PROCEEDING BOOK

THE 1st INTERNATIONAL CONFERENCE ON INTERPROFESSIONAL HEALTH COLLABORATION

“Combating The Growing Epidemic of Triple Burden Diseases through Interprofessional Health Collaboration in Developing Countries”

GRAGE HOTEL BENGKULU, INDONESIA
October 30-31th
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HEALTH POLYTECHNIC OF HEALTH MINISTRY BENGKULU
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Proceeding Book

The 1st INTERNATIONALCONFERENCE ON INTERPROFESSIONAL HEALTH COLLABORATION

“Combating The Growing Epidemic of Triple Burden Diseases through Interprofessional Health Collaboration in Developing Countries”

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Address from the Governor of Bengkulu Province

Dear honorary guests and participants,

First, I Recommend Welcome To Our Guests From State Friends Of Thailand, Malaysia, Philifina, And India And Speakers From Indonesia As The Host. Welcome To Bumi Rafflesia. And Happy To Enjoy The Beauty Of Bengkulu City Which Is A Historical City For The Indonesian Nation.

To Poltekkes, Bengkulu Ministry Of Health, Which Has Implemented International Seminars Today, This Polytech Is A Higher Education, Which Is Superior In Educing Health Personnel, Bengkulu And Indonesia Property In General And Always Visiting The Tri Dharma Of Higher Education.

I Realize That An Important Thing In Life Is Health, There Is No Meaning We Life If We Are Not Healthy, Then From The Role Of Health Personnel Is Very Important To Improve Optimal Health.

Ladies And Gentlemen,

The Success Of Health Development In Indonesia Must Implement The Entire And Integrated Health Development Program According To The Health Problems Faced By The Community.

At The Time Of Existing Diseases From Infection Disease To Degenerative Diseases That Need Handling Readiness Carefully Through The Approach To The Potential And Empowerment Of The Community. With The Multi Discipline Approach. Increasing Health Services Can Improve The Apptitude Of Community As Well As Decrease The Number Of Illness And Mortality In Any Region, And To Enhance The Available Health Service.

That Is All And Thank You

Governor Of Bengkulu

Dr Drh Rohidin Mersyah, MMA
Address from the Director of Health Polytechnic of Health Ministry Bengkulu

Dear honorary guests and participants,

Welcome to the International Conference whichis held annually in our institution Bengkulu Health Polytechnic. This is our first event of International Conference. We hope this event can be our place to share knowledge from many field studies related to health science.

It is a great pleasure to invite you in The 1\textsuperscript{st} International Conference on Interprofessional Health Collaboration. The International Conference on Health Sciences Named “Combating The Growing Epidemic of Triple Burden Diseases through Interprofessional Health Collaboration in Developing Countries”. We have missions to improve health collaboration in other health education, research and community service. This conference is one of the way to achieve our vision and mission Bengkulu Health Polytechnic.

We have a great expectation that this conference can be our good environment to develop knowledge, to share experience, to have interaction between us and of course to give contribution for our health world. We do hope the success of the conference and we hope you all enjoy it.

Sincerely,

Darwis, S.Kp., M.Kes
Director Bengkulu Health Polytechnic
GEL FORMULATION OF GUAVA LEAF (*PSIDIUM GUAJAVA LINN*) ETHANOL EXTRACT WITH HPMC (HIDROXISIPROPIL METIL SELULOSA) AS GEL BASE

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Abstract---In this study gel was formulated from 5% guava leaf (*Psidium guajava* Linn) ethanol extract with variation of HPMC concentrations as gel base, they were 1%, 1.5% and 2%. This study was aimed to formulated gel from 5% guava leaf extract. Guava leaf extract was obtained by using maceration method. Guava gel was formulated in 3 formulas with HPMC, they were FI 1% of HPMC, FII 1.5% of HPMC and FIII 2% of HPMC. Gel of guava leaf ethanol extract was evaluated in various parameters like organoleptic, homogeneity, pH, spreadability, adhesion, stability study and irritation test. The results can be concluded that FIII has best characteristic from other. FIII was transparent gel, homogeneous, has a good spreadability (in a range 5.1-5.8 cm), adhesion (5.35 minutes) and stability. FIII does not irritating skin when applied (pH 6).

Keywords---Gel, Guava, *Psidium guajava* Linn

I. INTRODUCTION

Indonesia, the country was famous has a lot of medicinal plant. There are around 30,000-40,000 medicinal plants that have been found in Indonesia [8]. Guava (*Psidium guajava* Linn.) is one of the medicinal plants that have been known and used traditionally as herbal medicine [1].

Guava was a medicinal plant that can be used as part of its stem, leaf, roots and fruit. Guava leaf was commonly used traditionally to help treat diarrhea, diabetes, flatulence, bleeding wounds, mouth sores. Some study was shown guava leaves have been flavonoid content, especially quercetin which used as antibacterial agent [12].

Aponno et. al. (2014) conducted study about formulation gel of guava leaf extract with 1%, 5% and 7% of extract concentration. Gel was formulated using Na-CMC as gel base. The study was shown that 5% of guava leaf in gel form could be as antibacterial against *Staphylococcus aureus* was healing wound in rabbit. However, the gel form had been spreading less than 5 cm (2.6 cm average), it was due to Na-CMC which was bad as gel base. Na-CMC gave bad viscosity in gel form.

HPMC (Hydroxypropyl methylcellulose) is one of semi-synthetic cellulose derivative which is ether of propylene glycol from methyl cellulose [6]. HPMC will be produce gel form was better than gel form with Na-CMC base. HPMC was generally known as non-toxic and non-irritating ingredient [9].

In this study guava leaves were extracted by maceration method using 96% of ethanol. 5% of ethanol extract of guava leaf was formulated into three formulas with variation of HPMC concentration, they are Formula I (FI 1%), Formula II (FII 1.5%) and Formula III (FIII 2%). Gel form were evaluated its organoleptic,
homogeneity, pH of the preparation, dispersion, stickiness, panelist test, and skin irritation test.

II. MATERIAL AND METHOD

Plant Collection and Identification

Fresh guava leaves (*Psidium guajava* Linn.) were collected from guava tree growing at Jalan Raden Fatah, Bengkulu City. Samples were then identified at Laboratory of Department Biology, Faculty Mathematics and Natural Science of Bengkulu University. Guava leaves had been obtained were sorted wetly, then it dried in the air.

Extraction Procedure

Guava leaves was washed in tap water, dried, and placed into blender to be grounded into powder. 250 g of guava leaf powder was extracted by maceration method with 1000 mL 96% of ethanol in a dark bottle for 3 days. After 3 days, sample was filtered to get its filtrate and the residue was macerated again for 3 days in 750 mL 96% of ethanol. The filtrate was evaporated with rotary evaporator at 40 °C to got thick extract.

Formulation of Guava Leaf Extract Gel

In this study gel from guava leaf ethanol extract was designed bellow:

<table>
<thead>
<tr>
<th>TABLE I. DESIGN GEL FORMULA OF GUAVA LEAF ETHANOL EXTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingredients</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>Guava leaf extract</td>
</tr>
<tr>
<td>HPMC</td>
</tr>
<tr>
<td>Glycerin</td>
</tr>
<tr>
<td>Propylene glycol</td>
</tr>
<tr>
<td>Methyl paraben</td>
</tr>
<tr>
<td>Corrigens coloris</td>
</tr>
<tr>
<td>Distilled water</td>
</tr>
</tbody>
</table>

Formulation procedure; 10 mL distilled water was heated at temperature of 80 °C. HPMC was swelling on hot water for 5 minutes, then added methyl paraben and ethanol extract of guava leaf, while stirred homogeneous. The gel mass has been formed then added glycerin and propylene glycol, finally added distilled water adequate while stirred homogeneous.

Evaluation of Guava Leaf Extract Gel Organoleptic

Evaluation aimed to saw physical form by observing visually from shape, color, and odor of gel form.

pH Evaluation

pH of gel was measured by using pH stick universal.

Homogeneity test

Homogeneity was tested by visual inspection. It was tested for its presence and appearance of any aggregates.

Spreadability test

Spreadability is expressed to extent of gel distribution when gel readily spread on application skin which is correlated with its effect. This evaluation is expressed immediately when gel finished to formulated. 0.5 g of gel was weighed, then was place in the middle of petri dish. Above the gel is placed small-scale glass and give the load sequentially from the smallest to the largest size (50 g, 100 g, 150 g and 200 g) within 1 - 2 minutes. Measure its diameter of spread, good spreadable value is in range 5 - 7 cm.

Adhesion test

0.125 g of gel is placed between two object glass in adhesion testing tool, 500 g of load is placed for 2.5 minutes, then the load is lifted and given 40 g of load on the tool and recorded release time.

Stability study

Stability study was done with open and close container. This study was observed at room temperature for 1 month.
Skin irritation test
Tests were carried out on 10 volunteers for one day. Gel is applied on arm skin with diameter of 2 cm, then covered with gauze and plaster. After 8 hours observe irritation skin symptom.

III. RESULT

Plant Extraction
Guava leaf (Psidium guajava Linn) was extracted by maceration method with 96% of ethanol as solvent. Maceration produce 32.60 g of thick extract. Extract was dark brown and specific odor.

Gel Formulation and Evaluation
Ethanol extract of guava leaf was formulated into three formulas they are FI, FII, and FIII. Gel was formulated with various concentration of HPMC (Hydroxypropyl methylcellulose) as gel base. Gel form was evaluated in various parameters like organoleptic, homogeneity, pH, spreadability, adhesion, stability study and irritation test. The results was shown in Table II.

TABLE II. RESULT OF EVALUATION FROM GUAVA LEAF ETHANOL EXTRACT GEL

<table>
<thead>
<tr>
<th>Evaluation Parameter</th>
<th>FI</th>
<th>FII</th>
<th>FIII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organoleptic</td>
<td>Transparent, greenish, specific odor</td>
<td>Transparent, greenish, specific odor</td>
<td>Transparent, greenish, specific odor</td>
</tr>
<tr>
<td>pH</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Homogeneity</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Adhesion</td>
<td>4.9 minutes</td>
<td>5.25 minutes</td>
<td>5.35 minutes</td>
</tr>
<tr>
<td>Spreadability (cm)</td>
<td>7.4 - 7.8</td>
<td>6.4 - 7.3</td>
<td>5.1 - 5.8</td>
</tr>
<tr>
<td>Stability (1 month, room temperature)</td>
<td>Stable (closed)</td>
<td>Stable (closed)</td>
<td>Stable (closed)</td>
</tr>
<tr>
<td>Skin irritation test</td>
<td>Not irritating</td>
<td>Not irritating</td>
<td>Not irritating</td>
</tr>
</tbody>
</table>

IV. DISCUSSION
In this study gel formulation of guava leaf ethanol extract was determined by Biology Laboratory at University of Bengkulu. Determination is aimed to ensure that sample are species of Psidium guajava Linn.

250 g of guava leaf powder was extracted with 96% of ethanol. The result of extraction was obtained 32.60 g of thick extract with yield was 13.04% and has characteristics dark brown color and specific odor. The yield and characteristics is suitable with guava extract standard in Farmakope Herbal Indonesia. Standard of yield guava extract is at least 12.3% [3].

Gel of guava leaf ethanol extract was formulated with 5% of extract in three gel formulas (FI, FII, and FIII) according to the formula design in Table I. Aponno et al (2014) study’s showed that 5% guava leaf extract was optimal as an antibacterial against Staphylococcus aureus in gel preparation which is formulated using NaCMC base.

Gel was formulated using HPMC with concentration: 1% in Formula I (FI); 1.5% in Formulas II (FII); and 2% in Formulas III (FIII). HPMC has better characteristics than NaCMC as a gel base. HPMC can produce gel form that are more transparent and has better spreadability [7].

Evaluation result of gel formulas were shown in Table II. Gel have organoleptic: greenish color and specific odor in all formula (FI, FII, and FIII). Gels are transparent and good homogeneity. pH value was in 6 and gel does not irritating skin of 10 volunteers. pH value of gel form must suitable with skin pH (4.5 - 6.5) so not to irritate the skin when applied [11].

Spreadability
Spreadability is expressed to extent of gel distribution when gel readily spread on skin application which is correlated with its effect [4]. Spreadability test was shown in Table III and Figure 1.

Figure 1. describes when weight of load was increased, the spreadability was increased. It was observed that by increasing the concentration of HPMC, the dynamic contact angle values also increased, thus, decreasing the spreading behavior of the polymer solution [5].
Figure I and Table III describe F1 and FII have spreadability value more than standard, but FIII is suitable with standard of spreadability. The standard of gel spreadability is in a range 5 - 7 cm. Spreadability is correlated with its effect when gel is applied on skin. Gel that has good spreadability will distribute active compound optimally [4].

<table>
<thead>
<tr>
<th>Weight of Load (g)</th>
<th>Spreadability of Formulas (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F1</td>
</tr>
<tr>
<td>50</td>
<td>7.4</td>
</tr>
<tr>
<td>100</td>
<td>7.6</td>
</tr>
<tr>
<td>150</td>
<td>7.7</td>
</tr>
<tr>
<td>200</td>
<td>7.8</td>
</tr>
</tbody>
</table>

Adhesion properties

Adhesion is one of critical characteristic in gel properties which is correlated with its absorption. Long adhesion value will give good absorption [10].

Using HPMC in formulas will give adhesion better than NaCMC. In other hand, increasing concentration of HPMC will increase adhesion [10]. In this study was describe in Table 2, F1 with HPMC concentration of 1% has adhesion of 4.9 minutes, while in FIII with HPMC concentration of 2% has adhesion of 5.35 minutes. It is mean that FIII has better absorption than other formulas.

V. CONCLUSION

This study can be concluded, FIII has best characteristic from other. FIII was transparent gel, homogeneous, has a good spreadability (in a range 5.1- 5.8 cm), adhesion (5.35 minutes) and stability. FIII does not irritating skin when applied (pH 6). FIII may be giving better absorption and optimal effect when it is applied.

ACKNOWLEDGMENTS

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REFERENCES


