

## Miconazole Nitrate Microemulsion: Preparation, Characterization and Evaluation for Enhancement of Antifungal Activity

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**SUMMARY.** The aim of this study was to prepare a miconazole nitrate microemulsion (ME) and to evaluate its antifungal activity. The solubility of miconazole nitrate was determined in oils, surfactants and co-surfactants. The pseudo-ternary phase diagram was constructed using the water titration method. ME formulations selected from the pseudo ternary phase diagram were characterized for pH, conductivity, viscosity, particle size, zeta potential and *in vitro* permeation studies. Agar well diffusion method was used for antifungal studies against *Candida albicans* and compared with 1 and 2% commercial available miconazole nitrate formulation. Eucalyptus oil as oil, tween 80 as surfactant and propylene glycol (PG) as co-surfactant, were selected for phase diagram on the basis of high solubility. Five ME formulations were selected and successfully prepared with acceptable topical limits. The final selected ME formulation showed enhanced antifungal activity than the commercially available formulation and concluded that ME is a promising carrier system for topical delivery of miconazole nitrate.

**RESUMEN.** El objetivo de este estudio fue preparar una microemulsión de nitrato de miconazol (ME) y evaluar su actividad antifúngica. La solubilidad del nitrato de miconazol se determinó en aceites, surfactantes y cotensioactivos. El diagrama de fase pseudo-ternario se construyó usando el método de titulación de agua. Las formulaciones ME seleccionadas del diagrama de fases pseudo ternario se caracterizaron por pH, conductividad, viscosidad, tamaño de partícula, potencial zeta y estudios de permeación *in vitro*. El método de difusión de pozos de agar se usó para estudios antifúngicos contra *Candida albicans* y se comparó con la formulación de nitrato de miconazol comercial disponible al 1 y 2%. El aceite de eucalipto como aceite, el tween 80 como surfactante y el propilenglicol (PG) como cotensioactivo se seleccionaron para el diagrama de fases sobre la base de una alta solubilidad. Se seleccionaron cinco formulaciones ME y se prepararon con éxito con límites tópicos aceptables. La formulación ME seleccionada final mostró una actividad antifúngica potenciada superior a la formulación comercialmente disponible y concluyó que la ME es un sistema de vehículo prometedor para la administración tópica de nitrato de miconazol.

**KEY WORDS:** antifungal activity, miconazole nitrate, microemulsion.

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