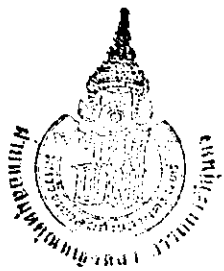
รายงานการวิจัยฉบับสมบูรณ์

เรื่อง



การศึกษาน้ำมันหอมระเหยจากขิง ไพล และขมิ้นอ้อย ในแง่การเป็นสารเพิ่มการดูดซึมผ่านผิวหนัง

Investigation of essential oils from *Zingiber officinale*, *Zingiber cassumunar* and *Curcuma zedoaria* as skin penetration enhancers.

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งานวิจัยนี้ได้รับทุนอุดหนุนการวิจัยจากเงินรายได้มหาวิทยาลัยสงขลานครินทร์

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Abstract

The effect of essential oils extracted from rhizomes of *Zingiber officinale*, *Zingiber cassumunar* and *Curcumar zedoaria* as skin penetration enhancers for hydrophilic permeant, diclofenac sodium, was evaluated *in vitro* across full thickness Wistar rat skin using modified Franz diffusion cell apparatus. The essential oils were investigated at three concentrations, 1%, 3% and 5% in the vehicle hydroalcoholic mixture (ethanol: water (1:1 v/v)). The skin permeation of diclofenac sodium was remarkably enhanced by the addition of these three essential oils. Generally, types and concentrations of the essential oils affected the enhancing activities. Overall, the greatest enhancement was observed with *Zingiber officinale* essential oil whereas, the lowest promoting activity was found with *Curcumar zedoaria* oil. Furthermore, the essential oils at the 5% concentration appeared to give the greatest enhancement for diclofenac sodium. The skin irritation potential of these three essential oils was also investigated using *in vivo* method. The essential oils were tested at concentrations of 1% and 5% in the vehicle hydroalcoholic mixture (ethanol: water (1:1 v/v)) and at 100%. These test solutions including the vehicle were applied on the abdominal surface of the Wistar rats and kept in contact with the abdominal areas of animals for 24 hours. After a biopsy technique, the skin irritation was evaluated by histological examination. Hydroalcoholic mixture was found to have no discernible effects in histological appearance in rat skin. Essential oils at concentrations of 1% and 5% in hydroalcoholic mixture and at 100% were found to cause skin irritation. The 1% concentration of these essential oils caused the most severe damage in rat skin whereas 100% concentration of *Curcumar zedoaria* essential oil caused the mildest skin irritation. There was no correlation between the enhancing efficacy of these essential oils and their skin irritation potential. Based on the results in the current

study, practically, these essential oils may not be acceptable to be used as skin penetration enhancers.

Key words: *Zingiber officinale*, *Zingiber cassumunar*, *Curcumar zedoaria*, skin penetration enhancer, essential oil, diclofenac sodium