Effect of cream formulas on SPF values of sunscreen creams containing bemotrizinol and titanium dioxide as the actives
Prapaporn Boonme1*, Thanaporn Amnuaikit1

Introduction: The skin damage caused by UVB (290 to 320 nm) and UVA (320 to 400 nm) in sunlight has lengthy been renowned; therefore efficient sunscreen formulas are necessary. Bemotrizinol, an organic sunscreen agent, is a broad-spectrum UV absorber since it has two absorption peaks at 310 and 340 nm. Titanium dioxide acts as an inorganic sunscreen agent by reflecting light. Combination of these sunscreen agents can enhance the effectiveness of sunscreen products which has been usually measured in form of sun protection factor (SPF); however, other factors such as formulas may also affect this efficacy. This study aimed to investigate effect of cream formulas on SPF values of sunscreen creams containing bemotrizinol and titanium dioxide as the actives. Materials and methods: Sunscreen creams containing cosmetic acceptable ingredients and sunscreen agents in the legislated concentrations were formulated and prepared by an emulsification process. Three cream formulas were selected for investigation. The studied concentrations of bemotrizinol were 6%, 8%, and 10% while those of titanium dioxide were 12% and 16%. The obtained creams were observed for color and texture. The SPF values of these representatives were directly related to the viscosity values of the sunscreen cream representatives. The pH values of these representatives were determined by a pH meter. Results: All obtained sunscreen creams were white and had desirable texture. Their SPF values were varied from 26.5±0.23 to 49.2±0.03. Surprisingly, the SPF values were not straightforwardly dependent on sunscreen agent concentrations or cream formulas. The reasons were unclear; however, it was found that the viscosity values of the sunscreen cream representatives were directly related to the measured SPF values. It could be due to spreading and adhesiveness properties of the creams. The pH values of these representatives were in the range of 6.29±0.26 to 7.78±0.06, implying the studied creams to be safe for skin application. Conclusion: The physical characteristics, especially viscosity, of the sunscreen creams were the crucial parameters influencing on their SPF values.

Keywords: Bemotrizinol, SPF, Sunscreen cream, Titanium dioxide

1 Department of Pharmaceutical Technology, Faculty of Pharmaceutical Sciences, Prince of Songkla University, Hat-Yai, Songkhla 90112, Thailand.
2 Corresponding author: Tel. 074-288642, Fax 074-428148, E-mail: prapaporn@pharmacy.psu.ac.th