• pISSN: 2085-1545
• eISSN: 2339-093X

Sains Medika Journal of Medicine and Health

http://jurnal.unissula.ac.id/index.php/sainsmedika

RESEARCH ARTICLE

Formulation and Physical Test of Ethanolic Extract Sambiloto Leaves *(Andrographis paniculata)* Ointment

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ABSTRAK

Pendahuluan: Sambiloto diketahui mengandung zat aktif seperti andrographolida, minyak atsiri, flavonoid, tanin, alkaloid dan saponin yang berfungsi sebagai antibakteri, antiracun, analgesik, dan antipiretik. Berdasarkan manfaat daun sambiloto sebagai antibakteri untuk mempermudah dalam penggunaannya dapat diformulasikan dalam bentuk sediaan salep. **Tujuan penelitian :** untuk mengetahui hasil uji fisik sediaan salep ekstrak etanolik daun sambiloto.
Metode penelitian: uji fisik meliputi uji organoleptik, pH, homogenitas, daya lekat dan daya sebar.
Hasil penelitian: Salep berbentuk setengah padat, warna hijau kehitaman dan bau khas sambiloto, pH 6, memiliki homogenitas yang baik, daya lekat 82 detik dan daya sebar 5,6 cm.
Kesimpulan : Hasil uji fisik sediaan salep ekstrak etanolik daun sambiloto sesuai dengan standar mutu.

Kata Kunci : salep, daun sambiloto, uji fisik sediaan salep.

ABSTRACT

Introduction: *Andrographis paniculata had known contained active substance such as andrographolida, atsiri oil, flavonoid, tannin, alkaloid, and saponin which functions as antibacterial, antitoxic, analgesic, and anti-pyretic. Based on its antibacterial properties, an ointment form of Andrographis paniculata leaf is then formulated, for practical usage. Ointment formula is semi solid for topical use in the skin or mucosal membranes.* ***Objectives:*** *to know the result of ointment physical test of etanolic extract Andrographis paniculata leaf.*
Methods: *physical tests contain organoleptic test, pH, homogenity, adhesion test and dispersive test.*
Results: *Ointment shaped semi solid, blacky green and special smell of Andrographis paniculata, pH 6, homogenity test obtained homogenous results, adhesion test was 82 second and dispersive test was 5.6 cm.*
Conclusion: *the result of physical tests of etanolic Andrographis paniculata leaf extract ointment appropriate with quality standard.*

Keywords : *ointment, Andrographis paniculata leaf, ointment physical test.*

INTRODUCTION

Indonesia is a country rich with natural resources especially herbs which have great potentials to be used and developed to its maximum capacity. The current 'back to nature' habitual change makes the demand of herbal medicine increasing. Plants are natural resources which contains many natural benefits as medicinal ingredients. The emerging public awareness about negative effects of medicines using chemical ingredients, public started using traditional medicine to treat various diseases. (Fauziah et al., 2014).

One plant used as ingredient for traditional medicine in Indonesia is Sambiloto *(Andrographis paniculata).* Sambiloto is one of many medicinal plants commonly used in Indonesia, Sambiloto is a plant that can be found throughout the year because it can grow in any types of soil, even in gardens, by the riverside, shrubs or bushes. Sambiloto is known contain active substances such as *andrographolida,* essential *oils, flavonoids,* tannins, alkaloids and saponins. Part of the sambiloto that may provide a therapeutic effect is the leaves (Lukistyowati, 2012).

Based on research by Pratama (2014), sambiloto's leaves can be used to cure wound because of its antibacterial property. Due to its antibacterial property, it is considered necessary to formulate sambiloto into several forms such as capsules, tablets, syrup, cream, gels and ointments. Ointments are semisolid preparations for topical application to the skin or mucosa (Anonymous, 1995). In this study, ointments was chosen because it has good stability, smooth form, able to maintain skin moisture, and does not irritate the skin. An ointment base can absorb the active substances faster to provide maximum therapeutic effect. Physical tests conducted on formulations include organoleptic test, pH test, homogeneity test, adhesion test, and test dispersive

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power in accordance with quality standards (Hamzah et al., 2013).

The research in formulation and physical tests of ethanolic extract from sambiloto's leaves has not been done before. Therefore, the researchers are interested in doing research on the physical test preparation ethanolic leaf extract ointment *(Andrographis paniculata).*

METHODS

Physical tests on ethanolic extract ointment formula of sambiloto done by observing the color, shape, smell, pH, homogeneity, adhesion and the dispersive power.

This research is a descriptive study to illustrate the results of Sambiloto leaves extract's ointment physical tests, presented in the form of numbers, narration, text and frequency distribution table.

Materials and Instruments

1. Materials and instruments for extraction of ethanolic extract ointment from Sambiloto leaves:
   a. Materials: sambiloto leaves simplicia powder 250 grams, ethanol 70% weighs 2.5 litres.
   b. Instruments: *beaker glass,* stirring bar, analytical scale, porcelain bowl, measuring cups, *waterbath*, strainer.
2. Materials and instruments for ointment formulation of ethanolic extract of Sambiloto leaves.
   a. Materials: 3.4 grams of sambiloto leaves extract, *adeps lanae* 0.6 grams, vaselin album 16.0 gram.
   b. Instruments: mortar and stamper, ointment container, analytical scale, stirring bar, parchment paper, blue etiquettes.
3. Materials and instruments for sambiloto leaves ethanolic extract ointment preparation and physical test.
   a. Materials: 3 grams of sambiloto ethanolic extract ointment preparation.
   b. Instruments: pH stick, transparent glass, stopwatch, round glass, calipher.

Research Stages

1) Preparation for Simplicia Powder
   Simplicia of Sambiloto leaves weighs 1 kilogram, obtained from Kerjo, Karanganyar. The simplicia was blended into powder using Fomac 1600 watt blender.
2) The making of ethanolic extract of Sambiloto Leaves
   Extraction was conducted by maceration method, the solvent used were 2.5 litres of ethanol 70%, strained simplicia powder of 250 grams. Maceration were conducted for 5 days. Stirring were done daily for 30 minutes, then filtered. The dregs were remacerated for 2 days so extract withdrawal can be done perfectly. The extract obtained were collected and evaporated in the water bath to obtain thick extract. Extract yield is calculated using the formula as follows :

$$\text{Yield} = \frac{\text{Thick extract weight}}{\text{Simplicia powder weight}} \text{ x } 100\%$$

3) The making of ethanolic extract of Sambiloto Leaves ointment
   Ointment from ethanolic extract of Sambiloto leaves was composed of active substance of Sambiloto leaf of 3.4 grams; adeps lanae 0.6 grams and 16 grams of vaseline album.
   The making of ethanolic extract of sambiloto leaves ointment for this study were conducted as follow: Adeps lanae was put inside mortar, stirred until homogenous. The extract was then diluted using approximately 3 drops of distilled water. Sambiloto leaves were added then stirred until it become homogenous.
4) Physical tests for ethanolic extract of Sambiloto leaves ointment
   a) Organoleptic tests
      Organoleptic tests were conducted to examine the physical appearance from the ointment include smell and color (Hamzah et al., 2013).
   b) pH tests
      pH test were conducted to look for the acidity level for each ointment to ensure that the ointment is not irritating the skin. The ointment preparation was measured using universal pH stick. Ointment was smeared on pH paper, set aside for a while and the result is matched with the existing color table with skin corresponding pH (Hamzah et al., 2013).
   c) Homogeneity tests
      Homogeneity tests was conducted to examine whether the ingredients of the ointment preparation mixed and dispersed evenly, by applying the ointment to the transparent glass where the dosage is taken into three parts, which are upper, middle and lower parts. The homogeneity of the ointment is characterized by the absence of the particles coagulation and also has the uniformity of

color on every part of the ointment. (Hamzah et al., 2013).

d) Adhesion tests

The test were conducted to determine the adhesive power of the ointment to the skin. Ointment weighs 0.5 grams were placed on spherical glass scale and added 500 grams of loads, let it rest for one minute and afterwards the load is lowered. The condition of good adhesion is no less than four seconds (Hamzah et al., 2013). The longer the ointment attached to the skin, the greater the effects.

e) Dispersive Power Tests

Dispersive power test was conducted to examine the ability of the ointment spread to the skin. The ointment of 0.5 grams were placed in the middle of the spherical glass scale. Then on top of the ointment was placed another round glass or other transparent material and ballast so the round glass and ballast weighed 150 grams, allowed to stand for one minute then record the diameter of distribution. The dispersive power requirement for topical preparations are 5-7 cm (Hamzah et al., 2013).

RESULTS

The result of Sambiloto extract yield was 12.19%, meets the requirement listed on Indonesian Herbal Farmacopoeia which is no less than 8%. The water content of simplicia powder of Sambiloto leaves is 8.42%. Result for determining the water content of simplicia powder of Sambiloto leaves has already meet the standard with no less than 10%. The unstandardized water content allows the growth of fungi. The color of the extract was blackish green. The result of physical tests for ethanolic extract of Sambiloto leaves ointment in this study consisted of organoleptic test, pH test, homogeneity test, adhesion test and dispersive power test.

Based on table 1, it can be figured out that the result for the physical tests for Ethanolic extract of Sambiloto Leaves ointment which is the organoleptic tests has the distinctive odor of Sambiloto leaves, semi solid shape and blackish green in color. pH test conducted using universal pH stick was conducted by comparing the color obtained with the existing pH color table. The pH value of ethanolic extract of sambiloto leaf ointment is 6, so that the pH of this preparation is matched to the skin's pH which are 4.5-6.5 (Hamzah et al., 2013).

Homogeneity tests indicated that the ethanolic extract of sambiloto leaves ointment has a good homogeneity. The result of adhesion tests is 82 seconds and the dispersive power tests result was 5.6 cm. These results indicate that ethanolic extract of sambiloto leaves is qualified for adhesion and dispersive power requirements.

DISCUSSIONS

The results of the organoleptic tests of the ethanolic extract of Sambiloto leaves has distinctive odor from Sambiloto leaves, the shape of the ointment was semi solid and the color obtained was blackish green. These results are in line with study conducted by Paputungan (2014), the more content of the extract in the ointment, then the color of the ointment will be more similar to the color of the extracts used. According to Hamzah et al (2013), organoleptic tests has met the requirements of the ointments form which is semi solid, odorless and blackish green in color which is the result of an ointment base melted with ethanol extract.

Observation of the ointment in terms of odor indicates the distinctive odor of Sambiloto leaves extract. This is due to the extract contained in the ointment masked the odor of the ointment base, so that the higher the concentration of the extract used in the preparation of the ointment, the easier to know the typical smell of the extract used in the ointment (Paputungan, 2014). Results of the organoleptic tests in this study indicated

Table 1. Results of Physical test of Ethanolic Extract of Sambiloto Ointment

No	Physical test of Ethanolic Extract of Sambiloto Ointment preparation	Result	Standard
1	Organoleptic test	Smell : typical Sambiloto Shape : semi solid Color : Blackish green	Smell : typical Sambiloto Shape : semi solid Color : Blackish green
2	pH test	6	4.5-6.5
3	Homogeneity test	Homogenous	Homogenous
4	Adhesion test	82 seconds	>4 seconds
5	Dispersive power test	5.6 cm	5-7 cm

that the result of organoleptic in terms of color was blackish green are affected by the tannin substance in the Sambiloto plant. This indicated that organoleptic in terms of color and odor of the ethanolic extract of Sambiloto leaf preparation was affected by the addition of ethanol extract in the Sambiloto leaf.

pH test results on the preparation for this study was 6. According to Tranggono and Latifa in Hamzah et al (2013), the pH requirement for topical preparation is between 4.5-6.5. According to research by Naibaho et al (2013), topical preparation must have the same pH with normal skin pH so it is safe to be applied. If the pH is too acidic, it will irritate the skin. And when it is too alkaline, it will scale the skin. Other studies mentioned that the safe pH value for the skin ranged from 5-10. So it can be stated that the ointment tested was safe to be applied, because met the requirement of the skin's pH range specified (Padmadisastra, 2007).

According to Hamzah (2013), the pH inclined in every ointment was affected by the addition of active substances. This statement corresponds with this study where pH values of the preparation experiencing changes in value after the addition of ethanolic extract of Sambiloto leaves. The pH preparation before the addition of ethanolic extract of Sambiloto leaves was 5, after ethanolic extract of Sambiloto leaves extract was added, the pH preparation become 6.

Results of the homogeneity tests on ethanolic extract of Sambiloto leaves indicated the homogenous composition marked with the absence of coagulated particles and disperse in colors (Hamzah et al., 2013). There were coarse particles on homogeneity tests after smeared on glass slide, this is due to the filtering on masseration process. The resin penetrated the filter cloth, resulting the extract still contains residue. Naibaho et al (2013) stated that an ointment preparation must be homogenous and evenly distributed so it will not make irritation and distributed evenly when applied. The homogenous preparation will give good result because the drug ingredients are dispersed evenly, so that in every part of the preparation contains the same amount of the ingredient. The ingredients not dispersed evenly will not achieve the desired therapeutic effect.

The result of adhesion test of ethanolic extract of Sambiloto leaf was 82 seconds. According to Anonymous (2012) in Ulaen (2012), the requirement for good adhesion test is no less than 4 seconds. This indicates that the ethanolic extract of Sambiloto leaves ointment is qualify the adhesion requirement, the longer the ointment attached to the skin, the greater the effect. According to Astuti (2007), the addition of *adeps lanae* can affect the adhesion of the preparation. *Adeps lanae* can absorb water twice the weight, so the mass become softer and the adhesion power becomes lower too.

The result of dispersive power test of ethanolic extract of Sambiloto leaves was 5.6 cm. Ulaen (2012) stated that the requirement of the topical preparation is around 5-7 cm. The result of the dispersive power test on the ethanolic extract of Sambiloto leaves ointment can be considered fulfilling the requirement of the good dispersive power. A good dispersive power can cause the contact between drugs into the skin spread widely so the drugs' absorption into the skin takes place quickly. According to Naibaho et al. (2013), the wider the membrane where the ointment spread, the coefficients of the drugs' diffusion is also increasing. So the bigger the dispersive power, the better the ointment.

CONCLUSION

Ethanolic extract of Sambiloto leaves is semi solid shape, blackish green in color and typical Sambiloto leaves in odor, pH 6, have a good homogeneity, adhesive power of 82 seconds and dispersive power of 5.6 cm. The results of physical test for Ethanolic extract of Sambiloto leaves corresponds to the quality standards.

REFERENCE:

Anonim. 1995. *Farmakope Indonesia Edisi IV.* Jakarta: Departemen Kesehatan RI.

Astuti, I.Y., Iskandar, S., Umi, H. 2007. Pengaruh Konsentrasi Adeps Lanae dalam Dasar Salep *Cold Cream* terhadap Pelepasan Asam Salisilat. *Jurnal Ilmiah Farmasi Vol 05 No 01*. Purwokerto. Universitas Muhammadiyah Purwokerto.

Fauziah, F., Helmi A., Elisma., dan Nila, A. 2014. Pengaruh Pemberian Ekstrak Daun Binahong *(Anredera cardifolia* (Ten.) Steenis) Terhadap Kadar Kolesterol Total Darah Pada Mencit Putih Jantan Hiperkolesterolemia. *Prosiding Seminar Nasional dan Workshop "Perkembangan Terkini Sains Farmasi dan Klinik IV" tahun 2014.*

Hamzah, H., Fatimawali., Paulina V.Y.Y., dan Jeane M. 2013. Formulasi Salep Ekstrak Etanol Daun Nangka *(Artocarpusheterophyllus* Lam.) dan Uji Efektivitas Terhadap Penyembuhan Luka Terbuka pada Kelinci. *Jurnal Ilmiah Farmasi Vol. 2 No. 03.*

Lukistyowati, I. 2012. Studi Efektifitas Sambiloto *(Andrographis paniculata Nees)* untuk Mencegah Penyakit Edwardsiellpsis pada Ikan Patin *(Pangasius hypopthalmus). Berkala Perikanan Terubuk Vol. 40. No. 2.*

Naibaho, O.H., Yamlean, P. dan Weny, W. 2013. Pengaruh Basis Salep terhadap Formulasi Sediaan Salep Ekstrak Daun Kemangi *(Ocimum Sanctum l.)* pada Kulit Punggung Kelinci yang Dibuat Infeksi Staphylococcus Aureus. *Jurnal Ilmiah Farmasi Vol 2 No 2.* Manado. Universitas Sam Ratulang.

Notoatmodjo, S. 2012. *Metodologi Penelitian Kesehatan.* Jakarta: PT Rineka Cipta.

Padmadisastra, Y., Amin, S., Shinta, A. 2007. Formulasi Sediaan Salep Antikeloidal yang mengandung Ekstrak Terfasilitasi Panas Microwive dari Herba Pegagan *(Centella asiatica (L) Urban).* Fakultas Farmasi Universitas Padjadjaran. Bandung.

Paputungan, F., Paulina, V.Y.Y dan Gayatri, C. 2014. Uji Efektifitas Salep Ekstrak Etanol Daun Bakau Hitam *(Rhizophora mucronata Lamk)* dan Pengujian terhadap Proses Penyembuhan Luka Punggung Kelinci yang Diinfeksi Bakteri *Staphylococcus aureus.* Jurnal Ilmiah Farmasi. UNSRAT Vol 3 No 1.

Pratama, H. 2014. Gambaran Kesembuhan Luka Iris Kulit Anjing *(Canis familiaris)* yang Diterapi dengan Gerusan Daun Sambiloto *(Andrographis paniculata)* secara makroskopis, *(Skripsi).* Fakultas Kedokteran Hewan Universitas Gadjah Mada. Yogyakarta.

Ulaen, S.P.J., Yos B., Suatan R.A. 2012. Pembuatan Salep Dari Ekstrak Rimpang Temulawak *(Curcuma xanthorrizha Roxb).* Jurusan Farmasi Politeknik Kesehatan Kemenkes Manado. Manado.