Proceeding

The 1st International Conference on Pharmaceutics & Pharmaceutical Sciences

ICPPS 2014

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The 1st International Conference on Pharmaceutics & Pharmaceutical Sciences

Drug Delivery Systems:
From Drug-Discovery, Pre-formulation, Formulation and Technological Approaches for Poorly Soluble Drugs and Protein

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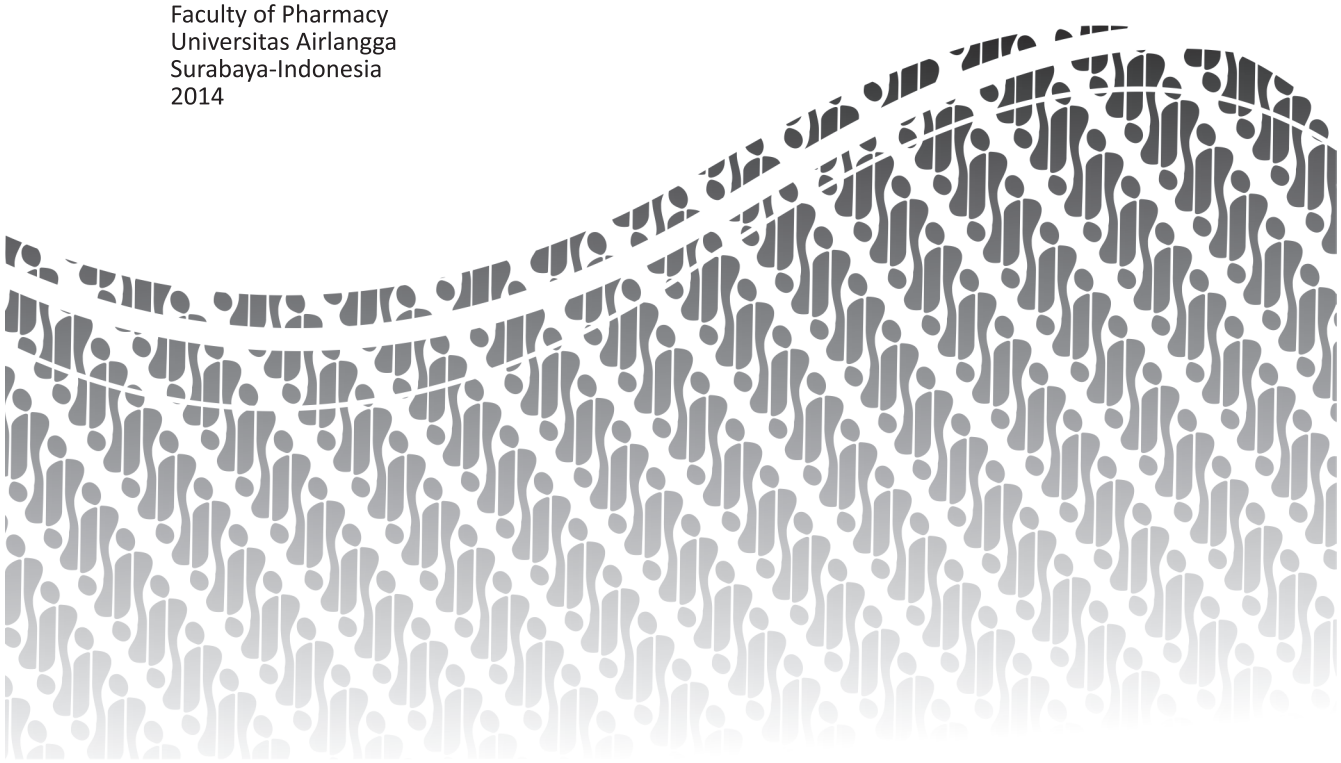
Published and Organized by
Faculty of Pharmacy
Universitas Airlangga
Surabaya-Indonesia
2014



The 1st International Conference on Pharmaceutics & Pharmaceutical Sciences Proceedings

ISBN : 978-602-72333-0-0
(Letter of National ISBN Agency No. 4127/E.8/p/03.2015 Date 18 March 2015)

1st edition Proceeding
Published by:
Faculty of Pharmacy Universitas Airlangga
Surabaya, Indonesia

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ISBN 978-602-72333-0-0

PREFACE From Chairman

It is our pleasure to present you the proceedings of The 1st International Conference on Pharmaceutics and Pharmaceutical Sciences (ICPPS) organized by The Faculty of Pharmacy Universitas Airlangga Surabaya Indonesia.

The proceeding was produced based on papers and posters presented at The 1st International Conference on Pharmaceutics and Pharmaceutical Sciences (ICPPS), held in Surabaya, Indonesia, 14-15 November 2014.

The proceeding clearly reflects broad interest, from the participants that coming from all around the world.

The papers presented were pharmaceutics and biopharmaceutics; requirements on how to evaluate molecules in discovery and their appropriateness for selection as potential candidate; their development in context of challenges and benefits, together with associated time and cost implications and also requirements to progress through pre-clinical and clinical.

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 1st International Conference on Pharmaceutics and Pharmaceutical Sciences (ICPPS) and your contribution to this proceeding.

Finally, I hope this proceeding will give contribution to the Pharmaceutics and Pharmaceutical Sciences research.

Chairman,

Dra. Esti Hendradi, MSI., Ph.D., Apt

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EFFECT OF COMPARISON SURFACTANT AND COSURFACTANT IN WATER/OIL MICROEMULSION IN RELEASE OF OVALBUMIN (Microemulsion Water/Oil with Surfactant (Span 80-Tween 80) : Cosurfactant (Ethanol) =5:1, 6:1, and 7:1)

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INTRODUCTION

Topically administering vaccines are currently being developed because of many bacterial and viral pathogens are able to enter the body through the skin1). Topical administration has the advantage, among others, to avoid the first-pass effect in the liver metabolism, prevent degradation in the gastrointestinal tract, as well as easier to use and comfortable for the patient2). Therefore we need a system that is capable of delivering the vaccine to be able to penetrate the skin.Microemulsion is a stable colloidal dispersion system is thermodynamically and consists of phases of oil, water, surfactant, and cosurfactant which forms a clear solution with a droplet size of < 200 nm3). This system is an ideal system for use as a drug delivery has advantages because it is thermodynamically stable, ease of manufacturing process, has a low viscosity, and droplet sizes are very small so that it has a greater surface area which facilitates penetration of the active compound molecules into the membrane2). As a prototype vaccine protein, ovalbumin used as an active ingredient. Therefore ovalbumin dissolved in water, it will be made the microemulsion with the type w/o (Water in oil) where ovalbumin will be in the water phase which trapped by the oil phase. With the microemulsion type w/o active ingredient will be stable. Comparison between the surfactant and cosurfactant composition will affect the characteristics of the microemulsion system4). The characteristics of this system to be a factor of the release of the active ingredient.The aim of this study was to investigate the effects of comparison surfactant (Span 80-Tween 80): cosurfactant (ethanol) = 5:1, 6:1, and 7:1 in released of ovalbumin from microemulsion water/oil (w/o) system.

METHODS

Material

Ovalbumin (Sigma-Aldrich), soybean oil food grade (PT Pan Pacific Indonesia), Tween 80 (Croda), Span 80 (Croda), ethanol (Merck), reagen Coomassie Brilian Blue (Sigma-Aldrich), aquabidest (PT Widatra Bhakti).

Preparation

Span 80, Tween 80, soybean oil, surfactan and cosurfaktan were mixed in different ratio (Table 1). In every ratio total concentration Surfactant and cosurfactan were 60% . Added aquabidest as water phase slowly to form a stable water in oil system. Then, mixed Ovalbumin into the system at high speed.

Material	Concentration (%)		
	5:1	6:1	7:1
Ovalbumin	1	1	1
Soybean oil	31	31	31
Span 80	37.38	38.45	39.25
Tween 80	12.62	12.98	13.25
Ethanol	10	8.57	7.5
Aquabidest	8	8	8

Table 1. Formula of ovalbumin in W/O microemulsion

Evaluation

Organoleptic Evaluation

Organoleptic evaluation carried out visually includes examining the color, odor, and consistency. The evaluations performed on microemulsion before and after added ovalbumin.

Evaluation Size Distribution of Droplet

Examination of the size and distribution of the microemulsion droplet size was performed with a submicron Delsa ™ Nano Particle Size and Zeta Potential Dynamic Light Scattering. The evaluations performed on microemulsion before and after added ovalbumin.

In vitro release studies

The in vitro release of the diclofenac was performed using Franz diffusion Cell with selofan as a membran. All in vitro released study were performed at 100 rpm, with each medium of dissolution (aquabidestilata) was ± 21.5 mL. In every 50 µl samples added 2.5 mL reagen Coomassie Briliant Blue at different time intervals were analyzed for drug content using spectrophotometer Double Beam UV-VIS Recording UV 18000 (Shimadzu) at a maximum wavelength. All of the results were analyzed by statistic one way analysis of variance with degree of believed 95%.

RESULT AND DISCUSSION

Organoleptic evaluation of the microemulsion before and after added ovalbumin ovalbumin in each ratio have the same organoleptic which has a distinctive odor, clear yellow color and viscous consistency like oil.

In Figure 1 shown the result of the size and distribution of the microemulsion droplet size showed that the value ± SD from 3 replications before added ovalbumin in formula 5:1 was 30.7± 4.01nm; formula 6:1 was 27.6 ± 2.97 nm; and formula 7:1 was 27.1 ± 1.70 nm. Meanwhile, at the formula that has been added ovalbumin has a droplet size in formula 5:1 was 26.4 ± 0.94nm; formula 6:1 was 23.8 ± 0.26 nm; and formula 7:1 was 25.0 ± 1.14 nm. The statistical analysis using Independent T-Test showed that the value of Tcalculation (1,781) < Ttable (2.776) in formula 5:1, Tcalculation (2.190) < Ttable (2.776) in formula 6:1, and Tcalculation (1.804) < Ttable (2.776) in formula 7:1. It means that there was no significant difference in each formula before and after added ovalbumin.

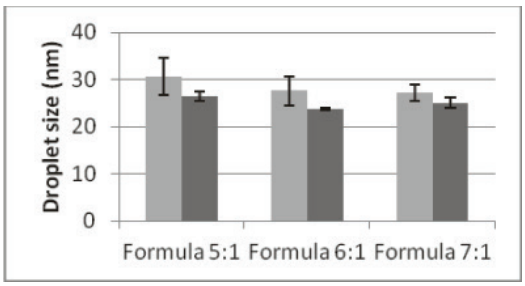

Figure 1 Histogram of the droplet size in microemulsion before and after added ovalbumin. Each column represents the mean ± SD (n=3)

Figure 2 showed the released process of ovalbumin in system microemulsion W/O. Ovalbumin release was calculated by calculating the AUC (Area Under Curve) value of the cumulative amount of ovalbumin released per unit area per time. Figure 3 showed the AUC (Area Under Curve) of in vitro ovalbumin released study in system microemulsion W/O each formula. AUC results obtained in the formula 5: 1 was 4693.46 g /cm2 ± 1764.77,formula 6:1 was 6590.04 g /cm2 ± 1084.94, and formula 7: 1 was 5288.90 g /cm2 ± 412.30. The result of statistic using ANOVA one way showed that Fcalculated (1.898) < Ftable (5.14). It means that there was no significant difference minimum one pair data. Based on these results as a whole, with an increase in surfactant-cosurfactant ratio on formula ratio 5: 1, 6: 1 and 7: 1 have not been able to provide a statistically significant difference from the results of droplet size. Therefore, the release of the results obtained did not give a significant difference.

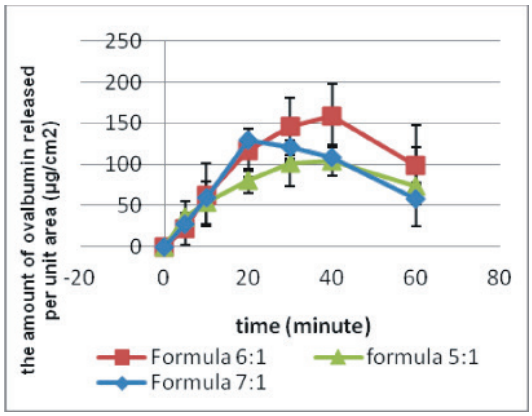

Figure 2. Profile between the amount of ovalbumin released per unit area (g /cm2) in a variety of formulas versus time

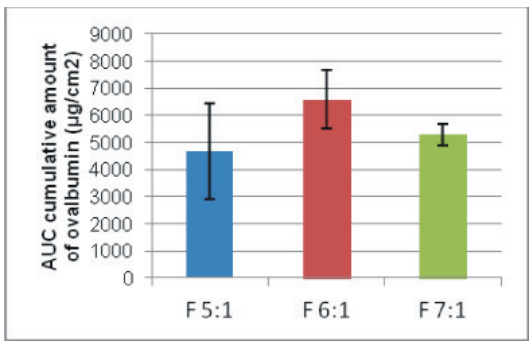

Figure 3. Histogram of AUC the cumulative amount of ovalbumin released in each formula. Each column represents the mean ± SD (n=3).

CONCLUSION

The released of ovalbumin from microemulsion with the comparison of surfactant (Span 80-Tween 80): cosurfactant (ethanol) =5:1, 6:1, and 7:1) was no significant difference.

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