

# Formulasi dan evaluasi fisik sediaan mikroemulsi dan emulsi ganda w o w yang mengandung arbutin asam laktat dan niasinamid sebagai kosmetika pemutih = Formulation and physical evaluation of microemulsion and w o w multiple emulsions dosage forms with arbutin lactic acid and niacinamide as skin whitening cosmetics

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## Abstrak

Alfa arbutin merupakan bahan aktif penghambat enzim tirosinase pada proses melanogenesis. Efek mencerahkan kulit juga diperoleh dari asam laktat yang mengangkat sel-sel terpigmentasi pada epidermis dan niasinamid yang menghambat transfer melanosom dari melanosit ke keratinosit. Kombinasi zat aktif tersebut dibuat dalam bentuk sediaan mikroemulsi dan emulsi ganda W/O/W dengan memvariasikan konsentrasi Tween 80 sebagai emulgator. Evaluasi dan uji stabilitas fisik dilakukan selama 8 minggu pada suhu  $28^{\circ}\pm 2^{\circ}\text{C}$ ,  $4^{\circ}\pm 2^{\circ}\text{C}$ ,  $40^{\circ}\pm 2^{\circ}\text{C}$  dan cycling test.

Hasil penelitian menunjukkan bahwa mikroemulsi berhasil dibuat dengan Tween 80 (surfaktan) 25-35% dan etanol (kosurfaktan) 10% dengan karakteristik jernih, memiliki ukuran globul 2,397-16,8 nm, sifat alir pseudoplastis dan stabilitas yang paling baik di suhu  $28^{\circ}\pm 2^{\circ}\text{C}$ . Mikroemulsi dengan Tween 80 35% merupakan formula mikroemulsi yang paling stabil karena memiliki ukuran globul paling kecil, viskositas paling tinggi dan profil distribusi ukuran globul yang stabil selama 8 minggu di ketiga suhu penyimpanan. Emulsi ganda W/O/W berhasil dibuat dengan Tween 80 (emulgator eksternal) 2,5-4,5% dan Span 80 (emulgator internal) 3% yang memiliki karakteristik sifat alir pseudoplastis thixotropik dan stabilitas yang paling baik di suhu  $28^{\circ}\pm 2^{\circ}\text{C}$ . Emulsi ganda dengan Tween 80 2,5% merupakan formula emulsi ganda yang paling stabil karena memiliki profil distribusi ukuran globul yang stabil selama 8 minggu di ketiga suhu penyimpanan.

.....Alpha arbutin is an active ingredient which inhibits tyrosinase in melanogenesis process. Skin lightening effect is also obtained from lactic acid that accelerates pigmented cells turnover in epidermis and niacinamide which inhibits the transfer of melanosoms from melanocytes to keratinocytes. Combination of those active ingredients were made in microemulsion and W/O/W multiple emulsions dosage forms in various concentrations of Tween 80 as emulsifier. Evaluation and physical stability test performed during 8 weeks of storage at  $28^{\circ}\pm 2^{\circ}\text{C}$ ,  $4^{\circ}\pm 2^{\circ}\text{C}$ ,  $40^{\circ}\pm 2^{\circ}\text{C}$  and cycling test.

Results showed that microemulsion could be made in 25-35% of Tween 80 (surfactant) and 10% of ethanol (cosurfactant) which had globule sizes 2.397-16.8 nm, transparent, pseudoplastic flow and most stable at  $28^{\circ}\pm 2^{\circ}\text{C}$  storage. Microemulsion with 35% of Tween 80 was the most stable microemulsion formula because it had smallest globule sizes, the most stable distribution profiles of globule sizes and highest viscosity. W/O/W multiple emulsions could be made with 2.5-4.5% of Tween 80 (external emulsifier) and 3% of Span 80 (internal emulsifier) which had pseudoplastic-thixotropic flow and most stable at  $28^{\circ}\pm 2^{\circ}\text{C}$  storage. Multiple emulsions with 2.5% of Tween 80 was the most stable formula because it had stable distribution profile of globul sizes during 8 weeks of storage at temperature  $28^{\circ}\pm 2^{\circ}\text{C}$ ,  $4^{\circ}\pm 2^{\circ}\text{C}$  and  $40^{\circ}\pm 2^{\circ}\text{C}$ .