ABSTRAK

Kunyit (*Curcuma longa* L.) merupakan tanaman dari famili *Zingiberaceae* yang mengandung senyawa kurkuminoid, yaitu kurkumin (75-80%), demetoksikurkumin (15-20%) dan bisdemetoksikurkumin (3-5%). Kurkumin memiliki peran farmakologis yaitu memberikan efek antitoksik, antikanker, antibakteri, antiinflamasi, dan antioksidan. Berdasarkan *Biopharmaceutical Class System* (BCS), kurkumin termasuk kelas II yang ditandai dengan kelarutan dan bioavailabilitas rendah, terutama pada pH 5,0 dalam air. Oleh karena itu, diperlukan upaya peningkatan kelarutan dan bioavailabilitas agar efektivitas farmakologinya optimal. Salah satu upaya untuk meningkatkan kelarutan kurkumin adalah melalui formulasi dispersi padat menggunakan PEG 4000.

Penelitian ini bertujuan untuk mengetahui pengaruh variasi *drug load* 20%, 30%, dan 40% terhadap profil disolusi dan kelarutan kurkumin dalam dispersi padat ekstrak kunyit berbasis PEG 4000 menggunakan metode peleburan. Evaluasi dilakukan melalui uji kelarutan dan profil disolusi menggunakan parameter *Dissolution Efficiency* selama 120 menit (DE_{120}) dengan spektrofotometer UV-Vis. Berdasarkan hasil yang diperoleh, dispersi padat dengan rasio ekstrak kunyit: PEG 4000 (1:4) memiliki nilai DE_{120} pada formulasi 1, 2, dan 3 yaitu 57,62% ± 1,04; 45,48% ± 1,45; 12,36% ± 0,08. Pada Uji kelarutan, hasil peningkatan antara CF dan DP yang diperoleh dari masing-masing formulasi 1, 2, dan 3 adalah 2,13; 1,98; 1,89. Dapat disimpulkan bahwa dispersi padat ekstrak kunyit berbasis PEG 4000 dengan variasi *drug load* terbukti meningkatkan profil disolusi dan kelarutan kurkumin ($p<0,05$).

Kata kunci: Dispersi padat, ekstrak kunyit, kurkumin, PEG 4000, *drug load*, peleburan.

ABSTRACT

Turmeric (*Curcuma longa* L.) is a plant belonging to the *Zingiberaceae* family that contains curcuminoid compounds, namely curcumin (75–80%), demethoxycurcumin (15–20%), and bisdemethoxycurcumin (3–5%). Curcumin possesses various pharmacological properties, including antitoxic, anticancer, antibacterial, anti-inflammatory, and antioxidant effects. According to the *Biopharmaceutical Classification System* (BCS), curcumin is classified as a Class II compound, characterized by low solubility and bioavailability, particularly at pH 5.0 in aqueous media. Therefore, efforts to enhance its solubility and bioavailability are necessary to optimize its pharmacological efficacy. One approach to improving curcumin solubility is through solid dispersion formulation using PEG 4000.

This study aimed to investigate the effect of varying drug loads of 20%, 30%, and 40% on the dissolution profile and solubility of curcumin in PEG 4000-based solid dispersions of turmeric extract prepared using the fusion method. Evaluation was conducted through dissolution profile and solubility testing using the *Dissolution Efficiency* parameter over 120 minutes (DE_{120}) with a UV-Vis spectrophotometer. Based on the results obtained, the solid dispersion with a turmeric extract to PEG 4000 ratio of 1:4 yielded DE_{120} values of 57.62% ± 1.04, 45.48% ± 1.45, and 12.36% ± 0.08 for Formulations 1, 2, and 3, respectively. In the solubility test, the enhancement ratios between the crystalline form (CF) and solid dispersion (SD) obtained for Formulations 1, 2, and 3 were 2.13, 1.98, and 1.89, respectively. It can be concluded that PEG 4000-based solid dispersions of turmeric extract with varying drug loads significantly improved the dissolution profile and solubility of curcumin ($p < 0.05$).

Keywords: Solid dispersion, turmeric extract, curcumin, PEG 4000, drug load, fusion method.