus limon</i> Burm.) Kaffir lime ( <i>Citrus hystrix</i> DC.)	4	8
7	Stem	Lemongrass ( <i>Cymbopogon citratus</i> DC.) Ganti ( <i>Ligustrum indicum aiton f.</i> )	3	6
Total			50	100

Removing leaves does not damage the plant because they can easily grow back and be used continuously.<sup>20</sup> The flowers are used for traditional rituals such as funeral ceremonies, *batapung tawar*, bathing, weddings, and others.<sup>21</sup> Furthermore, therapists use flowers because they are easily obtained and have a distinctive aroma beneficial for body treatment.

Plants such as roses, jasmine, ylang flower, kaffir lime, and vetiver used for body care purposes mostly contain essential oils. The research by Ardela *et al.*<sup>22</sup> show that the aroma of roses can reduce pain intensity in primary dysmenorrhea (menstrual pain) from moderate to mild on a scale of 5 to 0.9. In the Hongratanaworakit study,<sup>23</sup> rose essential oil was shown to significantly reduce respiratory rate, systolic blood pressure, and blood oxygen saturation. Furthermore, the study subjects group felt calmer, relaxed and less alert than the control. It is concluded that using roses in aromatherapy can reduce stress and depression in humans. The use is not limited to just relaxation, and oils from ylang and lemon can also be useful in overcoming insomnia.<sup>24</sup>

### **Batimung plant processing method**

All aromatic plants are processed by boiling (Table 6). **Table 6:** Methods of Processing *Batimung* Plants

In *Batimung*, the aromatic plants are boiled, and the steam is used for bathing. However, some plants need to be chopped, kneaded, squeezed and grated before boiling. Direct boiling at 66.67% is the highest processing method where the plant is boiled in a covered pot; this is because a physical impact is produced. Batubara et al. (2017)<sup>25</sup> stated that the process should be conducted for 20 – 40 minutes until the water changes colour, and the plants wither.

### **The dosage of *Batimung* plant use**

*Batimung* herb uses 5 – 12 species of plants boiled together, and the dosage is based on the therapist's experience (Table 7).

**Table 7:** The dose of the use of the *Batimung* plant

Plant Name	Plant Parts	The intended use	Total
Lime	Leaf	Caring for the body	1 handful (18,11-23,66 g)
Lime	Fruit	Caring for the body	½ -2 fruits (40,12 – 179,12 g)
Pandan	Leaf	Caring for the body	11-17 sheets (22,68-36,37 g)
Pulosari	Bark	Caring for the body	1 tablespoon (8 – 12,1 g)
Curcuma	Rhizome	Caring for the body	¼ – 1 part (17,21 -32,34 g)
Rose	Flower	Caring for the body	1-3 flowers (2,68 – 9,21 g)
Ylang Flower	Flower	Caring for the body	1 – 5 flowers (2,31-7,71 g)
Jasmine	Flower	Caring for the body	4-10 flowers (1,83-4,26 g)
Temugiring	Rhizome	Caring for the body	3 – 1 rhizome (3,41- 30 g)
Vetiver	Root	Caring for the body	2-5 root (4,6 – 15,6 (4g)
Cinnamon	Bark	Caring for the body	¼ - 1 bark (2-10,14 g)
Ganti	Stem	Caring for the body	1 tablespoon (1-3,41 g)
Lemongrass	Stem	Cure disease	1 stem (8-17,78 g)
Cempaka	Flower	Caring for the body	2 flowers(5-8,21 g)
Turmeric	Leaf	Caring for the body	5 sheet (12,1 -15,21 g)
Galangal	Rhizome	Cure disease	1 rizhyme (74,68 g)



Ginger	Rhizome	Cure disease	1 rizhome (26,34 g)
Sappan wood	Bark	Caring for the body	2 handheld (16,17 -18 g)
Lemongrass scented	Leaf	Caring for the body	8 sheet (14,21 – 18,11 g)
Patchouli	Leaf	Caring for the body	10 sheet (4,19-6,12 g)
Yellow root	Root	Caring for the body	1 handheld (50,12 – 60,71 g)
Aromatic Ginger	Rhizome	Cure disease	1 rizhome (18,01 g)
Mesoyi	Bark	Caring for the body	1 part bark (2 -5,21 g)
Coconut	Shell	Cure disease	1 shell (25,21 g)
Lemon	Fruit	Caring for the body	½ fruit (40,17-51,15 g)
Sugarcane	Stem	Cure disease	¼ part bark (20,87 g)
Corn	Hump	Cure disease	1 hump (7,12 g)

The use of steam baths in other areas such as West Kalimantan (Betagas) is used for relaxation media and customs before marriage.<sup>5</sup> However, in contrast to the purpose of using steam baths in the Karo Batak (Oukup) community, it treats diseases such as vertigo, diabetes, gout, colds, skin pain, insomnia, fatigue and post-natal pain.<sup>25</sup> In Minahasa (Bakera), it is predominantly used to restore or recover the body after childbirth.<sup>26</sup> The difference in the purpose of use is influenced by customs, habits and mixtures of ingredients in each region.

### **The purpose of using *Batimung***

The results showed that while 98.98% of *Batimung* is used for body treatment, 1.02% cures disease. The body treatments prevent or eliminate body odor, provide relaxation, reduce excessive sweat, eliminate fatigue, enhance natural body smell, and are used in traditional wedding performances.<sup>27</sup> Thermotherapy soothes symptoms such as muscular strain, heaviness in the limbs, oedema, loss of appetite, and constipation. The essential oils of the plants have an immuno-stimulant antiseptic and antiphlogistic effect.<sup>26,28,29</sup> The use of *Batimung* to cure disease is less desirable due to easier and affordable access to health services in Banjarmasin, but it is an alternative option recommended by therapists.

The period of use depends on the purpose, and when it is for body care, the user is expected to continuously utilize the combination for 1 year at most. Users for 3 days intend to practice Banjar wedding traditions, while one day users aim to treat ailments. According to the therapist, pre-marriage is conducted three days prior to the wedding and *Batimung* is performed twice yearly. The pre-wedding application is intended to reduce perspiration for bridal makeup to last longer. Due to the instantaneous nature of the action, the treatment of disease requires only one to two consecutive applications.

*Batimung* should be used for 15 to 60 minutes, or until the decoction of the plant begins to cool, depending on the strength of the user, as prescribed by the therapist. The varying period of use is a result of the resistance of each individual. The duration of single-use is in line with the research from Hannuksela & Ellahham,<sup>30,31</sup> where sweating will begin after 15 minutes of steam bath. The study of Batubara et al.<sup>25</sup> shows that users in Batak Karo can withstand hot steam for 15 minutes after using for 3-5 times.

### **Conclusion**

There are 27 species of aromatic plants used in *Batimung* tradition, where 25 tested positive for terpenoids. The plant parts used for body treatment are leaves (24%), flowers (24%), bark (16%), rhizomes (14%), roots (8%), fruits (8%), and stems (6%). Meanwhile, the parts used to cure disease are rhizomes (42.86%), stems (28.56%), and shells and cobs (14.29%).

### **Acknowledgement**

The author would like to thank the Dean of the Faculty of Mathematics and Natural Sciences, Head of Study Program of Pharmacy at Lambung Mangkurat University for the support of laboratory facilities.

## Authors contributions

ARN collects data, analyzes, and compiles manuscripts, NIL collects data, literature, and prepares manuscripts, NRL performs data analysis, manuscript reviews, STM results analysis, manuscript reviews for submission to web journals.

## Conflict of interests

The author says that there is no conflict of interest, the author will be fully responsible for the content and writing of this article.

## Ethical consideration

All authors have checked for errors and falsifications related to the manuscript.

## Funding/Support

This research is supported by Lambung Mangkurat University through research support to lecturers with all laboratory facilities.

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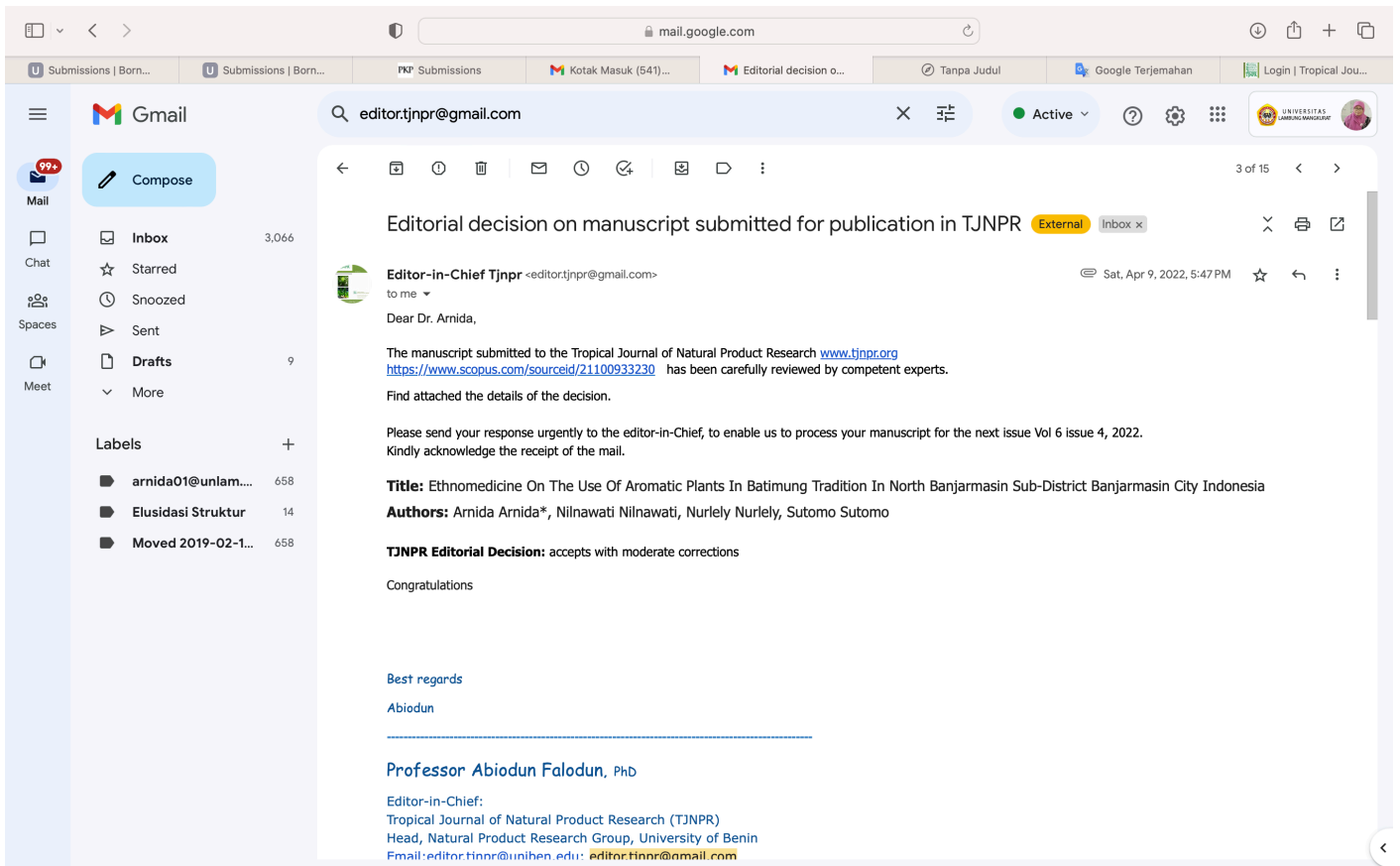
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## An Ethnomedicine Approach to Aromatic Plant Use in *Batimung* Tradition of North Banjarmasin Subdistrict Banjarmasin, Indonesia

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### ARTICLE INFO

#### Article history:

Received 06 February 2022

Revised 21 May 2022

Accepted 08 July 2022

Published online xxxxxxxx

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### ABSTRACT

Ethnomedicine is the study of the health-related indigenous knowledge of a particular ethnic group. Unique to the Banjar people is their use of fragrant plants blended by herbalists to treat illness, and the process is known as *Batimung*. Therefore, this study aimed to identify plants and the parts of aromatic plants used for practicing *Batimung*. It is a descriptive study with prospective observational data collection using purposive and quota sampling techniques. The number of therapist and user respondents were 5 and 98 people, respectively. The results showed that 27 types of plants were used, where 25 contained terpenoids. The plant parts used are leaves, flowers, bark, rhizomes, roots, fruit, stems and cobs. The approach entails boiling the plant materials and utilizing the resulting steam in the processing. In conclusion, the most widely used aromatic plant parts are the leaves and flowers of *Citrus hystrix* DC.

**Keywords:** Ethnomedicine, *Batimung*, Therapists, Banjarmasin, Aromatic plants, Sauna

### Introduction

Indonesia is one of the mega bio-diversity countries with more than 25,000-30,000 plant species,<sup>1</sup> with 160-200, producing essential oils.<sup>2</sup> In 2010, according to the Central Statistics Agency, the country had 1,300 ethnic groups, including Banjar, with diverse cultures such as *Batimung* that fulfilled all aspects of people's lives. The tradition originated from South Kalimantan and was performed by a Banjar descendant before marriage to eliminate body odor and excessive sweating. Additionally, it is used for *wisa* treatment<sup>3</sup> since the Banjar community believes that the disease is caused by supernatural beings capable of turning the patient's body color yellow.<sup>4</sup> *Batimung* is traditionally performed by mixing plants with distinctive aromas. Ideham *et al.*<sup>3</sup> explained that this tradition had been passed down from several generations. Exploration of the types and uses of aromatic plants in this tradition is still minimal. Meanwhile, written information about the diversity of the aromatic plants used is still lacking. In the future, it is feared that knowledge about the tradition could be lost in society, hence extracting information and documentation needs to be carried out on the aromatic plants.<sup>5</sup>

Ethnomedicine is an area of ethnobotanical studies that discusses scientifically validated indigenous practices for preserving health or medical systems.<sup>1</sup> The aromatic plants contain essential oils, mostly terpenoid compounds that should be identified.<sup>6</sup> This study was conducted in Banjarmasin, the origin of the ethnic Banjar.<sup>7</sup> Furthermore, the selection of North Banjarmasin was influenced by the Central Statistics Agency,<sup>8</sup> population census data, which recorded most of Banjar ethnic group. Moreover, the study aimed to identify aromatic plants and the percentage of the different parts used.

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**Citation:** Arnida A, Nilnawati N, Nurlily N, Sutomo S. An Ethnomedicine Approach to Aromatic Plant Use in *Batimung* Tradition of North Banjarmasin Subdistrict Banjarmasin, Indonesia. Trop J Nat Prod Res. 2022; 6(7):xxxx

Official Journal of Natural Product Research Group, Faculty of Pharmacy, University of Benin, Benin City, Nigeria.

### Methods

#### Study time and place

This study was conducted from February–March 2019 in North Banjarmasin Sub-district, Banjarmasin City (Figure 1).

#### Tools and Materials

Data collection was conducted using informed consent sheets, respondent demographics, a list of questions, and questionnaires. Apparatus used for the plants' terpenoid test include mortar, beaker, test tube, test tube rack, and drop pipette. The solvents and reagents used include methanol, chloroform, and Lieberman Buchard reagent of anhydrous acetic and sulfuric acids.

#### Field data collection method

The therapist's data was collected through semi-structural interviews following questions from the list according to their needs. In contrast, the plant samples were taken, captured, and collected. Species of the collected plants were recognized, and terpenoid components were analysed using plant methanol extract and Lieberman Burchard reagent.<sup>9,10</sup>

#### Population

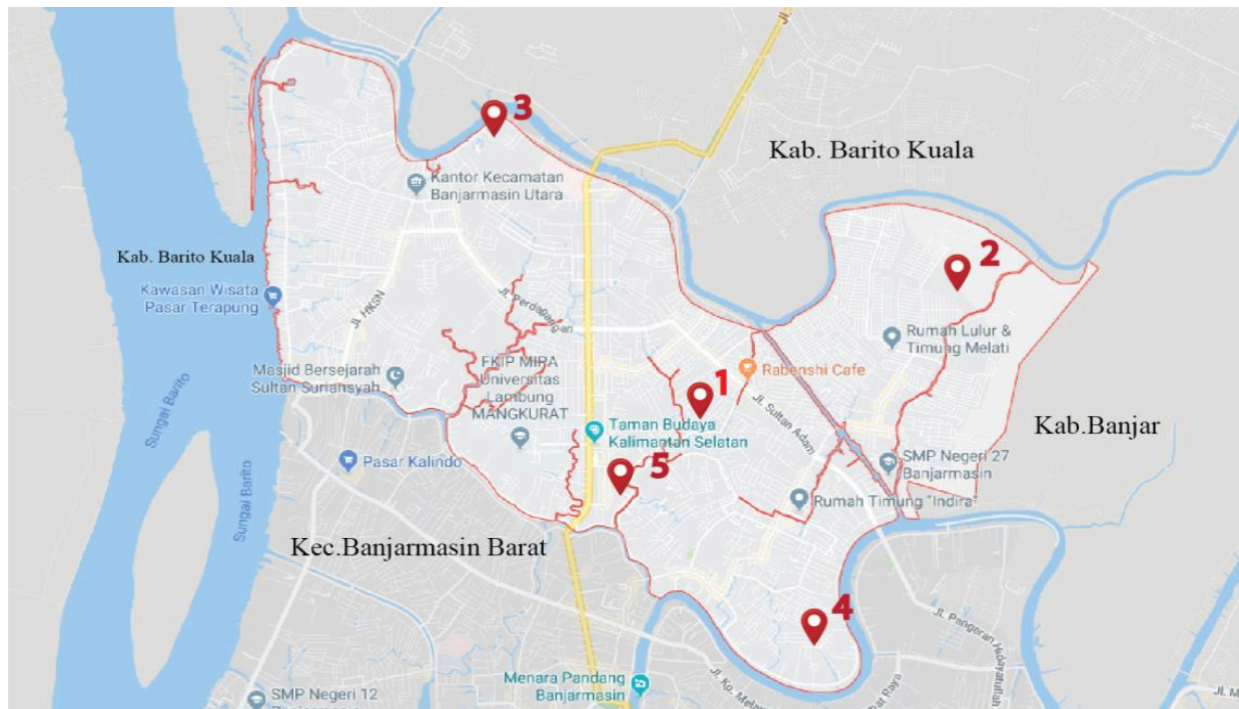
The population were people in North Banjarmasin Sub-district who practised the tradition, and the recommendations for research permits were carried out at the National Unity Agency 072/109-Sekr/Bakesbapol. Ethical clearance was given by the Faculty of Health Research Ethics Commission and Banjarmasin Politics, and Lambung Mangkurat University of Medicine with number 82/KEPK-FK UNLAM/EC/III/2019.

#### Sample

The sample was divided into therapists and patients that fulfilled the following criteria:

1. The therapists should come originally from Banjar ethnicity, be accustomed to the plants used, possess sufficient procedure knowledge (using traditional equipment), *Batimung* practice awareness creator to the public, and possess the willingness to participate.
2. The patients should have performed the tradition in February 2019 and provided willingness to participate.
3. Incomplete or unfilled questionnaires as well as therapists using modern equipment were eliminated from the study.





**Figure 1:** The map of the research site (own collection)

#### Sampling method

The purposive and quota sampling methods were used.<sup>11,12</sup>

#### Number of samples

The samples included 5 therapists recommended by liaisons and matched the inclusion criteria,<sup>13,14</sup> while 98 users were sampled using Snedecor and Cochran calculations.

#### Statistical analysis

The data - aromatic plant species, parts, methods employed, and function of *Batimung* were gathered and analysed using percentages.

## Results and Discussion

#### Demographics of Respondents in North Banjarmasin Sub-district

The results revealed that females predominated as indicated in Table 1 because they place a higher importance on appearance and body care,<sup>5</sup> and housewives dominated the patients at 47.96%. Furthermore, they were mostly between 26-35 years at 48.98% and included senior high school students aged 15-19 years who are more aware of the benefits of beauty and body treatment.<sup>5</sup> Additionally, the users included housewives, private employees, traders, student entrepreneurs, and others.

Table 2 demonstrates that all therapists were female due to their preponderance, and they were mostly old, threatening *Batimung*'s sustainability. Therefore, young people should be trained to preserve and share this tradition for future practice.<sup>5,15</sup> The educational level of therapists varied from Elementary, Junior, and Senior High Schools.

#### Ethnomedicine of Aromatic Plants in Batimung

##### Batimung plant species

The study showed 26 species from 15 families as shown in Table 3. The most used plants are kaffir lime and pandanus at 12.29% and 8.78%, respectively while Zingiberaceae is the most prominent plant family at 19.30%.

##### Batimung Application

*Batimung* is a steam bath employing aromatic plants that is used by the Banjar ethnic group, and it utilizes hot steam from boiled plants to make the user sweat. The results of the survey in the field, and the implementation begins with preparing the necessary materials and

tools. The materials used are adjusted to the user's goals in utilizing *Batimung*, and the tools needed are pot, wooden bench, purun mat, wooden spoon and blanket or cloth cover, as shown in Figures 2A and 2B.

The therapist mixes and boils the prepared plants using water. After boiling, the user sits on a wooden bench provided, and a pot filled with *Batimung* is placed in a closed state between the user's feet. The purun mat is conical or circular to cover the user's body, and a blanket is placed around the mat to cover the open space, as shown in Figure 1C. After the user's entire body is tightly closed, the pot's lid is slowly opened, allowing the hot steam from the boiled plants to go out. A wooden spoon is used for stirring the plant mixture, and after sometime, the kaffir lime mat and blanket is removed. The decoction can be used to boil two to three more times for one batch of *Batimung*. After the implementation, the user is advised to drink water or sweet drinks to restore the lost body fluids. The tradition is not much different from the procedure described by Ideham.<sup>3</sup> However, in the practice to cure disease, there is a special mantra that the therapist pronounces during its implementation.

##### Terpenoid test on Batimung plants

The terpenoid test showed that 25 out of the 27 samples were positive, while the remaining 2 (corn & coconut) were negative, indicated by a lack of colour or a brownish ring. The plants positive for terpenoids include *Citrus hystrix* DC., *Amaryllifolius* Roxb., *Alyxia reinwardtii* Bl., *Curcuma xanthorrhiza* Roxb., *Rosa* sp., *Cananga odorata*, *Jasminum samba*, *Curcuma heyneana*, *Vetiveria zizanioides* L., *Cinnamomum burmannii* Bl., *Ligustrum indicum* maiton, *Cymbopogon citratus* DC., *Cymbopogon nardus* L., *Michelia* sp., *Zingiber officinale*, *Kaempferia galangal* L., *Curcuma domestica*, *Alpinia purpurata* K.Schum., *Caesalpinia sappan* L., *Pagostemon cablin*, *Arcangelisia flava* Merr., *Massoia aromatica* Becc., *Citrus limon* Burm., *Cocos nucifera* L., and *Saccharum officinarum*. Additionally, the sugarcane sample using the Lieberman-Buchard test showed a brownish ring and turned green which indicated the presence of terpenoid and steroid compounds.<sup>16-18</sup> Terpenoids are compounds composed of an isoprene (C<sub>5</sub>) skeleton. Many of these compounds are contained in plants with a distinctive or aromatic smell, classified as monoterpenes.

**Table 1:** Characteristics of *Batimung* Users

Characteristics	Total	Percentage (%)
<b>Gender</b>		
Man	14	14.29
Woman	84	85.71
<b>Age</b>		
15-25	22	22.45
26-35	48	48.98
36-45	17	17.35
46-55	7	7.14
>55	4	4.08
<b>Education</b>		
Not completed in primary school	1	1.02
SD	5	5.10
Middle School/Equivalent	19	19.39
High School/Equivalent	58	59.18
Academy/College	15	15.31
<b>Work</b>		
Not working/IRT	47	47.96
Private employees	27	27.55
Student/Student	8	8.16
civil servant	1	1.02
Entrepreneur/Trader	14	14.29
Etc	1	1.02
Total	98	100

Traditionally, aromatherapy has also been used for anxiety relief and mood improvement. In alleviating anxiety and depression, essential oils have no drawbacks associated with conventional medication therapy. In-vivo studies on animal models have verified these essential oils' anxiolytic effects and their significant components' interactions with central nervous system receptors. Therefore, it seems reasonable to argue that the modulation of glutamate and GABA neurotransmitter systems are likely to be the critical mechanisms responsible for the sedative, anxiolytic, and anticonvulsant properties of linalool and essential oils. Popular anxiolytic essential oils are rich in terpenoid alcohols, such as linalool, geraniol, citronellol, and monoterpene limonene or citral. Other formulations that contain these terpenoids as major components may serve as important aromatherapeutic.<sup>19</sup>

#### *Batimung* plant parts

The study showed that 42.68% of people use the rhizomes for disease healing as shown in Table 4, while 24% utilize the leaves and flowers for body treatment as described in Table 5. Furthermore, the treatment is used to treat wisa caused by jinn, which weakens and yellows the body. The therapists use it to warm the body and induce perspiration to expel the jinn or evil spirit. The Banjar people linked the "wisa sickness" with malaria, dengue fever, hepatitis or depression.

Removing leaves does not damage the plant because they can easily grow back and be used continuously.<sup>20</sup> The flowers are used for traditional rituals such as funeral ceremonies, *batapung tawar*, bathing, weddings, and others.<sup>21</sup> Furthermore, therapists use flowers because they are easily obtained and have a distinctive aroma beneficial for body treatment.

Plants such as roses, jasmine, ylang flower, kaffir lime, and vetiver used for body care purposes mostly contain essential oils. The research by Ardela *et al.*<sup>22</sup> show that the aroma of roses can reduce pain intensity in primary dysmenorrhea (menstrual pain) from moderate to mild on a scale of 5 to 0.9.

In the Hongratanaworakit study,<sup>23</sup> rose essential oil was shown to significantly reduce respiratory rate, systolic blood pressure, and blood oxygen saturation. Furthermore, the study subjects group felt calmer, relaxed and less alert than the control.

**Table 2:** Characteristics of the Therapist Respondents in *Batimung*

No	Initials	Gender	Age (years)	Education	Ethnicity	The Origin of Knowledge in <i>Batimung</i>
1	A	Woman	64	Junior High School	Banjar	Hereditary
2	J	Woman	55	Elementary School	Banjar	Training
3	K	Woman	55	Junior High School	Mix of Banjar and Dayak	Hereditary
4	N	Woman	55	Senior High School	Banjar	Hereditary
5	AA	Woman	53	Elementary School	Banjar	Hereditary

**Table 3:** Types of *Batimung* Plants

No	Plant Name	Latin name	Family	Local Name	Total	Percentage (%)
1	Orange	<i>Citrus hystrix</i> DC.	Rutaceae	Limau purut	7	12.29
2	Pandan	<i>Pandanus amaryllifolius</i> Roxb.	Pandanaceae	Pudak	5	8.78
3	Pulosari	<i>Alyxia reinwardtii</i> Bl.	Apocynaceae	Pulosantan	4	7.03
4	Curcuma	<i>Curcuma xanthorrhiza</i> Roxb.	Zingiberaceae	Temulawak	4	7.03
5	Rose	<i>Rosa</i> sp.	Rosaceae	Mawar	4	7.03
6	Ylang Flower	<i>Cananga odorata</i> .	Annonaceae	Kenanga	4	7.03
7	Jasmine	<i>Jasminum sambac</i> .	Oleaceae	Melati	3	5.26
8	Temugiring	<i>Curcuma heyneana</i> .	Zingiberaceae	Temugiring	3	5.26
9	Vetiver	<i>Vetiveria zizanioides</i> L.	Gramineae	Akar sariwangi	3	5.26
10	Cinnamon	<i>Cinnamomum burmanii</i> Bl.	Lauraceae	Kayu manis	2	3.51
11	Ganti	<i>Ligustrum indicum aiton</i> f.	Oleaceae	Ganti	2	3.51

12	Lemongrass	<i>Cymbopogon citratus</i> DC.	Gramineae	Sarai	2	3.51
13	Lemongrass scented	<i>Cymbopogon nardus</i> L.	Gramineae	Sarai wangi	1	1.75
14	Cempaka	<i>Michelia</i> sp.	Magnollaceae	Cempaka	1	1.75
15	Ginger	<i>Zingiber officinale</i> .	Zingiberaceae	Tipakan	1	1.75
16	Aromatic ginger	<i>Kaempferia galangal</i> L.	Zingiberaceae	Kencur	1	1.75
17	Turmeric	<i>Curcuma domestica</i> .	Zingiberaceae	Janar	1	1.75
18	Galangal	<i>Alpinia purpurata</i> K.Schum.	Zingiberaceae	Laos	1	1.75
19	Sappan wood	<i>Caesalpinia sappan</i> L.	Fabaceae	Secang	1	1.75
20	Patchouli	<i>Pogostemon cablin</i> .	Lamiaceae	Nilam	1	1.75
21	Yellow root	<i>Arcangelisia flava</i> Merr.	Ranunculaceae	Kayu kuning	1	1.75
22	Mesoyi	<i>Masosia aromatica</i> Becc.	Lauraceae	Mesoyi	1	1.75
23	Coconut	<i>Cocos nucifera</i> L.	Arecaceae	Niur	1	1.75
24	Lemon	<i>Citrus limon</i> Burm.	Rutaceae	Lemon	1	1.75
25	Sugarcane	<i>Saccharum officinarum</i> .	Gramineae	Niran habang	1	1.75
26	Corn	<i>Zea mays</i> .	Poaceae	Jagung	1	1.75
Total					57	100

**Table 4:** Parts of the *Batimung* Plant used for Healing Diseases

No	Plant Parts	Plants Name	Total	Percentage (%)
1	Rhizome	Galangal ( <i>Alpinia purpurata</i> K.Schum.) Ginger ( <i>Zingiber officinale</i> ) Aromatic ginger ( <i>Kaempferia galangal</i> L.)	3	42.86
2	Stem	Sugarcane ( <i>Saccharum officinarum</i> ) Lemongrass ( <i>Cymbopogon citratus</i> DC.)	2	28.56
3	Shell	Coconut ( <i>Cocos nucifera</i> L.)	1	14.29
4	Cob	Corn ( <i>Zea mays</i> )	1	14.29
Total			7	100

**Figure 2:** (A) Mix of plants in the tradition; (B) Wooden bench, pot, and wooden spoon; (C) Example of a mat used

It is concluded that using roses in aromatherapy can reduce stress and depression in humans. The use is not limited to just relaxation, and oils from ylang and lemon can also be useful in overcoming insomnia.<sup>24</sup>

#### *Batimung* plant processing method

All aromatic plants are processed by boiling (Table 6).

In *Batimung*, the aromatic plants are boiled, and the steam is used for bathing. However, some plants need to be chopped, kneaded, squeezed and grated before boiling. Direct boiling at 66.67% is the highest processing method where the plant is boiled in a covered pot; this is because a physical impact is produced. Batubara *et al.*<sup>25</sup> stated

that the process should be conducted for 20 – 40 minutes until the water changes colour, and the plants wither.

#### *The dosage of Batimung plant use*

*Batimung* herb uses 5 – 12 species of plants boiled together, and the dosage is based on the therapist's experience (Table 7).

The use of steam baths in other areas such as West Kalimantan (Betagas) is used for relaxation media and customs before marriage.<sup>5</sup> However, in contrast to the purpose of using steam baths in the Karo Batak (Oukup) community, it treats diseases such as vertigo, diabetes, gout, colds, skin pain, insomnia, fatigue and post-natal pain.<sup>25</sup> In Minahasa (Bakera), it is predominantly used to restore or recover the body after childbirth.<sup>26</sup> The difference in the purpose of use is influenced by customs, habits and mixtures of ingredients in each region.

#### *The purpose of using Batimung*

The results showed that while 98.98% of *Batimung* is used for body treatment, 1.02% cures disease. The body treatments prevent or eliminate body odour, provide relaxation, reduce excessive sweat, eliminate fatigue, enhance natural body smell, and are used in traditional wedding performances.<sup>27</sup> Thermotherapy soothes symptoms such as muscular strain, heaviness in the limbs, oedema, loss of appetite, and constipation. The essential oils of the plants have an immuno-stimulant antiseptic and antiphlogistic effect.<sup>26,28,29</sup> The use of *Batimung* to cure disease is less desirable due to easier and affordable access to health services in Banjarmasin, but it is an alternative option recommended by therapists.

**Table 5:** Parts of the *Batimung* Plant for Body Care

No	Plant Parts	Plant Name	Total	Percentage (%)
1	Flower	Pandan ( <i>Pandanus amaryllifolius</i> Roxb.)	12	24
		Kaffir lime ( <i>Citrus hystrix</i> DC.)		
		Turmeric ( <i>Curcuma domestica</i> .)		
		Lemongrass ( <i>Cymbopogon nardus</i> L.)		
		Patchouli ( <i>Pogostemon cablin</i> .)		
2	Stem Bark	Jasmine ( <i>Jasminum sambac</i> )	12	24
		Ylang ( <i>Cananga odorata</i> L.)		
		Roses ( <i>Rosa</i> sp.)		
		Cempaka ( <i>Michelia</i> sp.)		
3	Rhizome	Cinnamon ( <i>Cinnamomum burmanii</i> BL.)	8	16
		Mesoyi ( <i>Massoia aromatica</i> Becc.)		
		Sappan ( <i>Caesalpinia sappan</i> L.)		
		Pulosari ( <i>Alyxia reinwardtii</i> BL.)		
4	Root	Curcuma ( <i>Curcuma xanthorrhiza</i> Roxb.)	7	14
		Temugiring ( <i>Curcuma heyneana</i> )		
5	Fruit	Vetiver ( <i>Vetiveria zizanioides</i> L.)	4	8
		Yellow Root ( <i>Arcangelisia flava</i> Merr.)		
6	Flower	Lemon ( <i>Citrus limon</i> Burm.)	4	8
		Kaffir lime ( <i>Citrus hystrix</i> DC.)		
7	Stem	Lemongrass ( <i>Cymbopogon citratus</i> DC.)	3	6
		Ganti ( <i>Ligustrum indicum aiton f.</i> )		
Total			50	100

**Table 6:** Methods of Processing *Batimung* Plants

No	Cara pengolahan	Total	Percentage (%)
1	Boiled straight away	38	66,67
2	Chopped and boiled	7	12,28
3	Kneaded and boiled	7	12,28
4	Squeezed and boiled	3	5,26
5	Grated and boiled	2	3,51
Total		57	100

The period of use depends on the purpose, and when it is for body care, the user is expected to continuously utilize the combination for 1 year at most. Users for 3 days intend to practice Banjar wedding traditions, while one day users aim to treat ailments. According to the therapist, pre-marriage is conducted three days prior to the wedding and *Batimung* is performed twice yearly. The pre-wedding application is intended to reduce perspiration for bridal makeup to last longer. Due to the instantaneous nature of the action, the treatment of disease requires only one to two consecutive applications.

*Batimung* should be used for 15 to 60 minutes, or until the decoction of the plant begins to cool, depending on the strength of the user, as prescribed by the therapist.

**Table 7:** The dose of the use of the *Batimung* plant

Plant Name	Plant Parts	The intended use	Total
Lime	Leaf	Caring for the body	1 handful (18.11-23.66 g)
Lime	Fruit	Caring for the body	½ -2 fruits (40.12 – 179.12 g)
Pandan	Leaf	Caring for the body	11-17 sheets (22.68-36.37 g)
Pulosari	Bark	Caring for the body	1 tablespoon (8 – 12.1 g)
Curcuma	Rhizome	Caring for the body	¼ – 1 part (17.21 -32.34 g)
Rose	Flower	Caring for the body	1-3 flowers (2.68 – 9.21 g)
Ylang Flower	Flower	Caring for the body	1 – 5 flowers (2.31-7.71 g)
Jasmine	Flower	Caring for the body	4-10 flowers (1.83-4.26 g)
Temugiring	Rhizome	Caring for the body	3 – 1 rhizome (3,41- 30 g)
Vetiver	Root	Caring for the body	2-5 root (4.6 – 15.6 (4g)
Cinnamon	Bark	Caring for the body	¼ - 1 bark (2-10.14 g)

Ganti	Stem	Caring for the body	1 tablespoon (1-3.41 g)
Lemongrass	Stem	Cure disease	1 stem (8-17.78 g)
Cempaka	Flower	Caring for the body	2 flowers(5-8.21 g)
Turmeric	Leaf	Caring for the body	5 sheet (12.1 -15.21 g)
Galangal	Rhizome	Cure disease	1 rizhome (74.68 g)
Ginger	Rhizome	Cure disease	1 rizhome (26.34 g)
Sappan wood	Bark	Caring for the body	2 handheld (16.17 -18 g)
Lemongrass scented	Leaf	Caring for the body	8 sheet (14.21 – 18.11 g)
Patchouli	Leaf	Caring for the body	10 sheet (4.19-6.12 g)
Yellow root	Root	Caring for the body	1 handheld (50.12 – 60.71 g)
Aromatic Ginger	Rhizome	Cure disease	1 rizhome (18.01 g)
Mesoyi	Bark	Caring for the body	1 part bark (2 -5.21 g)
Coconut	Shell	Cure disease	1 shell (25.21 g)
Lemon	Fruit	Caring for the body	½ fruit (40.17-51.15 g)
Sugarcane	Stem	Cure disease	¼ part bark (20.87 g)
Corn	Hump	Cure disease	1 hump (7.12 g)

## Conclusion

There are 27 species of aromatic plants used in *Batimung* tradition, where 25 tested positive for terpenoids. The plant parts used for body treatment are leaves (24%), flowers (24%), bark (16%), rhizomes (14%), roots (8%), fruits (8%), and stems (6%). Meanwhile, the parts used to cure disease are rhizomes (42.86%), stems (28.56%), and shells and cobs (14.29%).

## Conflict of Interest

The authors declare no conflict of interest.

## Authors' Declaration

The authors hereby declare that the work presented in this article is original and that any liability for claims relating to the content of this article will be borne by them.

## Acknowledgements

The author would like to thank the Dean of the Faculty of Mathematics and Natural Sciences, Head of Study Program of Pharmacy at Lambung Mangkurat University for the support of laboratory facilities.

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