Formulation and *in vivo* Effectiveness Test of Albumin Gel Isolated From White Egg As Anti-Aging

Nurul Arfiyanti Yusuf[1], Aisyah Fatmawaty[2]
[1] Sekolah Tinggi Ilmu Farmasi Makassar, Perintis Kemerdekaan Street Km 13,7 Daya Makassar-Indonesia
[2] Fakultas Farmasi, Universitas Hasanuddin, Makassar-Sulawesi Selatan

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ABSTRACT

The aim of this study was to find a stable formula of the albumin gel isolated from white egg. Albumin was formulated into 3 different concentration: F1 (1%), F2 (2%), and F3 (3%). Evaluation of gel was conducted after pass out the stress condition using an accelerated storage in the climatic chamber, temperature 5°C to 35°C, 75% RH, for 12 hours, 10 cycles. Physical stability including organoleptic, homogeneity, pH, viscosity, spread ability, and adhesion ability were observed before and after storage. While, on effectiveness test use 3 volunteers (age> 30 years), not using any other cosmetics and not allergic to eggs. The gel was applied to the back of them left hand twice a day for 3 months and compared with that right hand (without using the gel). The results showed that all formula required a physically stable and F3 (3%) most effectivelly and significantly to incerease the skin moisture (p> 0.05). In conlusion, albumin isolated from white egg can be formulated into a gel as anti-aging.

Keyword
Albumin
Putih telus
Gel *anti anging*

ABSTRAK

Tujuan dari penelitian ini adalah untuk mendapat formula yang stabil secara fisik dan efektif sebagai *anti aging* dari albumin yang diisolasi dari putih telur. Albumin hasil isolasi diformulasikan kedalam bentuk gel dengan 3 variasi konsentrasi: F1 (1%), F2 (2%), dan F3 (3%). Evaluasi fisik dilakukan sebelum dan setelah penyimpanan terkondisi dalam *climatic chamber*, dua suhu berbeda 5 dan 35°C setiap 12 jam, 75% RH, dan 10 siklus. Sementara untuk uji efektifitas dilakukan pada 3 probandus berumur diatas 30 tahun, tidak mempergunakan kosmetik lain dan tidak menunjukkan reaksi alergi pada putih telur. Gel dioleskan pada punggung tangan kiri sementara disisi yang lain tanpa diolesi krim. Hasil penelitian menunjukkan bahwa semua formula stabil secara fisik akan tetapi F3 (3%) menunjukkan potensi sebagai anti anging dan berbeda secara nyata dengan formula yang lain (p> 0,05). Dapat disimpulkan bahwa albumin yang terisolasi dari butih telur dapat diformulasikan menjadi gel yang berkhasiat *anti anging*.

Koresponden author
Nurul Arfiyanti Yusuf
Email: ikhlasiyahyusufnurul@gmail.com
Sekolah Tinggi Ilmu Farmasi Makassar, Perintis Kemerdekaan Street Km 13,7 Daya Makassar-Indonesia

INTRODUCTION

Every woman have dream to get a beautiful face. Beautiful is not only identified with white, but also smooth, firm, and free from skin problems such as acne, oily skin, dull, black spots and wrinkles. Skin consists of several layers: epidermis, dermis, and subcutaneous. Reticular layer on dermis composed of a dense regular connective tissue, collagen, and elastic fibers. Aging of the skin occurs when collagen damage and loss its funtion. Fibroblast that produces collagen and elastin (a protein substance) can be damaged if exposed to ultraviolet radiation (UV). The sympstom of aging including wrinkles, blotches on the face, and uneven pigment became more clear. These factors influence the aging process of the skin, among others genetic, hormonal, psychological, and the sunshine (Slonae dan Ethel, 2003; Mehmet *et al*., 2010; Lumenta *et al*., 2006)

White egg has long been used empirically as a mask to fight aging. White egg mask is very popular because of easily to find and fairly economical. Albumin from egg contains protein concentrate. Albumin from white egg is a source of protein and contains all the amino acids that body needed (King, 2012). In the world, cosmetic containt albumin namely cosmetic serum, a concentrated formula consist the main active ingredient which needed skin (Bentley, 2006). Many studies have shown the anti aging in clinical study of serum albumin.

However, the drawback is not practical, a fishy odor and the physical properties of the white egg is not durable during storage. For this reason, needs to be made a practical and convenient form.

In general, cosmetic serum formulated into a gel. The gel is clear and translucent containing active substances in the dissolved state (FKI, 2014; Lachman *et al*., 1994). Excess gel is able to penetrate further than the cream, very well used for hairy areas, preferably in cosmetics, is evenly when applied to the skin without emphasis, giving the sensation of cold, do not cause scars skin, and easy to use. In addition, the gel has a soft texture (Yanhendri dan Satya, 2012; Anggraeni *et al*., 2012). Based on the above background, it is the problem in this research is whether the stable formulation of gel serum albumin effective as an anti-aging with various concentrations and the concentration of how the most optimal.

The purpose of this study was to determine the stable formula of the albumin gel white egg that is effective as an anti-aging and optimal concentration serum albumin. This research is expected to provide information on the formulation and evaluation of gel preparation serum albumin from egg whites as anti-aging and may contribute to the development of science, especially in the field of the formulation.

MATERIALS AND METHODS

Materials

The material used is distilled water, carbomer, albumin white egg (egg white flour), methylparaben, oleum rosae, propylene glycol, and TEA.

Prepared Serum Albumin Gel

Carbopol was dissolved in hot water (80°C), allow a few minutes until fluffy. Then the mass was stirred to form a gel. Added methylparaben diluted with hot water. Then egg albumin powder was dissolved in propylene glycol, then mixed into the base gel and mix until homogeneous. Triethanolamine is added and then stirred till homogeneous. Then added oleum rosae

Evaluation of Serum Albumin Gel

Organoleptic

The organoleptic observation was carried out on a gel that has been made include changes in odor, color, and shape. These observations were made before and after the given stress condition at a temperature of 5°C and 35°C, 75% RH for 12 hours alternately as many as 10 cycles in the climatic chamber

Homogeneity Test

Homogeneity test is done by applying a gel formulation was made on a glass object. Gel preparation should be homogeneous and no particles. Seen changes in the gel before and after given stress condition at a temperature of 5°C and 35°C, 75% RH for 12 hours alternately as many as 10 cycles in the climatic chamber.

Viscosity Test

The viscosity measurements carried out on a gel preparations have been made before and after given by the stress condition at a temperature of 5 °C and 35 °C, 75% RH for 12 hours alternately as many as 10 cycles in the climatic chamber. The viscosity measurements were done on a Brookfield viscometer with a 63 spindle speed of 3, 6,12, and 30 rpm.

pH Measurement

PH measurement is carried out on a gel preparations that have been made with a pH meter. The pH measurements made before and after given by the stress condition at a temperature of 5°C and 35 °C, 75% RH for 12 hours alternately as many as 10 cycles in the climatic chamber.

Test Coverage

250 mg gel is placed in the midst of dispersive power test equipment, then covered with and allowed to stand for 1 minute and then measured the diameter of the scatter gel. After it is loaded every 1 minute at 50 g to 250 g and measured the diameter to analysis the effect of changes in the diameter spread the load on the gel. The test is performed before and after given by the stress condition at a temperature of 5°C and 35°C, 75% RH for 12 hours alternately as many as 10 cycles in the climatic chamber.

Adhesive Power Test

Adhesive power test is done by modifying the adhesive power test equipment by using a set of tools. 250 mg gel is flattened on one object glass is then covered with another object glass. After that pinned under a load of 1 kg for 5 minutes. Couple object glass is then mounted on the bonding strength test, and a stopwatch is turned on. Time calculated from the administration burden and discontinued when the object glasses off. The test is performed before and after given by the stress condition at a temperature of 5°C and 35°C, 75% RH for 12 hours alternately as many as 10 cycles in the climatic chamber.

Table 1. The organoleptic of all formula before and after stress condition

Organoleptic	Stress condition					
	Before			After		
	F I	F II	F III	FI	F II	F III
Odor	Odorless	Odorless	Odorless	Odorless	Odorless	Odorless
Color	White	White	White	White	White	White
Form	Semi solid	Semi solid	Semi solid	Semi solid	Semi solid	Semi solid

Effectiveness Test preparations Serum Albumin Gel For Anti Aging

The effectiveness of the gel formulation will be measured by the test against some of the volunteers. Where three volunteers will have to use a gel formulation serum albumin powder on the area back of the hand, rubbed two to three drops twice daily for 8 weeks. The characteristics of the selected volunteers are aged at least 30 years, is not using other cosmetics, and not allergic to eggs.

RESULTS

Organoleptic

The observation of gel preparation is the organoleptic albumin gel white egg can be seen in the following Table 1.

The test results all showed a gel formula does not differ before and after the stress condition. The color white is produced from the original color of the egg white powder that does not change before and after the stress condition in the climatic chamber at 5°C and 35°C, 75% RH for 10 cycles. This is due to the gel is stable in extreme temperature conditions.

All formulas albumin gel white egg that is made in the form of semisolid and fairly thin. This consistency has not changed after the stress condition in the Climatic Chamber at 5°C and 35°C, 75% RH for 10 cycles. Carbopol concentration used was 0.2%. Carbopol high concentration would create a gel formulated into a thin layer that is hard when used on the skin, and this can cause discomfort to those who wear it. One characteristic of a good preparation is convenient to use and can give the effect.

Homogeneity Test

Determination of homogeneity done visually by applying the gel formulation has been made on the object glass homogeneity observed before and after the stress condition at a temperature of 5°C and 35°C, 75% RH for 12 hours alternately as many as 10 cycles. Homogeneity does not reflect the formation of the particles are separated. The results can be seen in the following table.

Homogeneity testing is an important factor and one of the measurements of gel preparation quality because a preparation can have a good effect if the active ingredient is evenly distributed in the carrier. When a preparation is not evenly distributed it will directly affect the dose of the preparation. From the previous table it can be seen that the serum gel preparation of albumin powder from egg white is made stable before and after the stress condition in climatic chamber 10 cycles for 12 hours alternately at 5°C and 35°C, RH 75%.

pH Testing

pH testing is a parameter preparation physicochemical properties that must be observed in pharmaceutical preparations, since the pH of the preparation may influence the effectiveness of the drug release gel formulation. Good preparation should have a pH that does not irritate the skin. According to the table indicates that the gel serum albumin from egg white powder stable before and after the stress condition in the climatic chamber for 12 hours by turns as much as 10 cycles at 5°C and 35°C, 75% RH. The pH value gained 7.1 is still included in the corresponding neutral pH with a pH of topical preparations. pH values obtained from stating that formula on the stressed condition not affected pH preparation of serum gel albumin powder. This shows that the gel formulation was made have the stable of pH.

Viscosity Test

Testing with less viscosity measured using a Brookfield viscometer with a 63 spindle speed 3, 6, 12, and 30 rpm (Table 3).

Dispersive Power Test

The test results of the scatter more can be seen in the following table.

Adhesiveness Test

Testing the stickiness done using test equipment adhesiveness. Some 250 mg gel is flattened on one object glass is then covered with another object glass. After that pinned under a load of 1 kg for 5 minutes. Couple object glass is then mounted on the bonding strength test, and a stopwatch is turned on. Time calculated from the administration burden and discontinued when the object glasses off. The test is performed before and after given by the stress condition at a temperature of 5°C and 35°C and 75% RH for 12 hours alternately as many as 10 cycles in the climatic chamber.

Effectiveness Gel For Anti Aging

The effectiveness of the preparation gel serum albumin powder was done by testing of some volunteers. Where three volunteers will have to use a gel formulation serum albumin powder on the area back of the hand, rubbed two to three drops twice a day for three months. The characteristics of the selected volunteers are aged at least 30 years, is not using other cosmetic products, and are not allergic to eggs.

First volunteers aged 35 years using gel formula serum powder albumin concentration of 1%, volunteers both 55 years old using gel formulation serum powder albumin concentrations of 2%, and volunteers are three

Formula	Parameter							
	Homogeneity		pH		Dispersive Power Test		Adhesiveness Test (Seconds)	
	Before	After	Before	After	Before	After	Before	After
F I	Homogeneous	Homogeneous	7,1	7,1	9	8,5	1.45	1.25
F II	Homogeneous	Homogeneous	7,1	7,1	7	9	2.59	1.94
F III	Homogeneous	Homogeneous	7,1	7,1	9	9	8.03	7.80

Table 3. Viscosity measurement of albumin gel white egg

Formula	Stress condition							
	Before				After			
	3 rpm	6 rpm	12 rpm	30 rpm	3 rpm	6 rpm	12 rpm	30 rpm
F I	800	500	537	264	1134	800	500	320
F II	1800	1027	850	540	2200	1400	903	580
F III	4400	2267	1400	734	5000	2800	1684	807

aged> 70 years using gel formulation serum powder albumin concentration of 3%

The use of gel formulation twice a day for three months, after the application, the first volunteers to use formulation albumin gel white egg concentration of 1%, when viewed from the lining there is no significant difference during use gel formulation serum albumin powder. In the second volunteer to age 55 who use formulation albumin gel white egg concentration of 2% when viewed from wrinkles does not change during the use of gel preparation. But in the third volunteers aged >70 years with the use of gel preparation serum albumin powder concentrations of 3% when viewed from wizened changes after using the gel formulation twice daily for three months, where the number of wrinkles is reduced.

Additionally, brighter than the hand that does not use gel formulation serum albumin powder, when palpated feels softer and looks moister. In all three volunteers feel the skin feel refreshed after using the gel preparation serum albumin powder. The third formula albumin gel white egg concentration of 1%, 2%, and 3% did not show irritation during use.

CONCLUSION

After a stable formulation study and evaluation of albumin gel white egg white as anti-aging, it can be concluded that all formulation is stable and effective formulations as anti-aging are a gel with a concentration 3% of albumin powder.

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