FORMULATION AND PHYSICAL PROPERTIES OF CREAM WITH RED ROSE PETAL EXTRACT (Rosa sp. L.)

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Abstract. Red rose petals (Rosa sp.) are known for their antioxidant properties, which can help combat free radicals—one of the primary causes of premature aging. This makes red rose petals a promising ingredient for the development of topical formulations that can be used daily to soften the skin and prevent the formation of wrinkles caused by free radicals. According to a 2019 study by Esviyani, the IC50 value of red rose petal extract was found to be 15.844 ppm, classifying it as a highly potent antioxidant. This highlights its potential for use in pharmaceutical or cosmetic products. This study employed experimental methods to formulate red rose petal extract into cream preparations with varying concentrations of gelling agents. The formulations were then subjected to physicochemical testing, including organoleptic evaluation, homogeneity, pH, spreadability, and phase separation tests. Additionally, an irritation test was conducted to assess the safety of the preparations.

Keywords: *Formulation, Characteristics, Red Rose Leaf Extract (Rosa sp.L.), Cream.*

Introduction

The current social trend of using natural ingredients in personal care (“back to nature”) is gaining popularity these days, so people are once again resorting to using various natural ingredients. Long before formal healthcare services and modern pharmaceuticals reached the society level, effective plants had greater economic value and fewer side effects than synthetic drugs. Therefore, using natural medicines with proper formulation is very important and naturally safe and effective. One plant that is effective and offers many benefits is red rose petals (Rosa sp. L.) which contain

vitamins A, C and K and beta-carotene. The beta-carotene in the bulbs of red rose petals (Rosa sp. L.) is useful in maintaining skin moisture, softening the skin and preventing the formation of wrinkles on the face, making the face always look radiant. Red rose petals (Rosa sp. L.) are not only rich in vitamins but also easily available and available at a price that is affordable for all sections of society. This is why red rose petals (Rosa sp. L.) are enjoying great popularity. The development of cosmetics for personal care is progressing very rapidly these days. Cosmetics are a mixture of several ingredients formulated in such a way that they can be used for the care and beautification of body parts depending on the purpose of the cosmetics.

To achieve local effects, various formulations of therapeutics and cosmeceuticals are applied to the skin surface. However, the main obstacle is the permeability of chemical substances in the formulation to pass through the permeable skin membrane (Shashi, 2012). The outermost layer of the skin, namely the multilayered stratum corneum, provides a strong barrier to the penetration of chemical substances into the skin, especially since most medicinal chemicals are unable to penetrate the stratum corneum (Raut SV, 2014). . The development of drug delivery systems has led to new formula modifications that can increase the bioavailability of drugs in the skin. The new drug delivery system resulting from the combination of two pharmaceutical dosage forms such as a cream which combines two dosage forms namely an emulsion preparation and a gel preparation has been shown to increase the percutaneous absorption of drugs especially for fat soluble types of drug molecules (Shashi, 2012). Also, the use of penetration enhancers is being considered to increase the penetration of the drug into the skin (Raut SV, 2014). This proves that aspects of the formulation and properties of the active ingredient are very important factors that determine the penetration of drugs into the skin as the properties of the active ingredients and excipients each have different influences on the penetration and absorption profile of drugs through the skin membrane (Shashi, 2012). In addition, anatomical and physiological factors of the patient also influence the permeation and absorption of drugs through the skin such as E.g. the condition of the injury, the pH of the skin, the thickness of the skin and the age of the patient.

Cosmetic preparations containing extracts can be processed into cream preparations more easily and stably as this system is an emulsion in a gel, which provides an elegant appearance and high stability. And that too with high effectiveness. Cream is a form of stable emulsion and gel preparation with the addition of a gelling agent, where the gel capacity of the cream preparation makes the emulsion formulation more stable.

Cream preparations can be characterized by physical and chemical properties in the form of organoleptic observations, pH, viscosity, spreadability, stickiness and stability tests (Garg et al., 2017; L. Kumar & Utreja, 2019)

The aim of this research is to obtain the most optimal formula by meeting all the physicochemical properties that are still within the range included in the specified range of requirements.

The active ingredients in the cream can be chemical or natural active ingredients derived from plants. In order to obtain the properties of a plant, a process called extraction is carried out, namely the extraction of the desired nutrients from a plant by various extraction methods and assisted by various suitable solvents for the desired active substance, the end result being a thick extract that can then be processed into a dry extract or added to the selected preparation.

Therefore, in this research, a formulation for a cream containing red rose petal bulbs was developed and then characterized to obtain the optimal formula.

Basic Theory

Methodology

A. Tools and materials

The tools used are glassware, analytical balance, micropipettes, magnetic stirrer and pH meter. The materials used for cream formulation are red rose petal tubers (Rosa sp. L.), Span 20 (Brataco Chemical), Tween 20 (Brataco Chemical), Parrafin liquidum (Brataco Chemical), Propylene glycol (Brataco Chemical), Methyl and propyl paraben (Brataco Chemical), Triethanolamine (Brataco Chemical), HPMC (Brataco Chemical), Phosphate buffer pH 7.4, Aqua mineralizate (Brataco Chemical).

B. Research methods

Procedure for preparation of red rose petal extract (Rosa sp.L)

A. Collection of materials

The material used for research was red rose petals (Rosa sp. L.) collected from Lembang market in Bandung district, West Java province.

B. Creating Simplicia

Red rose petals are cleaned, then washed and cut into small pieces with a knife. Cut red rose petals are dried in air without direct sunlight for up to 7 days. The maximum water content in Simplicia is not more than 10%. Dry sorting is then carried out to remove unnecessary foreign matter. Preparation of Red Rose Petal Extract (Rosa sp. L.)

Prepare 500 grams of dried Simplicia from red rose petals, add 2,200 ml of 95% ethanol solvent, put it in a closed bottle and add the filter liquid or solvent, namely

ethanol, cover and leave for 5 days away from light, stirring regularly three times a day up to four times for about five minutes. After 5 days, the mixture was filtered and the macerate was then thickened using a rotary evaporator at a pressure of 70 rpm and a temperature of 70 °C (Voigt, 1997).

Formula design

The cream preparation is prepared in 3 formulas with different extract concentrations, with a volume of 100 ml in each formula. The cream formula can be seen in Table 1.

Table 1. Formula design for cream with red rose petal extract (Tarigan et al., 2021)

Composition	Persentase (%)		
	F1	F2	F3
Extract	10	20	30
Isopropil miristat	1	1	1
Span 80	1,7	1,7	1,7
Propil Paraben	0,02	0,02	0,02
Propilenglikol	15	15	15
Metil Paraben	0,018	0,018	0,018
Tween 80	4,3	4,3	4,3
Gliserin	15	15	15
Titanium Dioksida	0,5	0,5	0,5
BHT	0,1	0,1	0,1
Parfum	qs	qs	qs
Aqua ad.	100	100	100

Method for preparing a cream from red rose petals (Rosa sp. L.)

The preparation basis of this study is that the oil phase (Span 80, Tween 80) is melted in a water bath at a temperature of 700 °C with stirring until the entire oil phase is completely melted, then transferred to a hot mortar and crushed until homogeneous. In another mortar, add the water phase (isopropyl myristate, propyl paraben, propylene glycol, methyl paraben, glycerin, distilled water) and grind until homogeneous. In the oil phase, gradually add the water phase, grinding until a cream is obtained. After the mortar temperature has dropped, add titanium dioxide and BHT, then grind until a homogeneous mass is obtained. The red rose petal extract is added last, along with the perfume, crushing until homogeneous. After that, pour it into a cream container and leave it at room temperature until it freezes.

Cream evaluation

Test the physical properties of cream

a) Organoleptic examination

Organoleptic examination involves visual observation of shape, color and smell. This is done by observing changes in the shape, smell and color of the cream preparation during the four-week storage.

b) Homogeneity test

Apply the preparation on a piece of transparent glass. The preparation has a homogeneous composition.

c) pH test

Put the preparation in a container using a pH meter and then immerse the electrode in the container. The value shown by the pH meter is the pH of the cream.

d) Spreadability test

The spreadability on the skin depends on the concentration and viscosity of the cream. This spreadability is very important when applying the preparation on the skin because a preparation with good spreadability ensures even distribution of the dose on the skin. The test was done using the extensometry method. The principle is to calculate the increase in surface area that the preparation offers when loaded with a certain weight and within a certain time interval.

e) Viscosity

The viscosity of each formulation was determined at ambient temperature using a Brookfield digital viscometer with spindle no. 5 at 50 rpm (V. Naga Sravan et al, 2014).

f) Irritation test

The purpose of the irritation test is to find out whether the preparation prepared by the author can cause irritation or not. Irritation to the skin is characterized by a reddish discoloration of the skin and the appearance of red spots on the skin. After conducting the organoleptic test, pH test, homogeneity test and viscosity test, an irritation test is conducted to find out whether the preparation has an irritating effect. Test the irritation on the sample using the open patch test method. Namely, by conducting direct irritation tests on 10 panelists aged between 17 and 25 years. A sample was administered to each examiner by applying a thin layer to the examiner's forearm and covering it with a bandage for up to 1 hour for 5 consecutive days. Skin reactions were then observed, occurring after 1 hour or after 5 consecutive days of application. Signs of irritation may include local itching and redness of the local skin. If irritation of the examiner's skin occurs, the preparation does not meet the requirements of the irritation test.

Results and Discussion

A. Preparation of red rose leaf extract (Rosa sp. L.).

Red rose leaf extract is prepared from 6 kg of red rose petals and 2200 ml of 95% ethanol with a soaking time of 7 days to obtain 63 grams of extract. The obtained red rose petal extract is used as an antioxidant.

The characteristics of the physical properties of the red rose petal extract after filtering in the form of organoleptics (consistency, smell, color) are shown in Table 2.

Table 2. Physical properties of the red rose petal extract (Rosa sp. L.)

Preparation	**Organoleptic**		
	Consistency	**Smell**	**Color**
Red Rose Leaf Extract	Thick	Typical red rose leaves	Dark green

Based on the data contained in the table, it is known that the extract of red rose petals (Rosa sp.) The color of the extract is formed because it is oxidized from the crushing process to the extraction process.

B. Test results of the physical properties of the cream

Cream characteristic results

Based on the results in Table 3 and Table 4, formulas F1, F2 and F3 show good results in consistency, phase separation and freeze-thaw tests.

Table 3. Physical evaluation results of the cream with red rose petals extract

Formula	Color	Bau	Konsistensi	Pemisahan Fasa
F1	Light green	The distinctive smell of roses	Thick, easy to spread	No phase separation occurs
F2	Green	The distinctive smell of roses	Thick, easy to spread	No phase separation occurs
F3	Dark Green	The distinctive smell of roses	Thick, easy to spread	No phase separation occurs

Table 4 Freeze Thaw Test Results

Formula	Phase Separation in the cycle-					
	1	2	3	4	5	6
F1	(-)	(-)	(-)	(-)	(-)	(-)

F2	(-)	(-)	(-)	(-)	(-)	(-)
F3	(-)	(-)	(-)	(-)	(-)	(-)

Description: (-) No phase separation

(+) Phase separation occurs

Varying the concentration of red rose petal extract in the preparation of the cream results in differences in the color of the preparation. Cream F1 at 10% concentration gives a light green color, at 20% concentration gives a green color, while preparations at 30% concentration give a deep green color. However, all preparations with different concentrations had a semi-solid texture and produced a characteristic oleum rosae aroma and the three preparations also showed a good and homogeneous texture.

C. Physical stability study of red rose petal extract cream

Table 6 and Figure 1 show the physical properties of the cream in F1, F2 and F3. The research results show that F1 has a better formula based on parameters such as pH measurements and dispersion tests followed by stability tests. Figure 1 shows the stability study data of F1 formula.

Table 6. Physical properties results of red rose petal extract cream

Formula	Organoleptic Characteristics	Storage Time (Days)				
		0	7	14	21	28
F1	Phase separation	No	No	No	No	Tidak
	Color	White	White	White	White	Putih
	Odor	Odorless	Odorless	Odorless	Odorless	Tidak
	Texture	Slippery	Slippery	Slippery	Slippery	Berbau
	Consistency	Thick	Thick	Thick	Thick	Licin
	Homogeneity	Homogeneous	Homogeneous	Homogeneous	Homogeneous	Kental
						Homogen
F2	Phase separation	No	No	No	No	Tidak
	Color	White	White	White	White	Putih
	Odor	Odorless	Odorless	Odorless	Odorless	Tidak
	Texture	Slippery	Slippery	Slippery	Slippery	Berbau
	Consistency	Thick	Thick	Thick	Thick	Licin
	Homogeneity	Homogeneous	Homogeneous	Homogeneous	Homogeneous	Kental
						Homogen
F3	Phase separation	No	No	No	No	Tidak
	Color	White	White	White	White	Putih
	Odor	Odorless	Odorless	Odorless	Odorless	Tidak
	Texture	Slippery	Slippery	Slippery	Slippery	Berbau
	Consistency	Thick	Thick	Thick	Thick	Licin
	Homogeneity	Homogeneous	Homogeneous	Homogeneous	Homogeneous	Kental
						Homogen

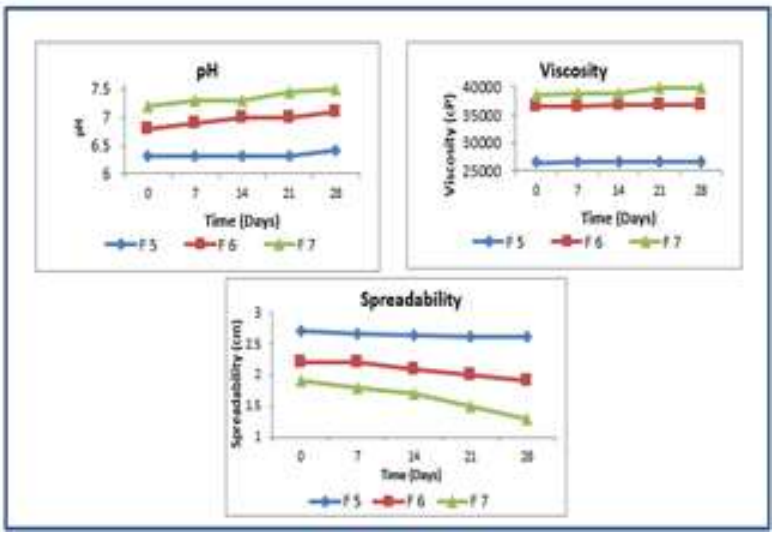

Figure 1. Results of pH, Viscosity and Spreadability Evaluation

D. Irritation Test Results

Irritation tests were conducted on all Formulas, namely formulas F1, F2, and F3 because the three formulas were considered to meet the requirements of the limits of each test parameter, so all three were tested through this irritation test.

Table 7. Irritation Test Results of Red Rose Leaf Extract Cream (Rosa sp. L.)

Formula	Results of irritation test on 10 panelists					Percentage of irritation (%)
	Day 1	Day 2	Day 3	Day 4	Day 5	
F1	(-)	(-)	(-)	(-)	(-)	0
F2	(-)	(-)	(-)	(-)	(-)	0
F3	(-)	(-)	(-)	(-)	(-)	0

Description: (-) No redness

(+) Redness, itching and stinging

From Table 7, it can be seen that the results of skin irritation tests on F1, F2 and F3 with 20 test subjects show that all preparations do not cause irritation on the skin, the percentage of skin irritation reactions carried out is 0% for 1 hour in a row for 5 days. This shows that there are no irritating substances in any of the cream formulas containing red rose petal extract (F1, F2 and F3).

Conclusion

From the research results, it can be concluded:

1. Red rose petal extract (Rosa sp. L.) can be formulated into cream dosage form whose physical properties meet all the requirements.

2. The results of the irritation test for the three formulas showed that no allergic reaction in the form of redness, itching, red spots or swelling occurred.

References

Anonim, 1979, *Farmakope indonesia, Edisi III,* Departemen Kesehatan Republik Indonesia, Jakarta.

Anonim, 1987, *Ilmu Penyakit Kulit dan Kelamin,* Hal 3, 4, 7, 8 Fakultas Kedokteran Universitas Indonesia, Jakarta.

Anonim, 1995, *Farmakope Indonesia Edisi IV,* Departemen Kesehatan Republik Indonesia, Jakarta.

Anonim, 2009, *Handbook of Pharmaceutical Excipients, sixth edition,.* Pharmaceutical Press and American Pharmacists Associations, London and Washington DC.

Anonim, 2004, *Ilmu Resep Teori,* Jilid II, Departemen Kesehatan Republik Indonesia Badan Pengembangan dan Pemberdayaan Sumber daya Manusia Kesehatan, Jakarta.

Cahyono,B., 2012, *Daun mawar merah Tekhnik Budi Daya dan Analisis Usaha Tani, Jakarta*

Carlotta M, Maria C, Luisa DM, Federica R, Chiara DM, Franco A, Pietro M dan Tommasina C., 2011. Sistem hidrogel baru yang dimuat kendaraan yang cocok untuk aplikasi topikal: Persiapan dan Karakterisasi, *Jurnal Pharm Pharmace Sci*., 14(3): 336-346.

Kartika, B.,1992, *Petunjuk Evaluasi Sensori Hasil Industri Produk Pangan*. Yogyakarta.

Kotler. 2005. Teori kepuasan dan faktor-faktor yang mempengaruhi kepuasan, Jakarta

Moravkova, T., dan Filip, P., 2014, Pengaruh Pengental pada Sifat Geologi dan Sensorik Cream Kosmetik, *Acta Polytechnica Hungarica*, Vol 11(6) : 173-186.

Meilgaard, MC, Civille, GV, Carr, TB, 2016. Teknik Evaluasi Sensorik, Edisi ke-5, CRC Press.

Nursalam. 2001. Pengertian Kepuasan, Yogyakarta

Salipian, W., & Usviany, V. (2023). Gambaran Efek Samping Obat Antihipertensi pada Pasien Rawat Jalan di Salah Satu Rumah Sakit di Kabupaten Bandung Barat. Health Information : Jurnal Penelitian, 15(2), e1163. Retrieved from https://myjurnal.poltekkes-kdi.ac.id/index.php/hijp/article/view/1163

Tranggono, Retno, Fatma,L., 2007, *Buku Pegangan Ilmu Pengetahuan Kosmetika,* Gramedia Pustaka Utama, Jakarta

Voight, 1994.,*Buku Pelajaran Teknologi Farmasi,*Terjemahan SoedaniNoerono, Gadjah Mada University, Yogyakarta.