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ABSTRACT

Acne is a bacterial infection that can diminish a person's confidence. Acne is caused by the microorganisms Propionibacterium acnes. Citronella oil has citronellal, citronellol, geraniol compounds that contain a very strong antimicrobial activity. Therefore, emulsion-based topical preparations are made with carbomer bases that are suitable for use. This study sought to determine the effect of 0.5%, 1%, and 1.5% carbomer bases with 3% citronella oil extract on the chemical physics properties of emulsion preparations. (Organoleptic, pH, viscosity and dispersion, stability and Freeze-Thaw test). This investigation employed an experimental method to compare three formulas with varying levels of carbomer in an emulsion preparation test for citronella oil extract. The researcher then analysed the chemical substance's physical characteristics. Based on the evaluation results, it was determined that all formulations had identical organoleptic properties, including a silky texture, citronella oil aroma, and a white hue. According to the results of One-Way ANOVA, viscosity, pH, dispersion, stability, and the Freeze-Thaw test, there were no significant variations in the formula.

Keywords: Citronella Oil, Carbomer, emulgel

INTRODUCTION

In Indonesia, there are numerous nutritious plants that can be used for a variety of purposes, including the treatment of acne with lemon grass. According to a study, lemongrass leaves have antibacterial activity against with (*Propionibacterium acnes* MIC 0.005-0.3 L/mL) (MBC 0.625 L/mL) MIC (inhibitory concentration) values. (Sinha, 2014). Acne is typically a chronic inflammatory disease that affects the pilosebaceous unit. Acne is very common and typically begins during the adolescent years, but typically between the ages of 12 and 24.

Lack of hygiene and maintenance frequently causes an accumulation of dirt and dead skin cells on skin that was initially in good condition, particularly on skin with a high level of oil production, one of the causes of which is hormonal changes. (increased endrogens) (2013, Isriany Ismail). In order to make emugel, a *gelling agent* is required, specifically carbomer, which has good spreading power on the skin, a cooling effect, is readily removed by water, has good drug release, can form a good gel, and can stabilise the emulsion. (Lochhead, 2017).

METHODS

A. Tool

Following are the tools involved in this research :Mortar, analytical balance, pH meter, petri dish, stamper, glassware, thermometer, Brookfield Viscometer, laminar air flow, Steroglass hot plate

B. Material :

Citronella oil, BHT, tween 80, spaan 20, nipagin, nipasol, propylenglikol , TEA and neutral, and aquadest.

Table 1st Formula

Compocition	Function	Quantity FI (%)	Quantity FII (%)	Quantity FIII (%)
Citronella oil	Active ingredients	3,0	3,0	3,0
Carbomer	*Gelling agent*	0,5	1,0	1,5
Trietanolamin	Basis	q.s	q.s	q.s
Sorbotan monolaurate (Span 20)	Emulgator	2,66	2,66	2,66
Polysorbate 80 (Tween 80)	Emulgator	2,34	2,34	2,34
Propilenglikol	Humektan	5	5	5
Metil Paraben	Preservative	0,1	0,1	0,1
Propil Paraben	Preservative	0,1	0,1	0,1
Butylhydroxytoluene (BHT)	Antioksidan	0,03	0,03	0,03
Aquadest	Solvent	Ad 100	Ad 100	Ad 100

C. Evaluation

The evaluation of the formulation comprising organoleptic, pH, viscosity and spreadability, stability, and the Freeze-Thaw test.

RESULTS AND DISCUSSION

This research was carried out with the purpose of determining the effect that carbomer has on citronella oil-containing emulgel formulations when used as a gel-forming ingredient. In this study, an evaluation of citronella oil emulgel preparations containing carbomer was carried out at a concentration of 0.5% (Formula 1), 1% (Formula II), 1.5% (Formula III) including physical tests of the preparation, namely organoleptic (color, odour , homogeneity), spreadability, viscosity, pH, emulsion type, spreadability, and preparation stability test with 1 month storage at various temperatures (4±2˚C , 30±2˚C , 40±2˚C) and *Freeze-thaw test*.

1. Characteristics

It was found that formulas I, II, and III had a soft and homogeneous texture and the three emugel preparations were white in color, with a distinctive aroma of citronella oil with an M/A oil-in-water emulsion type.

Table 2st. Organoleptic Observation Results of Citronella Oil Emulgel

Formula	Organoleptic		
	Color	**Smell**	**Tekstur**
I	White	Typical Citronella oil	Gentle
II	White	Typical Citronella oil	Gentle
III	White	Typical Citronella oil	Gentle

2. pH

Examining the pH of the emulgel preparations, the mean SD of formula I (6.01 ± 1.09), formula II (5.03 ± 0.80), and formula III (4.15 ± 0.69), respectively.

Table 3st pH Observation Results of Citronella Oil Emulgel

Formula	Replikasi			Rate average ± SD
	1	2	3	
I	7.25	5.63	5.16	6,01 ± 1,09
II	4.93	4.30	5.88	5,03 ± 0,80
III	4.30	3.39	4.75	4,15± 0,69

3. Viscosity

Based on the viscosity measurement, formula I (55166.67cps 10251.02), formula II (71166.67cps 19939.49), and formula III (83166.67cps 17566.54) were determined.

Table 3st. Viscosity Observation Results of Citronella Oil Emulgel

Formula	Replikasi Viscosity (cPs)			Rate average ± SD
	1	2	3	
I	55000	45000	65500	55166.67± 10251.02
II	92500	53000	68000	71166.67± 19939.49
III	98500	64000	87000	83166.67 ± 17566.54

4. Stability and Freeze Thaw test

The freeze-thaw test yielded stable results from formulations I, II, and III, with no color change, phase separation, or citronella oil odor. During the freeze-thaw test at temperatures (4±2˚C,30±2˚C ,40±2˚C). the pH of the chemically stable preparation remained between 4.5 and 5.8.

Formula-	Temperature 4±2ºC		Temperature 30±2ºC			Temperature 40±2ºC
Replikasi	H1	H30	H1	H30	H 1	H30
1			30,5 ºC 55%	31,3 ºC 51%		
I-1	S	S	S	S	S	S
I-2	S	S	S	S	S	S
I-3	S	S	S	S	S	S
II-1	S	S	S	S	S	S
II-2	S	S	S	S	S	S
II-3	S	S	S	S	S	S
III-1	S	S	S	S	S	S
III-2	S	S	S	S	S	S
III-3	S	S	S	S	S	S

CONCLUSION

The process of making emulgel citronella oil with carbomer base variations of 0.5%, 1%, and 1.5% begins with the development stage of carbomer with CO2-free distilled water; the function of CO2-free distilled water is to prevent the formation of air bubbles in the emulsifier preparations; then, triethanolamine is added little by little. (TEA). The gel base is produced by dispersing carbomer in water; in their dry state, the carbomer molecules are tightly coiled, but when they are exposed to oxygen, they begin to hydrate and relax. This can be accomplished through either the conversion of an acid molecule to a salt or the addition of a neutralizing agent suitable for carbomer expansion and amine group addition, i.e. *triethanolamine* or *diethanolamine*.

The objective of this neutralization is to ionise the carbomer molecule by generating a negative charge along the polymer chain and releasing electrostatics. The addition of *triethanolamine* TEA must be as required, as excessive or insufficient amounts can alter the viscosity of the carbomer. (Gibson et al., 2014). The results of 3% citronella oil emulgel preparations with variations in carbomer content of 0.5%, 1%, and 1.5% affected the Freeze-Thaw stability test and 1 month real time stability test results at various temperatures without organoleptic changes, but there was a change in pH for formulas I, II, and III. Lastly, the authors

recommend a need for additional research to enhance the formula so that a better preparation formula can be obtained.

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PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5