BUKTI KORESPONDENSI

Lampiran	**:**	Peer review proses korespondensi submit Publikasi Jurnal Ilmiah Internasional Bereputasi
Nama Jurnal	**:**	Journal of Advanced Pharmaceutical Technology & Research Vol 12 Issue 1 January-March 2021 Hal: 94-98
Index	**:**	Terindeks pada database internasional bereputasi dan berfaktor dampak (SCOPUS Q2)
Judul Jurnal	**:**	Modification of anti-acne bawang dayak (*Eleutherine bulbosa* (Mill.) Urb.) cream to *Propionibacterium acnes*

No	Item	Tanggal	Halaman
1	**Register akun jurnal**	29 Juli 2020	1
2	**Submission article and acknowledgement of submission (JAPTR_107_20)**	03 Agustus 2020	2
3	**Acknowledgement of revised manuscript JAPTR_107_20**	10 Agustus 2020	2
4	**Review process (Article for revision)**	03 September 2020	3
5	**Acceptance of manuscript (LoA)**	01 Desember 2020	17
6	**Article for final proof**	14 Desember 2020	18
7	**Article Published**	09 Januari 2021	18
8	**Ethical approval**	17 Desember 2019	31

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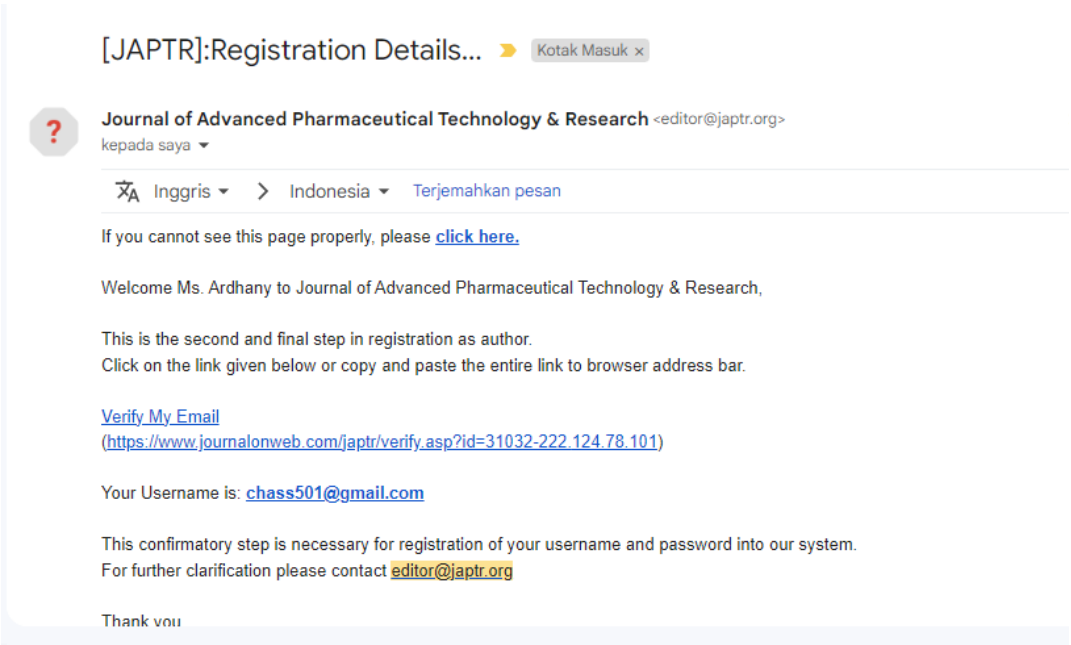

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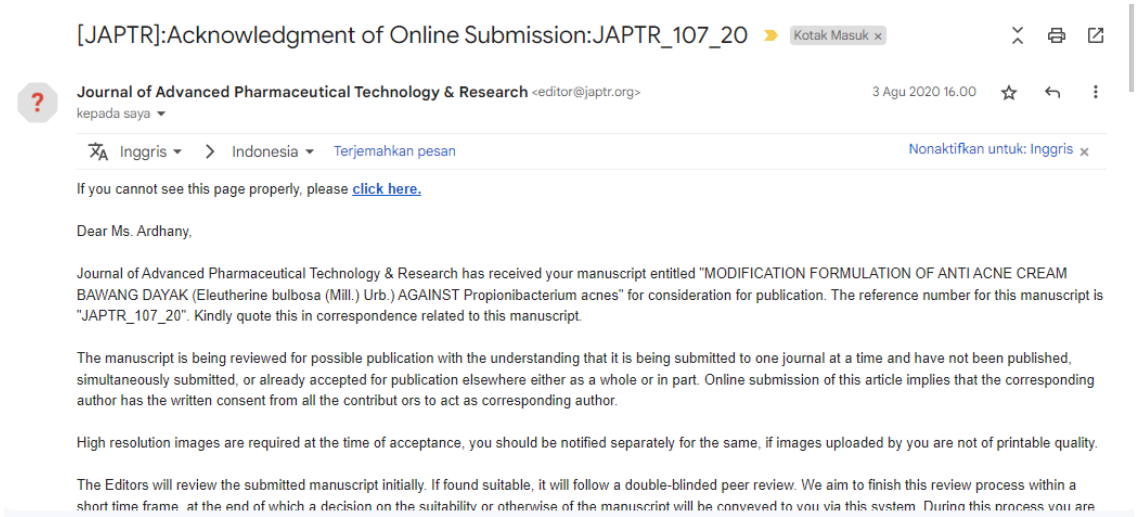

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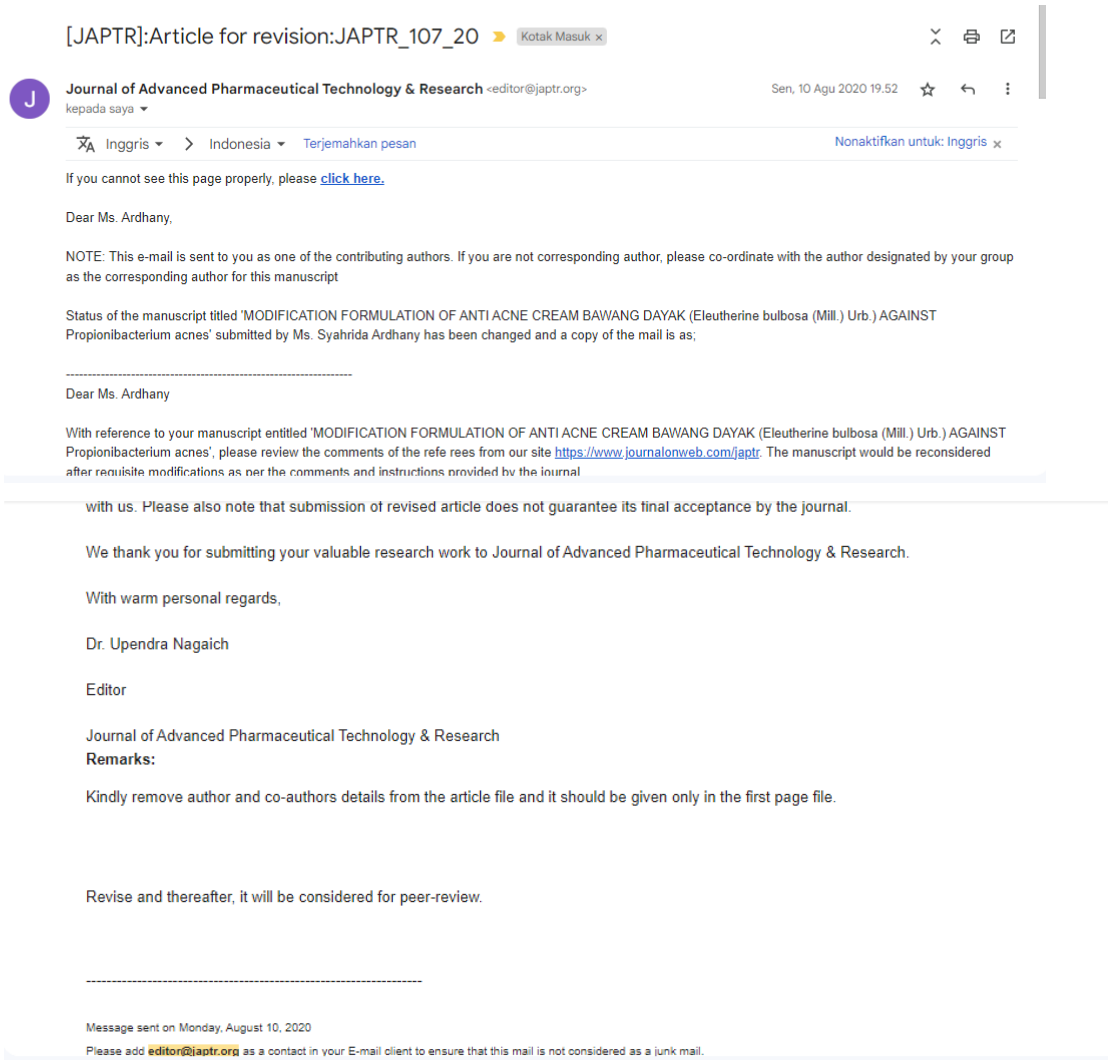

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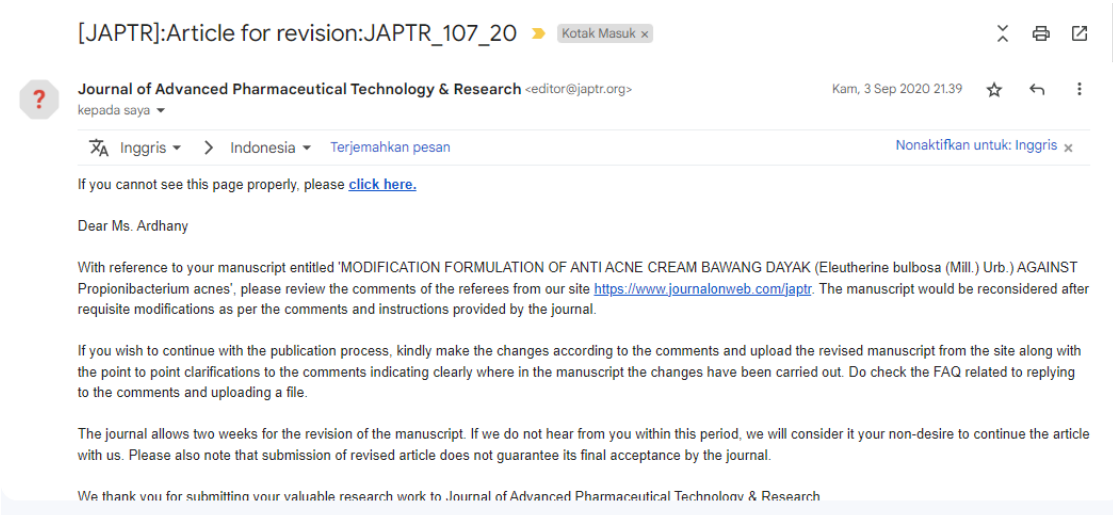

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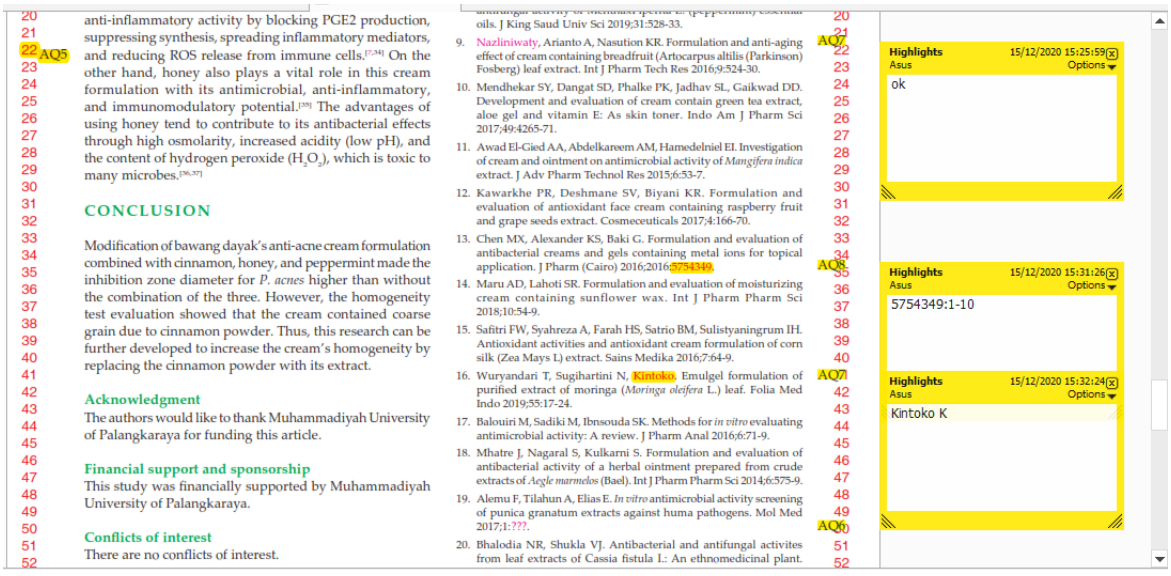

anti-inflammatory activity by blocking PGE2 production, suppressing synthesis, spreading inflammatory mediators, and reducing ROS release from immune cells.[17,34] On the other hand, honey also plays a vital role in this cream formulation with its antimicrobial, anti-inflammatory, and immunomodulatory potential.[35] The advantages of using honey tend to contribute to its antibacterial effects through high osmolarity, increased acidity (low pH), and the content of hydrogen peroxide (H_2O_2), which is toxic to many microbes.[36,37]

CONCLUSION

Modification of bawang dayak's anti-acne cream formulation combined with cinnamon, honey, and peppermint made the inhibition zone diameter for *P. acnes* higher than without the combination of the three. However, the homogeneity test evaluation showed that the cream contained coarse grain due to cinnamon powder. Thus, this research can be further developed to increase the cream's homogeneity by replacing the cinnamon powder with its extract.

Acknowledgment

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Conflicts of interest

There are no conflicts of interest.

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MODIFICATION FORMULATION OF ANTI ACNE CREAM BAWANG DAYAK (Eleutherine bulbosa (Mill.) Urb.) AGAINST *Propionibacterium acnes*

ABSTRACT

Bawang dayak is one of traditional medicine in Central Kalimantan for resolve acne vulgaris. Based on study before, cream formulation of ethanolic extract bawang dayak can inhibit growth of *P.acnes* but bawang dayak has too strong odor that make inconvenience and the cream formula separate after 3 days that make inhibitory ability against *P.acnes* decrease. The aim of this study is to improve the anti-acne cream formula of extract bawang dayak from previous studies with the addition of cinnamon, honey and aqua menthae piperitae to improve the odor of onion which too strong and the effectiveness of inhibition against *P.acnes*. The Modification formulation of cream extract bawang dayak was evaluated organoleptic test, homogeneity, pH, adhesion test, dispersion test and in vitro antibacterial against *P.acnes.*The results show organoleptic test especially the odor gives a more comfortable odor than without modification formulation, pH of cream suitable for topical application but the homogeneity observation of cream showed all homogeneous formulations are visible from a uniform color but the cream still contains coarse grains, furthermore this formula still needs a little improvement. The inhibition test of cream against *P.acnes* showed F1= 16.15 mm, F2= 14.85 mm, F3= 15.05 mm and F4= 17.10 mm all moderate activity and better in effectiveness than previous study, possibly because of the addition of cinnamon and honey. It can be concluded modification formulation of cream extract bawang dayak showed inhibitory zone increase against *P.acnes* compared with previous study but the cream still needs a little improvement for user convenience.

Keywords: Acne vulgaris, Bawang dayak, Cream, *Eleutherine bulbosa*, *Propionibacterium acnes*

INTRODUCTION

Acne vulgaris is a desease that cause noninflammatory lesions with open and closed comedones or inflammatory lesions (papules, pustules and nodules).[1] There are many causes of acne such as hormone level, fat or oil in skin and a bacterium like *Propionibacterium acnes*. *Propionibacterium acnes* is the predominant member in the skin areas of back, face and chest, *P.acnes* is a gram positive, anaerobic, immobile bacterium that populates skin pores and hair follicles .[2] Moreover, *P. acnes* is rarely found in young children prior to puberty, which is when sebaceous gland function begins to mature, *P.acnes* colonization increase throughout the teenager years and into the twenties.[3,4]

Bawang dayak is one of traditional medicine in Central Kalimantan for relieving many diseases including acne vulgaris. Based on study before, Cream formulation of ethanolic extract bawang dayak can inhibit growth of *P.acnes* but bawang dayak (onion) has too strong odor that make inconvenience and the cream formula separate after 3 days that make inhibitory ability against *P.acnes* decrease.[5,6] So in this study the cream formulation was modificated with adding honey, cinnamon and aqua *Menthae piperitae* for stability of cream effectiveness and improve the odor of bawang dayak, moreover honey, cinnamon and aqua menthae piperitae have antibacterial activity which can support the cream formula.[7,8]

METHODS

1.1 Plants materials and sample collection

Bulbs of bawang dayak (Eleutherine bulbosa (Mill.) Urb) were collected from farmer in Sei Gohong, Bukit Batu Palangka Raya Central Kalimantan. Specimens were prepared and sent for determination to the Indonesian Institute of Sciences Research Center for Biology.

1.2 Preparation of bulbs extract

The extract was prepared by cutting the bulbs and the bulbs were dried under the sun for 5-7 days. The dried bulbs were crushed by grinder. The powder of the bulbs was extracted with 96% ethanol using percolator and once process has finished, all extracts were concentrated in a rotary evaporator.

1.3 Formulation preparation

The formulation components used are listed in Table 1. The components consist of oily phase (stearic acid, adeps lanae and paraffin liquid) and aquaeous phase (TEA, nipagin, aqua menthae piperitae and aquadest). Each phase- oily phase and aquaeous phase- heated up to 55ºC until melts. Ethanolic extract of bawang dayak dissolved in aquadest, the powder of cinnamon dissolved in warm aquadest and filter it, then put into aquaeous phase and stir until homogenous in mortar, oil soluble add gradually, stir until the cream base was formed. The last add honey gradually stir ad homogen.

Table 1. Various cream formula of ethanolic extract bawang dayak

Materials	**F1**	**F2**	**F3**	**F4**
Extract ethanol of bawang dayak	5% (1250 mg)	10% (2500 mg)	15% (3750 mg)	20% (5000 mg)
Cinnamon powder	2500 mg	2500 mg	2500 mg	2500 mg
Honey	2000 mg	2000 mg	2000 mg	2000 mg

Oily phase:				
Stearic acid	5.000 mg	5.000 mg	5.000 mg	5.000 mg
Adeps lanae	750 mg	750 mg	750 mg	750 mg
Paraffin liquid	6.250 mg	6.250 mg	6.250 mg	6.250 mg
Aquaeous phase :				
Triethanolamine	375 mg	375 mg	375 mg	375 mg
Nipagin	25 mg	25 mg	25 mg	25 mg
Aqua menthae piperitae	20 ml	20 ml	20 ml	20 ml
Aquadest ad	25.000 mg	25.000 mg	25.000 mg	25.000 mg

1.4 Evaluation of Cream

1.4.1 Organoleptic properties

The cream was observed for color, odor and appearance

1.4.2 Homogeneity observed

The cream was observed on the glass object, the test was done by physical touch with hands; preparations should be had a homogenous composition [9,10]

1.4.3 Measurement of pH

The pH of cream was determined by pH meter [11,12]

1.4.4 Spreadability test

The spreadability of test sample was determined using the following technique: 0.5g cream was placed within a circle of 1 cm diameter pre-marked on a glass plate over which a second glass plate was placed (in the middle between two horizontal glass plates) for 5 minutes. The standard weight applied to the upper plate was 50 g for 1 minute and record the diameter of the spread cream, did the same thing with 100 g and 150 g. Spreadability refers to the area covered by a fixed amount of cream sample

after the uniform spread of sample on the glass plate. Each formulation was tested three times [13,14]

1.4.5 Adhesion test

The adhesion test was conducted by placing 0.5 gram of cream over one glass object with another glass object. The cream was applied between two glass objects and then pressed with 1 kg load for 1 minute on test equipment. After 1 minute the load was released and the time was noted up to the second object of the glass open [15,16]

1.5 Evaluation of antibacterial activity by zone of inhibition by well diffusion method

Cream was evaluated for in vitro antibacterial activity against *Propionibacterium acnes* (ATCC 11827) using the disc diffusion method with different concentrations of bawang dayak combination with cinnamon, honey and aqua menthae pipeitae.

The bacterial isolates were subcultured into a nutrient. The 24 hour old bacterial culture was standardized using 0.5 of McFarland standard.[17] Mueller-Hinton agar (MHA) was used for bacteria bioassay. MHA was prepared by dissolving 38 g in 1000 ml of distilled water and brought to boil to completely dissolve. Sterilization was achieved by autoclaving 121ºC for 15 minutes. [18, 19]

MHA plates were prepared and bacterial strains were inoculated by cotton swab and then clindamycin, various formula of cream applied on blank disc in MHA plates. The plates were incubated at 37 ºC for 24 h, zone of inhibition was measured and noted later on. [20, 21]

RESULTS AND DISCUSSION

2.1 Evaluation test of cream formula

2.1.1 Organoleptic appearance

The results of organoleptic test showed brown color of cream and by adding cinnamon and aqua menthae piperitae, the odor of onion not too strong (Fig1).

2.1.2 Homogeneity observation

The observation of cream showed all homogeneous formulations are visible from a uniform color but the cream still contains coarse grains due to the addition of cinnamon powder, this formulation needs to be improved one of it by making cinnamon extract not the powder, so that the cream is not coarse.

2.1.3 pH Observation

The pH observation showed all cream formula was 6. The pH that suitable for topical application is same with pH of skin, skin pH is normally acidic, ranging between 4-6. [22, 23]

2.1.4 Spreadability and adhesion test

The spreadibility test of all cream formula showed easily spreadable with an average spread more than 5 cm and the adhesion test for F1 to F4 are respectively 3", 3", 5" and 8", the larger amount of extract bawang dayak the adhesion gets stronger.

2.2 Antibacterial Activity

Based on study of Shahbazi (2017) the antibacterial activities can be classified into three levels: weak activity (inhibition zone lower than 12 mm), moderate activity (inhibition zone between 12 and 20 mm) and strong activity (inhibition zone higher than 20 mm).[24] The inhibition test results showed F1 have 16.15 mm inhibition zone (moderate activity), F2= 14.85 mm (moderate activity), F3= 15.05 mm (moderate activity) and F4= 17.10 mm (moderate activity) (Fig 2; Table 2.). The results of cream test compared with control, zone inhibition of modification formulation cream is not

large as clindamycin, but this cream formulation is good enough to be developed because it has moderate activity of inhibitory zone (Fig 2; Table 3.).

Table 2. Zone of inhibition of modification cream formulas

Various cream	Zone of inhibition (mm) ± SD	Results
F1	16.15 ± 0.45	Moderate activity
F2	14.85 ± 1.75	Moderate activity
F3	15.05 ± 1.45	Moderate activity
F4	17.10 ± 0.8	Moderate activity

Previous study reported that preliminary phytochemical screening of ethanol extract bawang dayak contained flavonoids, alkaloids, saponins and tannins. [25] Flavonoids compound have been found to be a potent antibacterial agent against a wide range of pathogenic microorganisms in vitro, the antibacterial mechanism of flavonoids has also been continuously test and renewed. Based on literature revealed that their antibacterial activity may be attributed to three mechanisms: cytoplasmic membrane damage, inhibition of nucleic acid synthesis and inhibition of energy metabolism. [26, 27] Alkaloids have antibacterial ability, most alkaloids are found to be bactericidal rather than being bacteriostatic.[28] The alkaloid act through EPI (Efflux Pump Inhibition) activity, which stand as a putative mechanism of antibacterial functionality. [29] The possible antimicrobial mechanism of total saponins were due to the reduced glucose utilization efficiency in microorganism, then affecting their growth and proliferation, reducing the activity of key enzymes in physiological metabolism and suppressing the synthesis of relevant proteins and finally executing the antibacterial effect. [30] Besides

that some research also show tannins have antibacterial ability either gram negative or gram positive. [31, 32]

Table 3. Zone of inhibition of clindamycin

Concentration of clindamycin (%)	Zone of inhibition (mm) ± SD	Results
0.5	40.20 ± 1.9	Strong activity
1	43.40 ± 0.8	Strong activity
2	45.10 ± 0.7	Strong activity
4	47.60 ± 0.6	Strong activity

Furthermore, cinnamon has strong antioxidant activity. In some study reports, cinnamon has shown potential activity against acne bacteria. This therapeutic effect is mainly due to presence cinnamaldehyde. In addition, cinnamaldehyde has anti-inflammatory effects, such as blockage of PGE2 production, suppression of synthesis, dissemination of inflammatory mediators and reduction of ROS release from immune cells. [33, 34] Moreover, honey has an important role too in this formulation cream because of ability antimicrobial, anti-inflammatory and potential immunomodulatory actions.[35] The beneficial role of honey is attributed to its antibacterial property with regards to its high osmolarity, acidi (low pH) and content of hydrogen peroxide (H_2O_2) and non-peroxide components, H_2O_2 is toxic to many microbes. [36, 37]

CONCLUSION

Modification formulation of anti-acne cream bawang dayak combination cinnamon, honey and adding aqua menthae piperitae make zone of inhibition against

Propionibacterium acnes higher than without combination but evaluation of cream test homogeneity observation show the cream contains coarse grains due to the addition of cinnamon powder, so next study the formulation must to be improved one of it is by making cinnamon extract not the powder.

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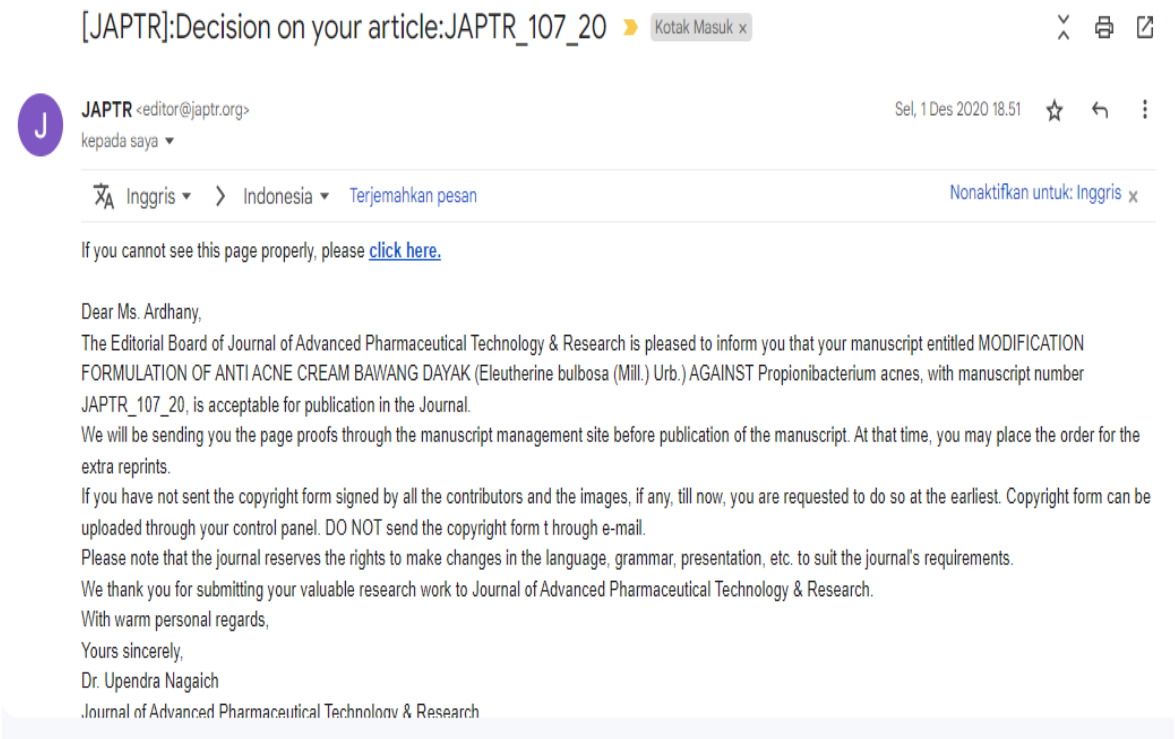

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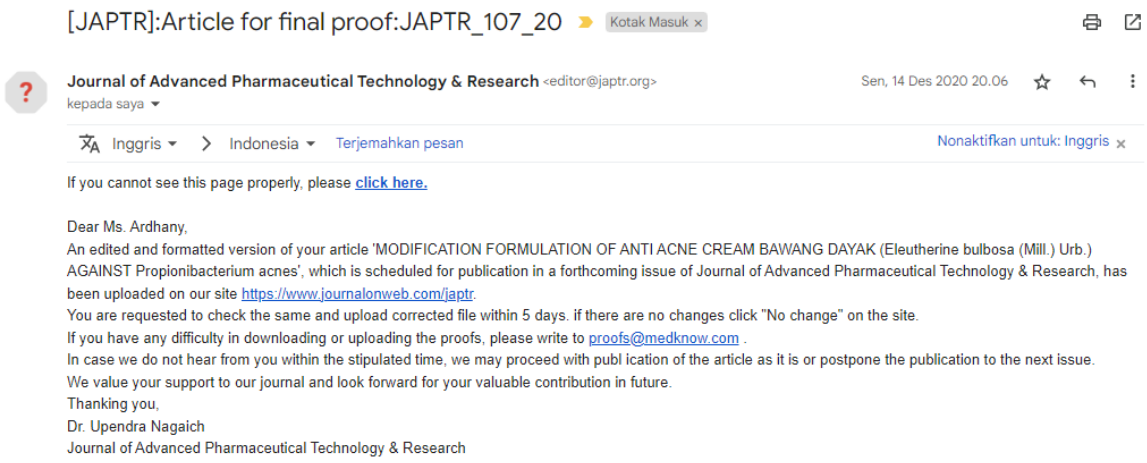

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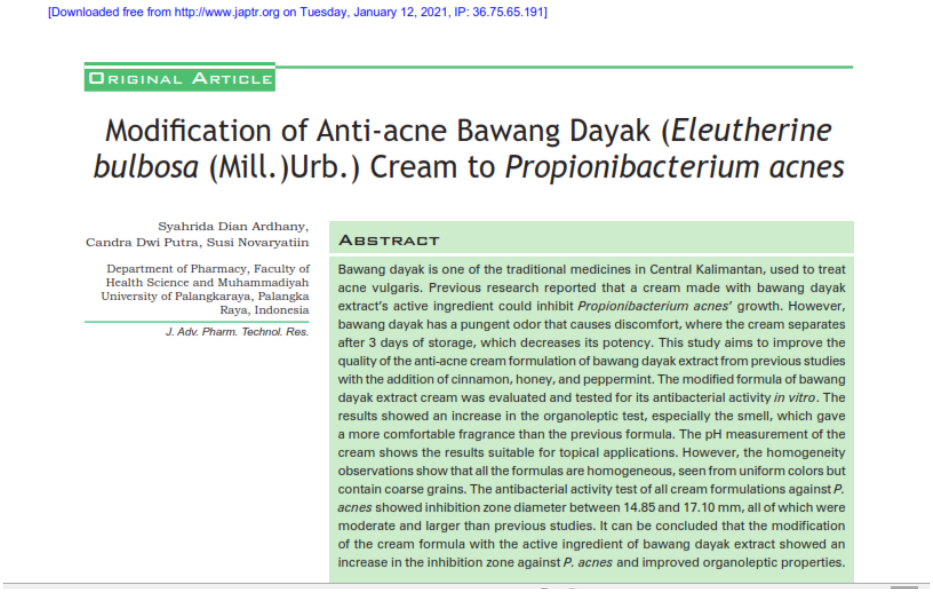

ORIGINAL ARTICLE

Modification of Anti-acne Bawang Dayak (*Eleutherine bulbosa* (Mill.)Urb.) Cream to *Propionibacterium acnes*

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ABSTRACT

Bawang dayak is one of the traditional medicines in Central Kalimantan, used to treat acne vulgaris. Previous research reported that a cream made with bawang dayak extract's active ingredient could inhibit *Propionibacterium acnes'* growth. However, bawang dayak has a pungent odor that causes discomfort, where the cream separates after 3 days of storage, which decreases its potency. This study aims to improve the quality of the anti-acne cream formulation of bawang dayak extract from previous studies with the addition of cinnamon, honey, and peppermint. The modified formula of bawang dayak extract cream was evaluated and tested for its antibacterial activity *in vitro*. The results showed an increase in the organoleptic test, especially the smell, which gave a more comfortable fragrance than the previous formula. The pH measurement of the cream shows the results suitable for topical applications. However, the homogeneity observations show that all the formulas are homogeneous, seen from uniform colors but contain coarse grains. The antibacterial activity test of all cream formulations against *P. acnes* showed inhibition zone diameter between 14.85 and 17.10 mm, all of which were moderate and larger than previous studies. It can be concluded that the modification of the cream formula with the active ingredient of bawang dayak extract showed an increase in the inhibition zone against *P. acnes* and improved organoleptic properties.

MODIFICATION OF ANTI-ACNE BAWANG DAYAK CREAM To *Propionibacterium acnes*

ABSTRACT

Bawang dayak is one of traditional medicine in Central Kalimantan for resolve acne vulgaris. Based on study before, cream formulation of ethanolic extract bawang dayak

can inhibit growth of *P.acnes* but bawang dayak has too strong odor that make inconvenience and the cream formula separate after 3 days that make inhibitory ability against *P.acnes* decrease. The objective of this study is to focus on improving anti-acne cream formula of extract bawang dayak from previous studies with the addition of cinnamon, honey and aqua menthae piperitae to improve the odor of onion which too strong and the effectiveness of inhibition against *P.acnes*. The Modification formulation of cream extract bawang dayak was tested evaluation cream and in vitro test.The results present that organoleptic test especially the odor gives a more comfortable odor than without modification formulation, pH of cream suitable for topical application but the homogeneity observation of cream showed all homogeneous formulations are visible from a uniform color but the cream still contains coarse grains, furthermore this formula still needs a little improvement. The inhibition test of cream against *P.acnes* showed F1= 16.15 mm, F2= 14.85 mm, F3= 15.05 mm and F4= 17.10 mm all moderate activity and better in effectiveness than previous study, possibly because of the addition of cinnamon and honey. It can be concluded modification formulation of cream extract bawang dayak showed inhibitory zone increase against *P.acnes* compared with previous study but the cream still needs a little improvement for user convenience.

Keywords: Acne, Bawang dayak, Cream, in vitro, *P. acnes*

INTRODUCTION

Acne vulgaris is a skin problem that cause noninflammatory such as comedone or inflammatory lesions like papules, pustules and nodules.[1] There are a lot of causes for acne like bacteria one of them is *Propionibacterium acnes*, fat, oil in skin and

hormone level. *Propionibacterium acnes* are generally found on the skin areas of face, chest and back, *P.acnes* is a gram positive bacteria with anaerobic properties, immobile bacterium that contains hair follicles and skin pores.[2] Moreover, *P. acnes* is usually found in young children before puberty that colonization increase in adolescence until twenties, where the function of the sebaceous glands begin to mature.[3,4]

Bawang dayak is one of traditional medicine in Central Kalimantan for relieving many diseases including acne vulgaris. Based on study before, Cream formulation of ethanolic extract bawang dayak can inhibit growth of *P.acnes* but bawang dayak (onion) has too strong odor that make inconvenience and the cream formula separate after 3 days that make inhibitory ability against *P.acnes* decrease.[5,6] So in this study the cream formulation was modificated with adding honey, cinnamon and aqua *Menthae piperitae* for stability of cream effectiveness and improve the odor of bawang dayak, moreover honey, cinnamon and aqua menthae piperitae have antibacterial activity which can support the cream formula.[7,8]

METHODS

1.1 Plants materials and sample collection

The plant part used is bulbs of bawang dayak (*Eleutherine bulbosa* (Mill.) Urb) were collected by farmer in Sei Gohong, Bukit Batu Palangka Raya Central Kalimantan. Specimens were prepared and sent for determination to the Indonesian Institute of Sciences Research Center for Biology.

1.2 Preparation of bulbs extract

The extract was prepared by cutting the bulbs and the bulbs were dried under the sun to dry. Dry bulbs were mashed by a grinding machine. The powder was extracted by

percolator with 96% ethanol and once process has finished, all extracts were concentrated in a rotary evaporator.

1.3 Formulation preparation

The formulation components used are listed in Table 1. The components consist of oily phase (stearic acid, adeps lanae and paraffin liquid) and aquaeous phase (TEA, nipagin, aqua menthae piperitae and aquadest). Each phase- oily phase and aquaeous phase- heated up to 55ºC until melts. Ethanolic extract of bawang dayak dissolved in aquadest, the powder of cinnamon dissolved in warm aquadest and filter it, then put into aquaeous phase and stir until homogenous in mortar, oil soluble add gradually, stir until the cream base was formed. The last add honey gradually stir ad homogen.

Table 1. Various cream formula of ethanolic extract bawang dayak

Materials	**F1 (5%) (mg)**	**F2 (10%) (mg)**	**F3 (15%) (mg)**	**F4 (20%) (mg)**
Extract ethanol of bawang dayak	1250	2500	3750	5000
Cinnamon powder	2500	2500	2500	2500
Honey	2000	2000	2000	2000
Oily phase:				
Stearic acid	5.000	5.000	5.000	5.000
Adeps lanae	750	750	750	750
Paraffin liquid	6.250	6.250	6.250	6.250
Aquaeous phase :				
Triethanolamine	375	375	375	375
Nipagin	25	25	25	25
Aqua menthae piperitae	20	20	20	20

Aquadest ad	25.000	25.000	25.000	25.000

1.4 Evaluation of Cream

1.4.1 Organoleptic properties

The cream was observed for color, odor and appearance

1.4.2 Homogeneity observed

The cream was observed on the glass object, the test was done by physical touch with hands; preparations should be had a homogenous composition [9,10]

1.4.3 pH Observation

The pH of cream was being calculated by pH meter [11,12]

1.4.4 Spreadability test

Equal to 0.5 g cream was put inside a circle of 1 cm diameter pre-marked on a glass plate then the second glass is placed on it (in the middle between two horizontal glass plates) for 5 minutes. The standard weight is 50 g applied to the upper plate for 1 minute and measure the diameter of the spread, did the same thing with 100 g and 150 g. The size of the spread was determined when the spread of cream had a fixed diameter. Each formulation was tested three times [13,14]

1.4.5 Adhesion test

The adhesion test was conducted by placing 0.5 gram of cream over one glass object with another glass object. The cream was applied between two glass objects and then pressed with 1 kg load for 1 minute on test equipment. After 1 minute the load was released and record the time up to the second object of the glass open [15,16]

1.5 Evaluation of antibacterial activity by zone of inhibition by well diffusion method

Cream of bawang dayak was evaluated for antibacterial activity against *Propionibacterium acnes* (ATCC 11827) using in vivo method with different concentrations of bawang dayak combination with cinnamon, honey and aqua menthae pipeitae.

The bacterial isolates were subcultured into a nutrient. The bacterial culture was standardized using 0.5 of McFarland standard after 24 hour.[17] Bacteria bioassay in this study is Mueller-Hinton agar (MHA). MHA was prepared by dissolving 38 g in 1000 ml of distilled water and brought to boil to completely dissolve. Sterilization used by autoclaving. [18, 19] MHA plates were prepared and bacterial strains were inoculated by cotton swab and then clindamycin, various formula of cream applied on blank disc in MHA plates. It was incubated at 37 ºC for 24h, zone of inhibition was calculated and noted later on. [20, 21]

RESULTS AND DISCUSSION

2.1 Evaluation test of cream formula

2.1.1 Organoleptic appearance

The results of organoleptic test showed brown color of cream and by adding cinnamon and aqua menthae piperitae, the odor of onion not too strong (Fig1).

2.1.2 Homogeneity observation

The observation of cream showed all homogeneous formulations are visible from a uniform color but the cream still contains coarse grains due to the addition of cinnamon powder, this formulation needs to be improved one of it by making cinnamon extract not the powder, so that the cream is not coarse.

2.1.3 pH Observation

The pH observation showed all cream formula was 6. The pH that suitable for topical application is same with pH of skin, skin pH is normally acidic, ranging between 4-6. [22, 23]

2.1.4 Spreadability and adhesion test

The spreadibility test of all cream formula showed easily spreadable with an average spread more than 5 cm and the adhesion test for F1 to F4 are respectively 3", 3", 5" and 8", the larger amount of extract bawang dayak the adhesion gets stronger.

2.2 Antibacterial Activity

Based on study of Shahbazi (2017) the antibacterial activities was classified into three levels with different of inhibition zone: weak activity (< 12 mm), moderate activity (12-20 mm) and strong activity (> 20 mm).[24] The inhibition test results showed F1 have 16.15 mm inhibition zone (moderate activity), F2= 14.85 mm (moderate activity), F3= 15.05 mm (moderate activity) and F4= 17.10 mm (moderate activity) (Fig 2; Table 2.). The results of cream test compared with control, zone inhibition of modification formulation cream is not large as clindamycin, but this cream formulation is good enough to be developed because it has moderate activity of inhibitory zone (Fig 2; Table 3.).

Table 2. Zone of inhibition of modification cream formulas

Various cream	Zone of inhibition (mm) ± SD	Results
F1	16.15 ± 0.45	Moderate activity
F2	14.85 ± 1.75	Moderate activity
F3	15.05 ± 1.45	Moderate activity
F4	17.10 ± 0.8	Moderate activity

Previous study reported that preliminary phytochemical screening of ethanol extract bawang dayak have chemical constituents are flavonoids, saponins, alkaloids and tannins. [25] Flavonoid compound in vitro technique has been shown to be a potent antibacterial agent against a variety of bacteria, the antibacterial mechanism has also been continuously testing and renewed. The literature has shown that their antibacterial activity can be due to three mechanisms: inhibition of energy metabolism, suppression of nucleic acid, and damage the cytoplasmic membrane.[26,27] Alkaloids have antibacterial ability generally act through EPI (Efflux Pump Inhibition) activity, most alkaloids are found to be bactericidal rather than being bacteriostatic.[28,29] One of the antibacterial mechanisms of saponins is the reduced efficiency of glucose utilization in bacteria,then affecting their proliferation or growth and eventually led to the antibacterial effect. [30] Besides that some research also show tannins have antibacterial ability either gram negative or gram positive. [31, 32]

Table 3. Zone of inhibition of clindamycin

Concentration of clindamycin (%)	Zone of inhibition (mm) ± SD	Results
0.5	40.20 ± 1.9	Strong activity
1	43.40 ± 0.8	Strong activity
2	45.10 ± 0.7	Strong activity
4	47.60 ± 0.6	Strong activity

Furthermore, cinnamon has strong antioxidant activity. In many study information, cinnamon has shown potential activity against acne bacteria. This therapeutic effect is mainly due to presence cinnamaldehyde. In addition, cinnamaldehyde has anti-inflammatory effects, such as blockage of PGE2 production, suppression of synthesis,

dissemination of inflammatory mediators and reduction of ROS release from immune cells. [33, 34] Moreover, honey has an important role too in this formulation cream because of ability antimicrobial, anti-inflammatory and potential immunomodulatory actions.[35] The advantage of using honey is likely to contribute to its antibacterial effect through high osmolarity, acidi (low pH) and content of hydrogen peroxide (H_2O_2), H_2O_2 is toxic to many microbes. [36, 37]

CONCLUSION

Modification formulation of anti-acne cream bawang dayak combination cinnamon, honey and adding aqua menthae piperitae make zone of inhibition against *Propionibacterium acnes* higher than without combination but evaluation of cream test homogeneity observation show the cream contains coarse grains due to the addition of cinnamon powder, so next study the formulation must to be improved one of it is by making cinnamon extract not the powder.

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