EFFECT OF VCO AND POLYVINYL ALCOHOL ON COCOS NUCIFERA L. ANTIBACTERIAL PEEL OFF MASK

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ABSTRACT

Background: Kopyor coconut which has Virgin Coconut Oil contains lauric acid which has been known to have an antibacterial activity against Propionibacterium acnes to improve the severe of pimple. The aim is to investigate VCO in antiacne formula for antibacterial activity against Propionibacterium acnes ATCC 11827 in Nutrient Agar.

Methods: Growth inhibition test was carried out by agar disk diffusion. The minimum inhibition concentration (MIC) of the VCO was 20%. In this research, VCO 20% and 30% were formulated as a component of emulgel peel off mask containing Poly Vinyl Alcohol (PVA) in various concentrations (8% and 10%). The emulgel peel off mask of VCO kopyor then evaluated the viscosity, pH, drying time, spread-ability, particle size, particle size distribution, zeta potential, antibacterial activity, and also stability thermal cycling evaluation at the temperature 40°C+2°C and 4°C+2°C in 3 cycles.

Results: Through this evaluation, the selected formula was formula 1 containing 20% of VCO and 8% of PVA. This formula has a pH that is suitable with skin pH 4.5-6.5, has no significant difference in zeta potential, good spread-ability, and produced antibacterial activity that has no significance different from other formulations that contain more concentration of VCO and PVA.

Conclusion: This VCO peel off mask has potential as antiacne and antimicrobial agents.

Keywords: Antibacterial activity, Propionibacterium acnes, PVA, Virgin Coconut Oil.

INTRODUCTION

Pimple or acne vulgaris is an inflammatory condition on the skin, where there is a blockage in the sebaceous glands and hair (pilosebaceous follicles). The condition of the blocked pilosebaceous follicle and sebum build up occurs, resulting in Propionibacterium acnes bacteria to develop well because of the supportive environment (Titus and Hodge, 2012). One of the most commonly found tropical plants in Indonesia is coconut (Cocos nucifera) and one of them is the variety of kopyor, which has genetic deviation. The main fatty acid contained in kopyor coconut meat is lauric acid. It is known that lauric acid has a strong antibacterial and anti-inflammatory effect on Propionibacterium acnes bacteria (Nakatsuji et al., 2009). Coconut meat containing lauric acid can be extracted to obtain pure coconut oil or Virgin Coconut Oil (VCO). This study aims to determine the VCO concentration of kopyor that will be used in peel off emulgel mask to provide antibacterial activity against Propionibacterium acnes ATCC 11827, as well as determining the effect of concentration of Polyvinyl Alcohol (PVA) on peel off mask’s physical characteristics (pH, viscosity, spreadability, drying time, droplet size, size distribution and zeta potential).

RESULTS

Drying Time Test Result

Based on the results of the drying time, formulas 1 to 4 have a drying time within 30 to 35 minutes. Samples containing VCO have a longer drying time than the two gel-based formulas without VCO. This shows that the drying time of the four formulas is longer than the drying time for gel masks in general, which is less than 30 minutes (Pisani et al., 2015). This is because VCO can withstand the evaporation of water in the preparation so it takes a longer time to dry.

Antibacterial Activity Test Result

Based on the results of one way ANOVA statistical analysis test, the comparison of the inhibitory zone between formulas did not significantly different. It can be influenced by the low content of lauric acid in Kopyor VCO; therefore it is necessary to optimize the selection of coconut based on its variety and processing method of VCO (Novarianti and Tulato, 2007).

CONCLUSION

Virgin coconut oil (VCO) kopyor, which is formulated into a gel peel off mask with the 30% level of VCO and 8% and 10% of polyvinyl alcohol (PVA) base, produced antibacterial activity against Propionibacterium acnes ATCC 11827. Increasing levels of VCO kopyor from 20% to 30% and PVA levels from 8% to 10% had no effect on antibacterial activity. Formula 1 was the best formula which was a formula that contains PVA 8% and VCO 30%, considering that it had a pH that fulfill skin pH requirements, the highest spreadability, a stable zeta potential value, and has a good antibacterial activity that was equal to VCO 30%. Therefore for formulation of formulas, it is advisable to produce a gel peel off mask formulation with Kopyor VCO levels of 20% and PVA levels of more than 10% to be able to produce an increase antibacterial activity.

From the results of this study, it is suggested to optimize the VCO extraction method obtained a higher level of lauric acid and tested the stability of the preparation at room temperature for a longer period of time in order to obtain stable gel peel off mask on an industrial scale.

REFERENCES