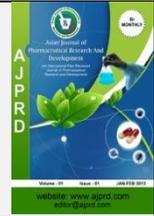


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Research Article

## Phytochemical Screening and Emulgel Formulation of Jernang Resin Extract (*Daemonorops Draco* (Willd) Blume)

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### ABSTRACT

**Objective:** *Daemonorops draco* (Willd) Blume is a plant that produces jernang, which is a red resin that sticks to the outer skin of the fruit. Also known as dragon's blood, it is used as a traditional medicine for wound healing, anti-diarrhea, etc. as a natural coloring agent. Emulgel is an emulsion that contains a gel base in a certain ratio. Emulgel has the advantages of increasing drug absorption, easy to apply and more comfortable, not sticky on the skin. This study aims to determine the class of secondary metabolites contained in jernang in the form of simplicia and their extracts and to make jernang resin extract emulgel preparations that can be used as wound medicine.

**Method:** Jernang simplicia collected by dry method. The extract was made by maceration using 96% ethanol solvent, separating the solvent using a rotary evaporator and concentrating it on a water bath. Phytochemical screening was carried out on simplicia and extracts. The emulsion formulation of jernang resin extract was made in three formulas with various levels of extracts P1 (2.5%), P2 (5%) and P3 (7.5%), using Tween 80 and Isopropyl myristate (IPA) as surfactants and oil phase, and 1% Carbopol as a gel base, then the emulgel was made with a ratio of emulsion and gel base of 4: 1 so that the variations of the extract were made into three formulas P4 (2%), P5 (4%) and P6 (6%)

**RESULTS:** The results of phytochemical screening showed that jernang simplicia contained flavonoid, glycoside and saponin compounds. Also compounds that are non-polar, namely steroids / triterpenoids. Whereas in the form of the extract it contains flavonoid class compounds, this is because the 96% ethanol solvent is semi-polar so that the compounds contained in the ethanol extract are polar compounds, namely flavonoids which are the largest content of compounds in jernang. Jernang P4 extract emulgel (2%) organoleptically has the best physical appearance, has the characteristics of a thick, slightly clear consistency, brownish red color, has a distinctive smell of jernang mixed with the aroma of Tween 80, and is homogeneous.

**Conclusion:** Based on the test results, it can be concluded that in the form of jernang simplicia, it contains polar compounds (flavonoids, glycosides and saponins) and non-polar (steroid / terpenoid groups) and in the form of jernang resin extract contains flavonoid class compounds. Organoleptically, the jernang resin extract emulgel with a content of 2% (P4) is the best formula compared to other formulas.

**Keywords:** Jernang, *Daemonorops draco*, phytochemical screening, emulgel

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### INTRODUCTION

Jernang resin abroad is also known as dragon's blood. Jernang generally comes from *Dracaena* (*Dracaenaceae*), *Daemonorops* (*Palmae*), *Croton* (*Euphorbiaceae*), and *Pterocarpus* (*Fabaceae*) plants. Jernang has also been used as traditional medicine since centuries ago. Jernang, which comes from several types of

rattan (*Daemonorops*), is a resin produced by the secretion of rattan jernang fruit, which sticks to the outer skin of the fruit. This type of jernang is only found in Indonesia and peninsular Malaysia<sup>9</sup> and is a non-timber forest product from Indonesia which is exported abroad, especially to Singapore and China. The Anak Dalam tribe in Jambi has traditionally used jernang as a wound healer<sup>8</sup> as well as the people in Aceh.

Emulgel is a delivery system for hydrophobic drugs. Where in this system uses a combination of gel and emulsion. Use of the gel in the drug delivery system has several advantages over other delivery systems. The gel system can assist with both the release and delivery of oil-based and insoluble drugs<sup>1</sup>. Gel can also make these preparations non-sticky or non-greasy, easy to apply, and comfortable to use so that they are preferred by patients and increase patient compliance in their use<sup>2</sup>.

## METHODOLOGY

### Materials

The tools and materials used in this study include analytical balance, vacuum rotary evaporator, water bath, a set of reflux devices, filter paper, mortar and stamper, vaporizer plates, glassware.

Jernang fruit, Aqua dest., Hydrochloric acid reagent (Merck), sulfuric acid (Merck), Chloroform (Merck), Methanol (Merck), Isopropyl myristate (Merck) and Isopropyl alcohol (Merck), Dragendorf reagent, Meyer reagent, Bouchardic reagent, Pb (II) acetic reagent, iron (III) chloride reagent, amyl alcohol and anhydrous acetic acid, 96% ethanol, Tween 80, triethanolamine, Karbopol 940,

### Simplicia processing and extraction

The processing of jernang resin or often simply called jernang, is done in a dry way, namely the jernang fruit that has been collected, weighed, then dried. After drying, sorting is carried out to remove the remaining foreign objects and then weighed the dry weight. Dried fruit is placed into a basket which has a hole/net and then the outside of the basket is beaten so that the sap/resin on the fruit skin will separate and be accommodated in a prepared container under the basket. The dried powder obtained was sieved to separate the dirt and then weighed it. Simplicia powder is stored in a tightly closed container<sup>8</sup>.

A total of 1 kg of simplicia powder was put into a vessel with a lid, 10 liters of solvent were added and soaked for the first 6 hours while stirring occasionally, then let stand for 18 hours. The maserate is collected in a dark bottle and then separated by precipitation, then filtered. The search process is carried out twice. The filtrate is collected and concentrated using a rotary evaporator at a temperature of 50 ° C4 and dried over a water bath.

### Phytochemical screening

#### Alkaloid examination

A total of 0.5 g of simplicia powder/extract was weighed, then added 1 ml of 2 N hydrochloric acid and 9 ml of distilled water, heated over a water bath for 2 minutes, cooled and filtered. The filtrate is used for the alkaloid test. 3 test tubes were taken, then into each test tube 0.5 ml of filtrate was added. To the first tube 2 drops of Bouchardat reagent were added, the second tube was added 2 drops of Dragendorf reagent, and in the third tube 2 drops of Meyer reagent were added. Alkaloids are called positive if there is sedimentation or turbidity in at least 2 test tubes from the above experiment<sup>3</sup>.

#### Glycoside examination

The simplicia powder/extract was weighed as much as 3 g then filtered with 30 ml of a mixture of 7 parts by volume of 96% ethanol and 3 parts by volume of distilled water added with 10 ml of 2 N hydrochloric acid. Refluxed for 30 minutes, then cooled and filtered. Take 20 ml of the filtrate, add 25 ml of distilled water and 25 ml of lead (II) acetate 0.4 M, then shake it for 5 minutes and filter it. The filtrate was filled with 20 ml of a mixture of 3 parts chloroform and 2 isopropanol and was repeated three times. Collection of water extract is evaporated at a temperature not more than 50°C. The rest is dissolved in 2 ml of methanol. The residual solution is used for the following experiments, namely 0.1 ml of the experimental solution is put into a test tube, evaporated in a water bath. The remainder is dissolved in 2 ml of distilled water and 5 drops of Molish reagent, then slowly add 2 ml of concentrated sulfuric acid. Glycosides are positive if a purple ring is formed<sup>3</sup>.

#### Saponin examination

A total of 0.5 g of sympathetic powder/extract is put into a test tube and 10 ml of hot distilled water is added, cooled then shaken vigorously for 10 seconds, a steady foam emerges not less than 10 minutes as high as 1-10 cm, 1 drop is added. 2 N hydrochloric acid, if the foam does not disappear, it indicates the presence of saponins<sup>3</sup>.

#### Flavonoid examination

A total of 10 g powder of simplicia/extract is then added with 100 ml of hot water, boiled for 5 minutes and filtered hot, 5 ml of the filtrate obtained is then taken and 0.1 g of Mg powder is added and 1 ml of concentrated hydrochloric acid and 2 ml of amyl alcohol, beaten and allowed to separate. Positive flavonoids if there is a red, yellow, orange color on the amyl alcohol layer<sup>5</sup>.

#### Tannin examination

A total of 0.5 g of simplicia powder / extract was filtered with 10 ml of distilled water, filtered then the filtrate was diluted with distilled water until it was colorless. The filtrate was obtained, 2 ml of solution was taken and then added 1 to 2 drops of iron (III) chloride reagent. The formation of a blue or green-black color indicates the presence of tannins<sup>5</sup>.

#### Steroid/Triterpenoid examination

A total of 1 g of simplicia powder/extract was macerated with n-hexane for 2 hours, then filtered. The filtrate is evaporated in an evaporating cup, the remaining 2 drops of acetic anhydride and 1 drop of concentrated sulfuric acid are added. Appearing blue or green indicates the presence of steroids and appearing red, pink or purple indicates the presence of triterpenoids<sup>5</sup>.

#### Emulsion and emulgel formulations

Making jernang resin extract emulgel begins with making jernang resin extract emulsion then adding it to the gel base. The nanoemulgel formula for jernang resin extract can be seen in Table 1.

The jernang resin extract emulsion is prepared in the following way: dilute the jernang resin extract with a little

isopropyl alcohol then add it to the mixture of Tween 80 and aqua dest, stir until it is homogeneous, add isopropyl myristate and stir until it is homogeneous. Basis gel dibuat dengan cara mendispersikan Karbopol dalam aqua dest dan ditambahkan tianolamin secukupnya hingga didapat pH 7.

Jernang resin extract emulgel was prepared with a ratio of emulsion to gel base ratio of 4: 1, stirring until homogeneous.

**Table: 1** Composition of jernang resin extract emulgel

Ingredient	Amount (gram)		
	P1	P2	P3
<b>Emulsion composition (%)</b>			
Jernang resin extract	2,5	5	7,5
Isopropyl myristate	7	7	7
Polisorbat 80 (Tween 80)	33,75	33,75	33,75
Aqua dest	up to 100	up to 100	up to 100
<b>Komposisi basis gel (%)</b>			
Carbopol 940	1	1	1
TEA	sufficiently up to pH 7	sufficiently up to pH 7	sufficiently up to pH 7
Aqua dest	up to 100	up to 100	up to 100

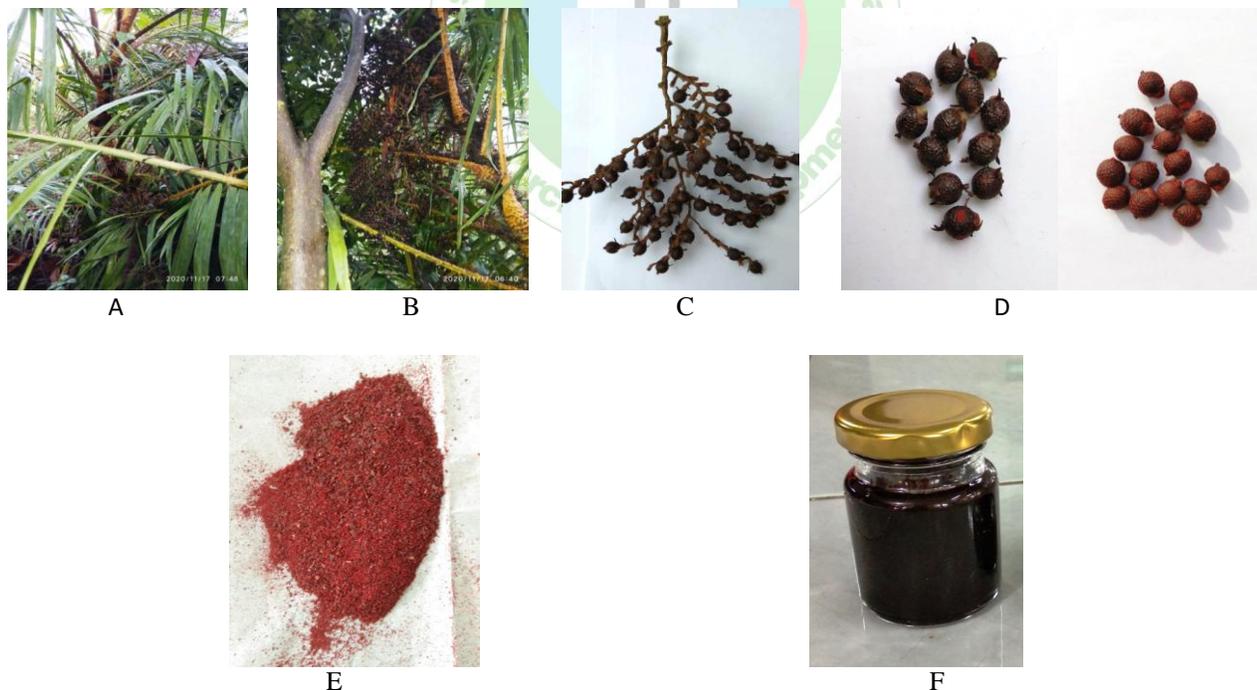
### Organoleptic testing for emulgel preparations

Organoleptic examination of the emulgel preparation of the Jernang resin extract was carried out visually, color, odor and homogeneity, carried out immediately after the preparation was finished.

### RESULTS AND DISCUSSION

#### Simplicia and jernang extract

Jernang simplicia is a red-brown powder and the extract obtained is brownish red in color but is more concentrated and sticky like sap, with a distinctive smell of clear. Plants, fruits, and extracted products can be seen in Figure 1.



**Figure 1** Jernang. A. Jernang plants; B and C. Jernang fruit; D. Jernang fruit that has been resinized; E. Jernang; F. Jernang resin extract

#### The results of phytochemical screening for simplicia and jernang resin extract

Phytochemical screening for simplicia and jernang resin extract was carried out to obtain information about the

content of secondary metabolite compounds contained therein. The results of phytochemical screening for simplicia and jernang resin extract can be seen in Table 2.

**Table 2** The results of phytochemical screening of simplicia and jernang resin extract

No.	Secondary metabolites group	Simplisia	Ekstrak etanol
1	Alkaloid grup	-	-
2	Flavonoid grup	+	+
3	Saponin grup	+	-
4	Tanin grup	-	-
5	Steroid/Triterpenoid grup	+	-
6.	Glikosida grup	+	-

The results of phytochemical screening show that the jernang simplicia contains secondary metabolites of flavonoids, saponins, steroids / triterpenoids and glycosides, while in the form of ethanol extract it contains secondary metabolites of the flavonoid group, this is because flavonoids are polar so that they can dissolve in 96% ethanol which is polar. The flavonoid group has antibacterial, antiseptic and antioxidant properties which in this case can help accelerate wound healing<sup>6,8,7</sup>.

### The results of the organoleptic test preparation emulgel resin extract jernang

Organoleptic testing of the jernang resin extract emulgel preparation was carried out at the beginning of making the emulgel preparation. The emulgel formulation of jernang resin extract has a thick and slightly clear consistency, has a distinctive smell of jernang mixed with the aroma of tween 80, brownish red in color which increases with the increase in the amount of extract. The appearance of the jernang resin extract emulgel preparation can be seen in Figure 2 and the results of the organoleptic test can be seen in Table 3.

**Figure 2** Jernang resin extract emulgel**Table: 3** The results of testing the characteristics of nanoemulgel and emulgel preparations for jernang resin extract

Formula	Consistency	Odor	Color	Homogeneity
P4	Thick slightly transparent	Typical clear and mixed with the aroma of Tween 80	Brownish red	Homogeneous
P5	Thick, not transparent	Typical clear and mixed with the aroma of Tween 80	Brownish red and darker color	Homogeneous
P6	Thick, not transparent	Typical clear and mixed with the aroma of Tween 80	Brownish red and darker color	Not homogeneous, there is separation of extracts

Based on the results of organoleptic testing, the P6 formula occurs when the extract is separated. This can be due to a lack of surfactant so it cannot prevent separation and a large amount of extract causes coalescence between extract particles. While the P4 and P5 formulas did not separate the extract and P4 had a clearer shape than the P5 formula.

### CONCLUSION

Based on the test results, it can be concluded that the jernang resin extract made by maceration in 96% ethanol solvent contains flavonoid class compounds and 2%

emulgel preparation (P4) has a clearer physical appearance than other formulas.

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### REFERENCES

- Alexander, A., Khichariya, A., Gupta, S., Patel, R.J., Giri, T.K. and Tripathi, D.K. Expansions in an Emergent Novel Drug Delivery Technology: Emulgel. *Journal of Controlled Release*. 2013; 171:122-132.

2. Chellapa P., Mohamed, A.T., Keleb, E.I., Elmahgoubi, A., Eid, A.M., Issa, Y.S., et. al. Nanoemulsion and Nanoemulgel as a Topical Formulation. *IOSR Journal of Pharmacy: IOSR Journal of Pharmacy*: 2015; 5(10):43-47
3. Departemen Kesehatan Republik Indonesia. *Materia Medika Indonesia*. Jilid III. Jakarta: Departemen Kesehatan RI.; 1979. p. 33,167-170.
4. Departemen Kesehatan Republik Indonesia. *Farmakope Herbal Indonesia*. Edisi I. Jakarta: Direktorat Jenderal Pengawasan Obat Dan Makanan; 2008. p.174-175.
5. Farnsworth, N.R. Biological and Phytochemical Screening of Plants. *J of Pharm Sc.* 1966; 55(3):262-264.
6. Gupta, D., Bleakly, B., Gupta, R.K. Dragon's Blood: Botany, Chemistry, and Therapeutics Uses. *Journal of Ethnopharmacology*. 2007; 115(3):361-380.
7. Namjoyan, F., Kiashi, F., Moosavi, Z. B., Saffari, F., dan Makhmalzadeh, B. S. Efficacy of Dragon's blood cream on wound healing: A randomized, double-blind, placebo-controlled clinical trial. *Journal of Traditional and Complementary Medicine*. 2016; 6:37-40.
8. Waluyo, T. K., dan Pasaribu, G. Aktifitas Antioksidan dan Antikoagulasi Resin Jernang. *Jurnal Penelitian Hasil Hutan*. 2013; 31(4):306-315

