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The International Conference on Pharmacy and Advanced Pharmaceutical Sciences

Faculty of Pharmacy UGM

PROCEEDING

# The International Conference on Pharmacy and Advanced Pharmaceutical Sciences

Faculty of Pharmacy UGM
Yogyakarta Indonesia
October 2009

UNIVERSITI SAINS MALAYSIA

NAIST

**PROCEEDING**

# 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

Dr. rer. nat. Pudjono, SU., Apt.

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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 63$^{th}$ 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 Malyasia, 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 be half of the Faculty of Pharmacy Universitas Gadjah Mada, I would like come to all of you in 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 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 recently information concerning social / clinical pharmacy and pharmaceutical sciences. I hope the symposium will be very fruitfull, very useful for all of us .
I addres special thanks to the plenary speakers both from domestic and aboard, 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.

## CONTENTS

# The Influence of Olive Oil Addition on Increasing of Arbutin Penetration in the *Carbomer-940's* Gel (Observation on Inhibition of Enzyme Tyrosinase Activity)

**Widji Soeratri*, Tristiana Erawati, Noorma Rosita, Fahriyatul Wahyuni**
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## Abstract

The aim of this study was to investigate the influence of olive oil addition on the increasing of arbutin penetrations in the *Carbomer-940's* gel; it was observed on inhibition of enzyme tyrosinase activity. High hydrophilicity of arbutin (log P. value, -1.35) makes it difficult to permeate through the skin and reach site of action. Olive oil addition was expected to increase the arbutin penetrations. Percent inhibition of tyrosinase by arbutin was determined by observing absorption value of Dopachrome (in intermediate product of melanin formation) using spectrophotometer. The result of this study, percent inhibition of the formula control, 1, 2 and 3 were 21.79; 24.24; 21.79 and 35.60% respectively. The processing data was using the statistic programmed of SPSS 12.0 with one way ANOVA method obtained the result there was significant difference from percent inhibition in one of formula. Conclusion from this study was olive oil addition 7% could increase of arbutin penetrations and increase the inhibition of enzyme tyrosinase activity.

Keyword: Arbutin, Penetrations, Olive oil, Enzyme tyrosinase, *Carbomer-940's*, inhibition

## Introduction

Arbutin is mostly used as lightening agent which was very hydrophilic with log P value -1.35; make it difficult to penetrate through the skin. Enhancer can be adding to increase penetration rate. Olive oil (3, 5 and 7%) addition was expected to increase the arbutin penetrations. Olive oil contains oleic acid (83.5%), a substance that's capable of interacting and modifying the lipid bilayer of stratum corneum to increase the lipophilicity of a substance. Its ability as penetration enhancer in local anesthetic agent has been proofed by Sarma and Fisher (Sarma, 1993).

Among several variant skin lightening preparations, gel gives us a cool sensation, not sticky, elegant, and smooth and easy to be washed from the skin. A synthetic gelling agent like *carbomer* 940 usually requires only a small amount of them to produce a gel with good consistency compared to other types of gelling agent.

The aim of this study was to investigate the influence of olive oil (3, 5, and 7% w/w) addition on the arbutin (3% w/w) penetrations in the Carbomer-940 gel base through the modified lipid membrane. It was observed on inhibition of enzyme tyrosinase activity.

## Methodology

### Preparation of skin lightening gel containing arbutin and olive oil

The arbutin in Carbomer-940 gel base formulas as lightening product was shown in table 1.

### Characteristics determination of skin lightening gel

The characteristic of preparation were determined include: organoleptic test visually. While the determination of pH and spread ability is done in 2 days after the formula were made by using a digital pH meter Schott CG 842. and a spreading-ability apparatus.

Table 1: Formula used in research

| Material | Consentration ( % w/w) | | | | |
|---|---|---|---|---|---|
| | Base | Control | F1 | F2 | F3 |
| Arbutin | - | 3 | 3 | 3 | 3 |
| Olive oil | - | - | 3 | 5 | 7 |
| Carbomer 940 | 1 | 1 | 1 | 1 | 1 |
| TEA | 1 | 1 | 1 | 1 | 1 |
| Propylene glycol | 20 | 20 | 20 | 20 | 20 |
| Methyl-parabene | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 |
| Propyl-parabene | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Na EDTA | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| BHT | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Tween 80 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Water up to | 100 | 100 | 100 | 100 | 100 |

**Determination of enzyme tyrosinase activity**

L-tyrosine solution 0.5 ml added with 3.0 ml sample solution that collected from compartment receptor after 360 minutes penetrated through Millipore membrane which was impregnated with isopropyl-myristate. The mixture was oxygenized 5 minutes then added with 1.0 ml tyrosinase solution. After incubated for 10 minutes at 25°C the mixture was inactivated with 0.5 ml TCA solution and then the absorption value measured at maximum wavelength of dophacrome (Avanti, 2003).

**The evaluation of inhibition of enzyme tyrosinase activity**

The inhibition of enzyme tyrosinase activity was performed as inhibition percent, which found from calculation of absorption value per second enzymatic reaction with inhibitor, compared with absorption value per second enzymatic reaction without inhibitor, using the following equation (Luanratana and Gritsadapong, 2005):

$$\text{inhibition}(\%) = 100 - \frac{(Ax100)}{B}$$

Whereas:
A = absorption value (A/second) at dophacrome λ maximum with inhibitor
B = absorption value (A/second) at dophacrome λ maximum without inhibitor

The data (inhibition %) were analyzed with ANOVA one way method ($p<0.05$).

## Results and Discussions

The pH of arbutin gels shows in table 2 indicated that 3, 5, and 7% w/w concentration of olive oil not influenced the pH value of arbutin gels. Based on the pH data was known that all formulas have suitable pH (5.84 – 6.53) for skin around 4.0 – 6.8 (Zulkarnain, 2003).

Figure 1 shows the spreading profile of arbutin gel preparation, and spreading-capasity (spreadingdiameter) of arbutin gels at 45 gram ballast shows in table 3. The ANOVA one way test of spreading-capacity found the value of $F_{calculation}$ (196.533) > $F_{table}$ (4.07). Based on the HSD test can concluded that addition 7% w/w olive oil decreased the spreading-capacity of arbutin gel preparation. Spreading-ability was the slope of linier-regression between spreading-diameter (mm) and ballast weight (gram), its shows in table 4. The slope value from its formulas was tested by ANOVA one way method, it's found that the value of $F_{calculation}$ (23.669) < $F_{table}$ (4.07). From HSD test can concluded that addition

olive oil decreased the spreading-ability of arbutin gel preparation by increasing concentration of olive oil 3, 5 and 7% w/w.

Table 2. The arbutin gel pH values

| Formula | pH | |
|---|---|---|
| | Mean ± SD | %CV |
| Base | 6.00 ± 0.01 | 0.17 |
| Control | 6.16 ± 0.11 | 1.78 |
| Formula 1 | 5.84 ± 0.08 | 1.37 |
| Formula 2 | 6.53 ± 0.05 | 0.76 |
| Formula 3 | 6.45 ± 0.02 | 0.31 |

The arbutin effectivity as lightening agent calculated as inhibition percent (%) of enzyme tyrosinase activity. The result of arbutin inhibition percent (%) with enhancer olive oil in carbomer gels shows in table 5.

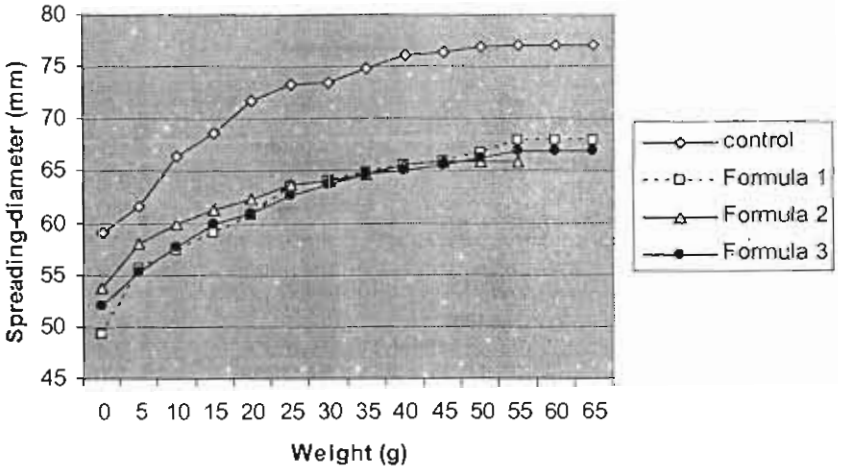


Figure 1. The spreading profile of arbutin gel preparation.

The ANOVA one way test of the arbutin effectivity in carbomer gel formulas found the value of $F_{calculation}$ (29.739) > $F_{table}$ (4.07), and from the HSD test was found inhibition percent of control = formula 1 = formula 2 < formula 3.

Table 3. Spreading-capacity arbutin gel at 45 gram ballast weight

| Formula | Spreading diameter mean ± SD (mm) |
|---|---|
| Control | 76.33 ± 0.58 |
| Formula 1 | 66.00 ± 0.00 |
| Formula 2 | 66.00 ± 1.00 |
| Formula 3 | 65.67 ± 0.58 |

Table 4. Spreading-ability of arbutin gel

| Formula | Average slope ± SD (g/mm) |
|---|---|
| Control | 0.3473 ± 0.02 |
| Formula 1 | 0.2965 ± 0.01 |
| Formula 2 | 0.2550 ± 0.01 |
| Formula 3 | 0.2497 ± 0.01 |

Addition 3 and 5% w/w enhancer olive oil did not influence arbutin effectivity it can be caused by decreasing arbutin release from the more viscous bases. In addition of 7 % w/w olive oil was known that it increased arbutin penetration, showed by increasing inhibition percent of tyrosinase activity. It more is caused increasing concentration of arbutin in water phase, replacing water by olive oil in the formula.

Table5. Arbutin effectivity (% inhibition) in skin lightening gel

| Formula | % Inhibition | |
|---|---|---|
| | Average ± SD | % CV |
| Control | 21.79 ± 1.65 | 7.57 |
| Formula 1 | 24.24 ± 2.57 | 10.60 |
| Formula 2 | 21.79 ± 1.65 | 7.57 |
| Formula 3 | 35.60 ± 2.35 | 6.60 |

## Conclusion

The addition of arbutin and olive oil affect the physical appearance (organoleptic and consistency) of skin lightening product as well as its spreading ability. Addition 7 % w/w olive oil increase arbutin effectivity by increased the inhibition percent value of enzyme tyrosinase activity in the skin lightening formula which was formulated in carbomer 940 gel base.

## Acknowledgement

This study was supported financially by Project Grant Faculty of Pharmacy. Airlangga University.

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