

PROCEEDING

The International Conference on
**Pharmacy and Advanced
Pharmaceutical
Sciences**

Faculty of Pharmacy UGM
Yogyakarta Indonesia
October 2009

The International Conference on Pharmacy and Advanced Pharmaceutical Sciences

Faculty of Pharmacy UGM



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The International Conference on Pharmacy and Advanced Pharmaceutical Sciences Yogyakarta, Indonesia, 2009

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Preface from the Editor

The proceeding was produced based on papers and posters presented at the international Conference on Pharmacy and Advanced Pharmaceutical Sciences, held in Yogyakarta, Indonesia, 5 – 6 October 2009.

The proceeding clearly reflects broad interest; from there are participants coming from all around the world. Many contributions on Pharmaceutical Sciences there are quite a substantial number of papers on Pharmacist role in general. The papers presented file into a broad spectrum in Pharmaceutical sciences including Pharmacology, Toxicology, Analytical Chemistry and Drug Design, Drugs Synthesis, Formulation of Drugs, Pharmacy Social, Pharmacoepidemy, Traditional Medicine Natural Product Chemistry and Phytochemistry, etc.

In addition there are substantial numbers of paper deal with professional aspect of Pharmacist in general health care.

In this an opportunity, I would like to express my appreciation to the editorial team of the proceeding who have been working hard to review manuscripts, and making the first edition of this proceeding be possible.

I would like also to thanks to all invited speakers and presenters who participated in the International Conference on Pharmacy and Advanced Pharmaceutical Sciences and your contribution to this proceeding.

Finally, I hope this proceeding will give contribution to the advanced scientific research in the field of pharmaceutical sciences

Yogyakarta, July 2010

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Welcome Message From the committee

Welcome to Yogyakarta

On behalf of the Scientific and Organizing Committees, it is a great pleasure for me to welcome all participants to Yogyakarta, to the International Conference on Pharmacy and Advanced Pharmaceutical Science 2009.

The international conference is organized by the faculty of Pharmacy UGM to celebrate its 63th anniversary and the Lustrum XII of Gadjah Mada University, as a collaboration work between the Faculty of Pharmacy UGM with the Nara Institute of Science and Technology (Japan) and the Universiti Sains Malaysia (Malaysia). In this conference 15 lectures within the field of Pharmaceutical Care and Advanced Pharmaceutical Science will be given by invited speakers. Besides, 55 posters and 75 paper will be presented in the parallels presentation sessions. Herewith, we express our gratitude to all speakers and presenter, who would like to share their advance knowledge in this scientific event.

The Organizing Committee gratefully acknowledges the Nara Institute of Science and Technology and the Universiti Sains Malaysia, for the nice collaboration in bringing forth this conference. A special acknowledgment is addressed to the Rector of Gadjah Mada University and the sponsors, for all supports that make this symposium possible. Furthermore, personally, I want to express my deep appreciation to the members of the Organizing Committee, for the good teamwork and their great effort given in the preparation for this symposium.

Finally, I wish all participants a scientifically rewarding and an enjoyable meeting in Yogyakarta.

Chairman

Dr. Hilda Ismail, M.Si., Apt.

Remark of the Dean Faculty

Assalamu'alaikum wr. wb.

Distinguished ladies & gentlemen.

First of all, on behalf of the Faculty of Pharmacy Universitas Gadjah Mada, I would like to welcome you all to Yogyakarta, thank you very much for your attention to come and to attend the international Symposium on Pharmacy and Advanced Pharmaceutical Sciences. I hope we are all in good health condition.

Ladies and gentlemen,

The symposium is organized by the Faculty of Pharmacy UGM in collaboration with the Faculty of Pharmaceutical Sciences Universiti Sains Malaysia and the Nara Institute of Science and Technology Japan, and held as part to celebrate the 63th anniversary of the Faculty of Pharmacy UGM.

In the symposium, I hope we can communicate our recent information concerning social / clinical pharmacy and pharmaceutical sciences. I hope the symposium will be very fruitful, very useful for all of us.

I address special thanks to the plenary speakers both from domestic and abroad, the oral and poster presenters, as well as to those who come just to know the development of clinical or social pharmacy and pharmaceutical science. Your willingness to come, to communicate and to share your experiences is highly appreciated.

Special thanks also I address to my colleague the Dean of Faculty of Pharmacy USM who has been coordinating USM students to attend this symposium. The hope is not to set up networking between the pharmacy students of USM and UGM.

Therefore, during almost whole day discussing scientific matter related to human health and welfare, I hope we can make a wonderful opportunity to make a scientific closer relationship while we enjoy the cultural performances of Yogyakarta presented by our pharmacy student.

Finally, I hope that this meeting will give benefits to all of us, and we may see each other again in a similar event in the near future.

I look forward to thank you all for attending this event.

Wassalamu'alaikum wa rahmatullahi wa barakatuh,
Dean of Faculty of Pharmacy UGM

Prof. Dr. Marchaban, DESS., Apt.

Speech of the Senior Vice Rector For Education, Research and Community Services, Gadjah Mada University

Assalamu'alaikum wa rahmatulLahi wa barakatuh,

On behalf of the Rector, I would like to welcome all of you to our campus Gadjah Mada University and to our home town Yogyakarta. It is a great honor for me and Gadjah Mada University to host the Two-day International Conference on Pharmacy and Pharmaceutical Sciences that is conducted by the Faculty of Pharmacy, Gadjah Mada University. The increasing problems and new cases of some diseases in the world, both the infectious and the degenerative diseases, have demanded the development of medical and pharmaceutical sciences and technologies for supporting the developments of early detection methods of the diseases, the accurate diagnoses, as well as the appropriate and effective medications or therapy. Pharmaceutical Science and Technology have been developing very fast within recent years. The development trend shows using much more biotechnological approach in both diagnose establishment and medication administrations. For examples the usage of some serums, enzymes, hormones, vaccines, etc., and their recombinant products. The science and technology for finding prevention method against infectious diseases or degenerative diseases now have been developing so amazing, for example the usage of growth hormones, vaccines, and stem cells for it.

Gadjah Mada University has been committed to become World Class University; therefore international networking in education, research and publication is much needed. I really support to this international conference on Pharmaceutical Science and Technology which can keep us in touch with the state of the art of pharmaceutical science. I do believe that by conducting this kind of international meeting, we can get and exchange new information and best practices on pharmaceutical science and technology, and it is very important to inspire our young researchers and enhance our research networking internationally. In this occasion, I would like to express my great gratitude to all the guest speakers and speakers, who have contributed their advanced presentations in this international conference. I also would like to extend my gratitude to the Organizing Committee from the Faculty of Pharmacy, Gadjah Mada University, who has already successfully arranged this international conference. I would also thank to all institutions or companies who have sponsored and supported this conference.

Finally, have a fruitful conference and enjoy Yogyakarta. Thank you
Wassalamu'alaikum wa rahmatulLahi wa barakatuh,

Senior Vice Rector for Education, Research and Community Service
Gadjah Mada University

Prof. Dr. Retno Sunarminingsih, M.Sc., Apt.

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Identification of components of essential oil from *Cananga odorata* which penetrated into the rat skin / (wistar strain) in the practice of Timung (development of Timung as alternative healing)

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Abstract

Components of essential oil of *Cananga odorata* (Lamk) Hook F. & Thompson) from Indonesia had been studied for their penetration ability into the skin of rat (Wistar strain) in the practice of Timung using modified Timung apparatus. Components which penetrated into the rat skin were determined using Gas Chromatography Mass Spectrometry (GC-MS) and identified as p-methyl-anisole, Linalool-L, geraniol, eugenol, neril-asetat, trans-(β)-caryophyllene, (+)-aromadendrene, α -humulen, α -amorphen, germacrene D, Germacrene B, (Z,E)- α -farnesen, Δ -cadinene. Components which penetrated into the receptor phase (buffer phase) are p-methyl-anisol, linalool-L, trans-geraniol, eugenol, benzyl alcohol, trans-caryophyllene, α -humulene, germacrane-D, (Z,E)- α -farnesen, Δ -cadinene. It can be concluded that components of *Cananga* Oil showed the ability to penetrate into the skin in the practice of Timung.

Keywords : *Cananga odorata*, essential oil, rat skin, Timung

Introduction

Various industries are now looking into sources of alternative medicine, as it is more natural and environmentally friendly. The possibility of utilizing essential oils is now being investigated. Although their biological activity have been known for centuries, but their mode of action was not fully understood.

Timung is one of traditional healing practices. This method has been used by Banjar ethnic, Kalimantan, Indonesia, which used steaming of water with essential oil from aromatic herbal medicines (Anthenas, 2003; Syaifullah, 2007). As the practice of timung is still popular, a research is needed to give scientific evidence to it.

One of the herbals that is mostly used in timung recipe is *Cananga odorata* (Lamk) Hook. F. & Thomson) Essential oil from *Cananga odorata* flower from Java is popular and has 1-2% essential oil content. (Ernest Guenther, 1972).

The aim of the research was to investigate the components of essential oil of *Cananga odorata* and the ability of the components to penetrate into the rat skin on Timung practice.

Methodology

Material and Method

Plant material

Fresh flower petals of *Cananga odorata* (Lamk.) Hook. F. & Thomson obtained from Surabaya, East Java, Indonesia.

Skin rat. Rat abdominal skin from male white rat strain Wistar was used in the experiment (Fig. 1) *Cananga* oil was extracted from fresh petals using water- steam distillation method.

Identification of Components of *Cananga* oil

Identification of *Cananga* oil components and components which penetrated into the rat skin were conducted using Gas Chromatography-Mass Spectrometry Detector (Agilent 6890 Series Plus, MSD Agilent 5973 Network, Auto injector 7683 database of Library Wiley 275.L and database NIST02.L).



Fig. 1. Rat abdominal skin.



Fig. 2. Modified timung apparatus

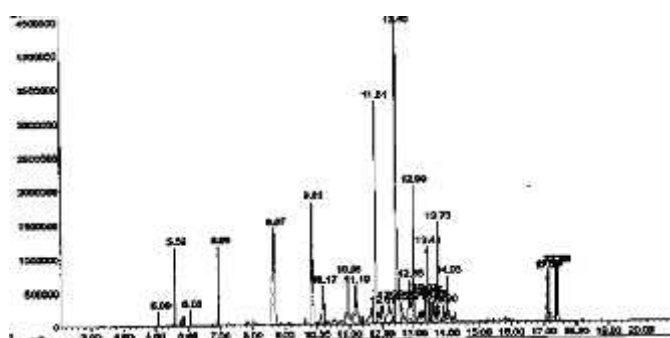


Fig.3. Gas-Chromatogram Profile of Cananga Oil

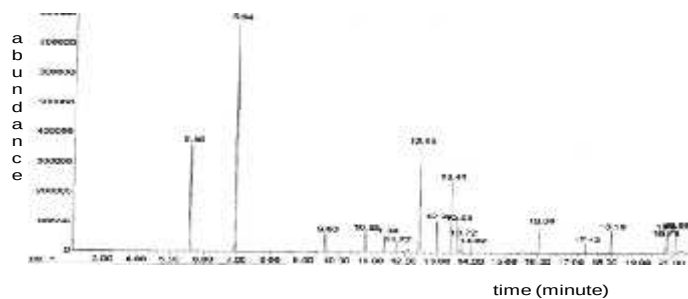


Fig. 4. Gas chromatogram profile of extracted oil from the treated skin

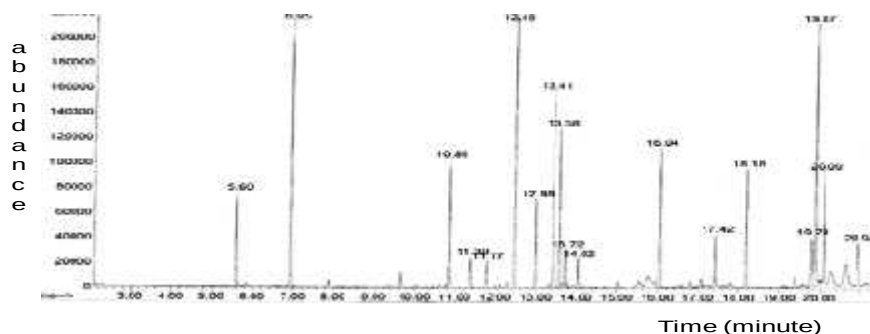


Fig. 5. Gas chromatogram profile of oil extracted from the receptor phase.

Timung procees

In the experiment, a modified- timung apparatus is used. 1 ml of essential oils in 30 ml of aquadest were put into the steamer of the apparatus and boiled. The steam was flown via glass pipe with 0,5 cm in diameter and 44 cm long to the timung glass chamber 9 x 9 x 8 cm facilitated with a thermometer. The temperature of timung chamber was maintained at 40-45°C on a water bath (Fig. 2). The treated rat skin was fixed with parafilm on a petri disc with 5 cm in diameter. A buffer solution with pH 7.4 was filled in to the petri disc. The buffer solution was named receptor phase.

The surface of the rat skin which had been treated was cleaned with methanol, then extracted with hexane for the determination of components of cananga oil which were able to penetrate into the skin. Liquid of receptor phase was extracted with hexane for the determination of components of cananga oil which entered the rat skin layer into receptor phase. The extract of the rat skin and receptor phase were examined by GC-MSD.

Result and Discussion

The oil yield from *Cananga odorata* was 1,4179% v/w. In this experiment the oil has 22 components consists of monoterpenes and sesquiterpenes (Fig. 3, Table 1).

Components of cananga oil able to penetrate into the treated skin were identified as 5 monoterpenes and 9 sesquiterpenes. The monoterpene compounds are p – methyl anisol, L – Linalool, geraniol, eugenol, neril – acetate, while the sesquiterpenes are trans – (β) – caryophyllene, (+) aromadendren, α – humulen, α – amorphen, D - germacrene , (Z,E) – α – farnesen, Δ-cadinene, α – cadinene, α – kubeben (Fig.4)

The components of cananga oil that penetrated into receptor phase are monoterpenes, identified as p- methyl anisole, l-linalool, trans geraniol, eugenol, neril acetate, citronellal, citronellol, geraniol, and sesquiterpenes identified as trans-β-caryophyllene, Δ-cadinen. Sesquiterpene compounds which was found in the receptor phase were trans – (β) – caryophyllene, α – humulen,

D – germacrene, (Z,E) – α – farnesen, Δ-cadinen. (Fig.5).

Result of the experiment showed that components of essential oil from cananga oil have penetration ability into the rat skin and receptor phase. The penetration ability was due to the small molecular weight (Michael, 2002), lipophilic and hydrophilic properties of the components. The temperature (40-45°C) of the timung glass chamber can enhanced the log P of the components (Cal K, 2007). Besides, the effect of temperature on permeability has been explored (Guy, 2003).

Steam of water in timung process hydrated the stratum corneum and caused the skin more permeable (Cal, 2007, Williams & Barry, 2004, Guy & Hadgraft, 2003).

There are component of essential oils known to improve diffusion through the skin. These compounds have similar structures in that they possess a polar head group and a long alkyl chain. They are known to intercalate into the structured lipids of the skin and reduce the diffusional resistance to permeation and aid drug transport (Hadgraft, 2003), such as shown by eugenol, linalool and geraniol.

Tabel 1. Component of cananga oil

Peak no.	Retention time (minute)	Area (%)	Component	Library
1	5,09	0,41	Mircene	Wiley275.L
2	5,59	2,29	P-methyl anisole	Wiley275.L
3	5,74	0,21	Limonene	Wiley275.L
4	5,87	0,29	Cis-ocimen	Wiley275.L
5	6,05	0,50	Trans- β -Ocimene	Wiley275.L
6	6,95	2,33	L-linalol	Wiley275.L
7	8,66	8,63	β -caryophyllene	Wiley275.L
8	9,64	0,29	Geraniol	NIST02.L
9	9,83	8,36	Trans (β)caryophyllene	Wiley275.L
10	10,17	3,05	α -humulen	Wiley275.L
11	10,89	0,39	α -kofaen / α -ylangen	Wiley275.L
12	10,95	2,81	α -humulen	Wiley275.L
13	11,13	0,73	α -amorphen	Wiley275.L
14	11,20	2,30	D-germacrene	Wiley275.L
15	11,26	0,72	Trans-caryophyllene	Wiley275.L
16	11,39	0,24	Eugenol	Wiley275.L
17	11,69	0,86	α -Amorphen	Wiley275.L
18	11,81	11,76	Trans-caryophyllene	Wiley275.L
19	12,01	1,43	(E,Z)- α -farnesen	NIST02.L
20	12,23	2,46	Farnesen	Wiley275.L
21	12,46	14,87	Trans-caryophyllene	Wiley275.L
22	12,58	1,12	E,E- α -farnesen	Wiley275.L
23	12,61	0,68	α -amorfen	Wiley275.L
24	12,86	2,44	Δ -cadinene	Wiley275.L
25	12,91	1,26	α -amorphen	Wiley275.L
26	12,99	5,44	α -humulen	Wiley275.L
27	13,16	0,60	α -cadinene	Wiley275.L
28	13,22	0,55	Aromadendren	Wiley275.L
29	13,28	0,44	β -kubeben	Wiley275.L
30	13,33	1,25	α -amorphen	Wiley275.L
31	13,41	3,54	D-germacrene	Wiley275.L
32	13,45	0,82	E,E- α -farnesen	Wiley275.L
33	13,58	1,19	α -amorphen	Wiley275.L
34	13,68	0,81	α -muurolen	Wiley275.L
35	13,68	3,65	Δ -cadinen	Wiley275.L
36	13,90	0,84	α -amorphen	Wiley275.L
37	13,97	0,32	α -cadinen	Wiley275.L
38	14,02	1,67	Δ -cadinen	Wiley275.L
39	14,25	0,34	α -muurolen	Wiley275.L
40	17,09	1,90	Benzil benzoat	Wiley275.L
41	17,16	2,12	Benzil benzoat	Wiley275.L
42	17,36	1,99	Benzil benzoat	Wiley275.L
43	17,42	2,10	Benzil benzoat	Wiley275.L

Rat skin and receptor phase can be penetrated by linalool and eugenol.

Both can relax smooth muscles and thus have vasodilatation property. (Kim,2003)

The antiseptic property of geraniol and linalool is five time stronger compare to phenol (Jeffrey,1999).

In the experiment, certain components of essential oil from *Cananga odorata* (Lamk.) Hook showed the ability to penetrate into the skin in the practice of timung.

Therefore, it can be concluded that timung method can be used as a prototype of transdermal drug delivery system.

Conclusion

Cananga oil obtained from petal of *Cananga odorata* (Lamk.) Hook contained monoterpene and sesquiterpene compound

Components of cananga oil showed the ability to penetrate into the skin in timung practice.

References

- Anthenas A, 2003, Adat istiadat Perkawinan Urang Banjar (III) Bapingit-Badudus Sebelum Akat Nikah, 6 Desember 2006, Banjarmasin Post. Barry BW, 1983, Dermatological Formulation : Percutaneous Absorption, Marcel Dekker INC, New York, pp. 127-145.
- Cal K, Janicki S, Sznitowska M, 2001, In vitro Studies on Penetration of Terpenes from Matrix- type Transdermal System Through Human Skin, *Int J Pharm.* 224(1-2): 81-8.
- Cal K, Kupiec K, Sznitowska M, 2006, Effect of Physicochemical Properties of Ciclic Terpenes on Their ex Vivo Skin Absorption Elimination Kinetics, *J Dermatol Sci.* 42(2): 137-42.
- Cal K, 2006, Skin Penetration of Terpenes from Essential Oils and Topical Vehicles, *Planta Med*, 72: 311-16.
- Cal K, 2007, Skin Penetration of Terpenes, *Pharmaceutical Technology Asia Pasific*, 1 February 2007. Guy RH, Hadgraft J, 2003, *Transdermal Drug Delivery*, Marcel Dekker, Inc, New York. Basel.
- Ernest Guenther, 1972, *The Essential Oils*, Robert E. Krieger Publising Co., Inc., Huntington, New York.
- Inouye S, Takizawa T, Yamaguchi H, (2001), Antibacterial Activity of Essential Oils and Their Mayor Constituents Against Respiratory Tract Pathogens by gaseous Contact, *Journal of Antimicrobial Chemotherapy* 47, 565-573.
- Michael EA, 2002, *Pharmaceutics the Science of Dosage from Design* 2nd ed, London, Churchill Livingstone.
- Sacchetti G, Maietti S, Muzzol M, Scaglianti M, Manfredini S, Radice M and Bruni R, 2004, Comparative evaluation of 11 Essential Oils of Different Origin as Functional antioxidant, antiradicals and antimicrobials in Foods, *Food Chemistry* 91 (2005) 621-632.
- Syaifullah M., 2007, Batimung, Mandi Uap Warisan Warga Banjar, *Kompas*, 12 Mei.
- Tiwary AK, Sapra B & Jain S, 2007, *Innovations in Transdermal Drug Delivery: Formulations and Techniques*, *Recent Patent on Drug Delivery & Formulation* vol 1, 23-36.
- Williams AC, Barry BW, (2004), Penetration Enhancers, *Advance Drug Delivery Reviews* 56 (2004) 603-618.