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Formulation and Physical Quality Test of Chinese Petai Leaf Gel Extract (Leucaena leucocephala)

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ABSTRACT

Petai Cina leaves (L leucocephala) contain flavonoids, tannins and saponins. Based on previous research, it has been proven that this group of compounds has activity as a burn wound healer. Therefore, it is necessary to develop a dosage form from petai cina leaves as a medicine for burns in the form of a gel dosage form. The aim of this research was to determine the physical quality of petai cina leaf extract. In this study, the extract was obtained using the maceration method with 70% ethanol solvent. Next, the extract was made into a gel preparation using a hydrophilic base with an extract concentration of 15% and 30%. The gel preparation was then evaluated for physical properties including organoleptic test, homogeneity test, pH test, adhesion test. The test results show that the physical test results obtained are in accordance with the requirements for the physical properties of the gel preparation.

Keywords: petai cina leaves, gel, physical quality

ABSTRAK

Daun petai cina (L leucocephala) memiliki kandungan senyawa golongan flavonoid, tanin, dan saponin. Penelitian sebelumnya membuktikan bahwa golongan senyawa tersebut mempunyai aktivitas sebagai penyembuh luka bakar. Maka dari itu perlu dikembangkan sediaan gel luka bakar yang berbahan dari daun petai cina. Tujuan penelitian untuk mengetahui mutu fisik pada ekstrak daun petai cina. Ekstrak didapatkan melalui metode maserasi dengan pelarut etanol 70%, kemudian ekstrak dibuat menjadi sediaan gel menggunakan basis hidrofilik dengan konsentrasi ekstrak 15%, dan 30%. Sediaan gel kemudian dilakukan uji fisik meliputi organoleptis, homogenitas, pH, daya lekat. Hasil uji menunjukkan Hasil evaluasi fisik yang didapatkan sesuai dengan persyaratan sifat fisik sediaan gel.

Kata Kunci: Daun Petai Cina, Gel, Mutu Fisik

INTRODUCTION

Burns are injuries or traumas that can occur to anyone, at any time, and in any location. Friction or the transmission of thermal energy, radiation, chemicals, or power sources can all produce such injuries, although most burns are caused by heat from hot liquids, solid objects, or fire (Jeschke *et al*., 2020). Traditional or herbal medicine is now being widely used by the society. Natural components, particularly therapeutic plants, are becoming more trustworthy. Mostly because of its antimicrobial and cell regeneration properties (Sukrama *et al*., 2017). Chinese petai leaves can be used as a burn remedy because they contain substances such as active flavonoids, lectins, alkaloids, saponins, and tannins (Rohmah et al., 2016).

The gel dosage form is appropriate for the treatment of skin burns because the gel is a semisolid preparation with an aqueous carrier such as jelly, causing a cooling effect on the wound region. The gel has calming characteristics, moisturises, is simple to use, and easily penetrates the skin, providing a healing effect (Ansel, 2010). Gelling agents used in pharmaceutical and cosmetic preparations must meet numerous characteristics, including being inert, safe, and not interacting with other substances. Carbopol 940 has a viscosity of 40,000 to 60,000 cP and can make transparent gel preparations due to its high viscosity. Carbopol is a gel base that is commonly used in gel preparations; carbopol is also included in the hydrophilic gel base. The benefits of hydrophilic gels include good dispersion on the skin, chilly effects provided by gradual evaporation of water on the skin, they do not clog skin pores, they are readily rinsed with water, they may be used on hairy portions of the body, and drug release is good (Yuliandari et al., 2021).

Based on these concerns, research was undertaken on the production of petai cina leaf extract gel formulations. The purpose of this research is to develop and test a physical preparation of Chinese petai leaf extract gel based on Carbopol 940.

METHOD

Obtaining and Manufacturing of Chinese Petai Leaf Samples

Petai cina leaves are obtained from the Farmer Group Garden of Wonokerto Village in Wonogiri District.

To eliminate dirt clinging to the leaves, the plucked leaves are removed from the stalk and carefully washed under running water. The washed leaves are aerated and then dried till absolutely dry. When the leaves of the Chinese petai are kneaded, they are readily broken or crushed.

Production of simplisia powder

Dried simplisia is ground into powder using a blender. The simplisia powder is then filtered to provide a finer product.

Extract creation

Chinese petai leaf simplisia powder is steeped in 70% ethanol. The blended is then agitated for 3 hours at a speed of 300 rpm using a stirrer. The mixture is then precipitated, poured, and squeezed. The pulp is macerated one more with a 1 litre filter liquid. Remacement is performed three times. Maserat produced after filtering is combined and evaporated on a water bath using a porcelain dish until a thick extract of Chinese petai leaves is formed, which is then weighed to ascertain its weight.

Creating Gel

To make carbopol gel, first mix carbopol in aquadest and then grind until homogenous. Following that, propylenglycol, glycerine, and triethanolamine are added until a fluffy and transparent gel is created. The generated base is then mixed with an ethanol extract of Chinese petai leaves and methyl parabens that have been dissolved in a little amount of ethanol and agitated until homogenous. After that, the gel is placed in a covered container and left to stand for 24 hours. The function of adding triethanolamine is to neutralise alcohol (Dewantari & Sugiharti, 2015; Veronica & Dwiastuti, 2022)

Table 1. Chinese Petai Leaf Extract Gel Formula With Concentration Variations

Formulation (in grams)	**F I**	**F II**
Chinese petai leaf extract	15	30
Karbopol 940	2	2
TEA	1	1
Propilenglikol	10	10
Glycerine	2	2
Methyl Paraben	0,04	0,04
Aquadest ad	100	100

1) F I : Concentration 15%
2) F II : Concentration 30%

Physical Test of Gel Properties

Organoleptis Test

Organoleptical testing formed as preliminary gel tests that cover the scent, colour, and consistency of each product.

Homogeneity Test

A gel preparation of Chinese petai leaf extract is applied topically on transparent glass. The gel preparation is then rubbed and touched to determine its homogeneity

pH Test

The pH test is carried out with the use of universal indicator paper. The homogeneity of the gel

preparation of Chinese petai leaf extract applied to transparent glass should be checked. To decide the homogeneity of the gel formulation, it is rubbed and palpated. A universal pH stick is dipped in an already diluted gel sample. Once they were submerged full, the change in the color of the universal pH was monitored and be cohered with the universal pH standard (Sugihartini & Wiradhika, 2017).

Adhesion test

The gel is placed on top of the glass object, then another glass object is placed on it and pressed with a load weighing 1 kg for 5 minutes. Next, the glass object is mounted on the test equipment. Then a load weighing 80 g is released and timed so that the two glass objects are released (Dewantari & Sugiharti, 2015 ; Maulina & Sugihartini, 2015).

RESULTS AND DISCUSSION

Gel Formulation

Making carbopol gel begins with combining carbopol with aquadest and then crushing until homogenous. Following that, propylene glycol, glycerine, and triethanolamine are added until a fluffy and transparent gel is created. The generated base is then mixed with an ethanol extract of Chinese petai leaves and methyl parabens that have been dissolved in a little ethanol and agitated until homogenous. The gel is then stored in a closed container for 24 hours. The purpose of adding triethanolamine is to neutralise alcohol (Dewantari & Sugiharti, 2015).

Physical Test of Gel Properties

Organoleptis Test

Tabel 2. Organoleptis Test

Group	Bentuk	Smell	Color
F 1	Gel, soft	characteristic odor	Dark brown
F 2	Gel, soft	characteristic odor	Dark brown

Organoleptical tests are performed as preliminary gel tests covering the smell, color and consistency of each formula

Homogeneity Test

Tabel 3. Homogeneity Test

Group	Result
F 1	Homogeneous
F 2	Homogeneous

From the table 3, it can be seen that the homogeneity test results of Chinese petai leaf extract gel. From the results of the homogeneity test, F1 and F2 produce homogeneous preparations, so the addition of extracts does not affect the homogeneity of the gel. The homogeneity test is used to decide whether or not there are coarse grains in the preparation. The gel preparation is homogeneous if there are no different particles and there is an even color similarity. Gel with good homogeneity can provide maximum effect as a wound healer because the active substance is evenly dispersed in the base used (Sayuti, 2015).

pH Test

Tabel 4. pH Test

Group	Result
F 1	6,25
F 2	6,46

Table 4 shows the PH test results of petai cina leaf extract gel.

This implies that the concentration of the extract has no effect on the preparation's pH. Preparations with a pH are safe since they remain within the skin pH range of 4.5-6.5 (Tranggono, 2007) or 4.0-6.0 (Jones et al., 2015). The pH test is carried out to decide the pH of the preparation. The suitability of the skin's pH to the pH of the topical preparation influences the skin's acceptance of the preparation. The ideal topical preparation is neither too acidic nor too alkaline, so that it does not irritate the skin (Ulean et al., 2012). The pH of the skin will change to a more alkaline level of about 7.4 when an acute injury occurs. After that, the body will respond naturally by restoring the acidity of the skin to heal wounds. In this process, the environment around the wound will turn acidic. This acidic condition will slow the growth of bacteria, so infection does not occur. This is one of the activities in the wound healing process (Baron et al., 2020).

Adhesion Test

Tabel 5. Dipersion Test

Group	Result
F 1	2.21 second
F 2	1.70 second

To determine the ability of gel preparations to stick to the skin through adhesion tests. The longer the gel stays on the skin, the better, therefore the ability of the active substance to achieve a wider therapeutic effect. The requirement for good adhesion is if it is more than 1 second (Rahmatullah et al., 2020).

CONCLUSIONS AND SUGGESTIONS

According on this investigation, it appears that petai cina leaf extract can be turned into gel formulations. The physical property testing findings can be concluded to show that the gel preparation has good physical properties. These physical tests include the tests of organoleptic, homogeneity, pH, and adhesion. The acquired physical test results correspond to the requirements of the physical qualities of the gel formulation.

The gel preparation of Chinese petai leaf extract with a Karbopol 940 base can be produced into physically satisfactory gel preparations, including organoleptis tests, pH homogeneity tests, and dispersion tests that match the requirements.

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