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

Key words: Acne, Bawang dayak, cream, *Propionibacterium acnes* Syahrída Dian Ardhany, Candra Dwi Putra, Susi Novaryatiin Department of Pharmacy, Faculty of Health Science and Muhammadiyah University of Palangkaraya, Palangka Raya, Indonesia J.

Adv. Pharm. Technol. Res. Access this article online Quick Response Code: Website: www.japtr.org DOI: 10.4103/japtr.JAPTR_107_20 INTRODUCTION nodules. [1] are acne including such as Propionibacterium acnes, fats, skin oils, and hormone P. acnes occurs in the skin area of the face, chest, and back. P. acnes is Gram-positive with properties [2] P. acnes usually found prepubertal young whose colonization increases from adolescence to twenties, when sebaceous gland function begins to mature.

[3,4] Bawang dayak (Eleutherine bulbosa [Mill.] Urb) is one of the traditional plants Central which is to various including Based previous the formulation the ingredient bawang ethanol can P. acnes' However, dayak a odor causes to users. the formulation the cream reported Address for correspondence: Ms. Syahrida Dian Ardhany, Jl. RTA Milono km 1,5 Palangka Raya 73111, Indonesia. E-mail: chass501@gmail.com This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0

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WKHLRPMedknow_reprints@wolterskluwer.com How to cite this article: SD, CD, S. Modification of Anti-acne Bawang Dayak (Eleutherine bulbosa (Mill.) Urb.) to Propionibacterium acnes . Pharm Res 2021;12:94-8. ORIGINAL ARTICLE Submitted: 03-Aug-2020 Accepted: 03-Nov-2020 Revised: 10-Aug-2020 Published : 09-Jan-2021 [Downloaded free from <http://www.japtr.org> on Tuesday, January 12, 2021, IP: 36.75.65.191] 95 after 3 days of storage, which may reduce P.

acnes' inhibitory potential. [5,6] study to the of anti-acne cream formulation of bawang dayak extract from previous studies. In this study, the cream formulation from previous studies was modified with the addition of honey, cinnamon, and peppermint to make the cream formulation mainly to disguise the smell of bawang dayak. Besides, the antibacterial activity of honey, cinnamon, and peppermint is also known to support the cream formulation because it has antibacterial activity.

[7,8] METHODS Plants materials and sample collection bawang in Gohong, Batu, Raya, for to Indonesian of Research Center for Biology. Preparation of bulbs extract The extract was prepared by cutting the bulbs and drying in the sun no later than 10 in the morning. A grinding machine mashed bulbs a powder obtained. powder was extracted by percolator with 96% ethanol, and once the process has finished, all extracts were concentrated in a rotary evaporator. Formulation preparation 1 .

phase (triethanolamine, nipagin, peppermint, and distilled Bawang dayak ethanol extract

is then dissolved in distilled water, with powder in water filtered. The mixture in the water phase and stirred until it was homogeneous in the mortar, then added the phase stirred a little at a time until homogeneous. Evaluation of cream Organoleptic properties The cream was observed for color, odor, and appearance. Homogeneity observed The was on glass the was done by physical touch with hands; preparations should be had a homogeneous composition. [9,10] pH observation The pH of cream was being calculated by pH meter. [11,12] Spreadability test As much as 0.5

g of cream is put into a circle 1 cm in diameter that been on glass then second is placed on it (in the middle between two horizontal glass plates) and left to stand for 5 min. A standard weight of 50 g was applied to the top plate for 1 min, and the diameter of the spread was measured. The same is repeated for 100 and 150 g of cream. The size of the spread is determined when the spread a diameter. formulation was tested three times. [13,14] Adhesion test The adhesion test is carried out by applying 0.5 g of cream on glass with glass The is applied between two glass objects and then pressed with a load 1 for min the instrument.

After min, the is and time takes the glass object to come off is recorded. [15,16] inhibition by well-diffusion method P. acnes Table 1: Various cream formula of ethanolic extract bawang dayak Materials Formula (mg) F1 (5%) F2 (10%) F3 (15%) F4 (20%)
Extract ethanol of bawang dayak 1250 2500 3750 5000 Cinnamon powder 2500 2500 2500 2500 Honey 2000 2000 2000 2000 Oil phase Stearic acid 5000 5000 5000 5000 Adeps lanae 750 750 750 750 Paraffin liquid 6250 6250 6250 6250 Aqueous phase Triethanolamine 375 375 375 375 Nipagin 25 25 25 25 Peppermint 20 20 20 20 Aquadest ad 25,000 25,000 25,000 25,000 [Downloaded free from <http://www.japtr.org> on Tuesday, January 12, 2021, IP: 36.75.65.191] 96 combinations Dayak with addition of cinnamon, honey, and peppermint. Bacterial isolates were subcultured into nutrients.

Bacterial standard 24 [17] bacterial in study - out an [18,19] containing were swab followed by clindamycin with concentrations ranging from 0.5%–4%, and then with a creamy formula applied to the disc. All were incubated 37°C 24 The of drag is calculated recorded. [20,21] RESULTS AND DISCUSSION Evaluation test of cream formula Organoleptic appearance The organoleptic test results showed a brown cream color, where addition cinnamon peppermint the smell of bawang dayak to be less pungent [Figure 1].

Homogeneity observation Observation of the cream showed that all formulations were homogeneous, by uniform However, the still coarse due the of cinnamon The can modified one of which is using racto replace t so that the cream does not appear to have coarse grains. pH observation The observation that cream was The that for applications

the as pH the Skin is acidic, between 4 and 6. [22,23] Spreadability and adhesion test that formulations easy apply an distribution >5 tests F1 F4 3", 3", 5", and 8", respectively. The more bawang dayak extract shows stronger adhesion properties. Antibacterial activity Shahbazi (2017) antibacterial into (12–20 mm), and strong (>20 mm) activity. [24] The inhibition test results showed that F1 had an inhibition zone diameter of 16.15 ± 0.45 mm, F2 = 14.85 ± 1.75 mm, F3 = 15.05 ± 1.45 mm, and = 17.10 ± 0.8 [Figure 2 and Table 2]. cream t resulthen compared with the conthe inhibition zone diameter of the modified cream formulation was not big clindamycin.

this formulation still to developed it moderate inhibition zone activity [Figure 2 and Table 3]. phytochemical of ethanol of [25] potent iberial againstvarious ypes bacteria. Their antibacterial activity can be caused by three mechanisms: Inhibition of energy metabolism, suppressing nucleic acids, and damage to the cytoplasmic membrane. [26,27] Other mechanisms bawang are being tested: Eleutherol A, a flavonoid from bawang dayak, which is ko inhib cell wall syntact [28] Alkaloids have antibility generally t efflux inhibition Most the are found to be bactericidal rather than bacteriostatic.

[29,30] One of saponin mechanisms a in Table 2: Inhibition zone diameter of the cream formulation Cream formulation Inhibition zone diameter (mm) \pm SD Activity classification F1 16.15 ± 0.45 Moderate F2 14.85 ± 1.75 Moderate F3 15.05 ± 1.45 Moderate F4 17.10 ± 0.8 Moderate SD: Standard deviation Figure 1: Various modification cream formulas Figure 2 Zone of inhibition modification cream formulas (a); Zone of inhibition clindamycin (b) b a [Downloaded free from <http://www.japtr.org> on Tuesday, January 12, 2021, IP: 36.75.65.191] 97 [31] Gram-negative and Gram-positive. [32,33] Apart that, also vigorous - anti-inflammatory by PGE2 suppressing synthesis, spreading inflammatory mediators, and ROS from cells.

[7,34] On the - [35] using tend contribute its effects through osmolarity, acidity (low and the of hydrogen (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 diameter P. acnes than the of three. the 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 The aute thanky of Palangkaraya for funding this article.

Financial support and sponsorship This was supported Muhammadiyah University of Palangkaraya. Conflicts of interest There are no conflicts of interest. REFERENCES Women's Dermatol 2018;4:56-71. 2 Weber N, Biehler K, Schwabe K, Haarhaus B, Quirin KW, Frank U, et al. Hop extract acts as an antioxidant with antimicrobial effects against *Propionibacterium acnes* and *Staphylococcus aureus*. Molecules 2019;24: 1-13.

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Strong activity SD: Standard deviation [Downloaded free from <http://www.japtr.org> on Tuesday, January 12, 2021, IP: 36.75.65.191] 98 Mali AS, P multipurpose herbal cream. *Int J Sci Res* 2015;4:1495-8. 23. Prakash C, Bhargava P, Tiwari S, Majumdar B, Bhargava RK. Skin surface PH in acne vulgaris: Insights from an observational study and review of the literature. *J Clin Aesthet Dermatol* 2017;10:33-9. 2. Shahbazi Y. Antibacterial and antioxidant properties of methanolic pomegranate (*Punica granatum* and fig (*Ficus carica L.*) fruits. *Pharm Sci* 2017;23:308-15. 25. Novaryatiin S, Ardhany SD. antibacterial of

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