

## ABSTRAK

*Biopharmaceutical Classification System* (BCS) mengklasifikasikan kurkumin, yang merupakan zat aktif utama *Curcuma longa* Linn. dalam kelas II karena memiliki permeabilitas tinggi namun kelarutan rendah dalam air. Hal ini mempengaruhi rendahnya bioavailabilitas kurkumin. Upaya peningkatan bioavailabilitas kurkumin dapat dilakukan dengan penambahan *bioenhancer* seperti isolat *Piper nigrum* Linn. (piperin) serta dengan meningkatkan kelarutan dan laju disolusinya dalam sistem dispersi padat dengan polimer hidrofilik (PVP K-30) menggunakan *spray drying*. Akan tetapi terdapat kecenderungan penurunan supersaturasi pada kombinasi zat aktif amorf, hal ini mempengaruhi rendahnya laju disolusi dan absorpsi.

Penelitian ini bertujuan untuk mengetahui pengaruh *drug load*, konsentrasi polimer dan penambahan piperin dalam dispersi padat kombinasi ekstrak *C. longa* Linn., isolat *P. nigrum* Linn. dan PVP K-30 terhadap peningkatan laju disolusi kurkumin dan piperin dengan variasi *drug load* 40%, 35%, 31% dan 30%. Hasil penelitian menunjukkan bahwa peningkatan laju disolusi linear dengan peningkatan konsentrasi polimer. Penambahan sedikit piperin dapat mempengaruhi penurunan laju disolusi kurkumin namun tidak berdampak secara signifikan pada konsentrasi 1-10% serta semakin tinggi *drug load* maka semakin rendah laju disolusi kurkumin. Nilai  $DE_{120}$  (*dissolution efficiency*) kurkumin tertinggi diperoleh pada DP (dispersi padat) dengan *drug load* 30% sebesar  $61,418\% \pm 3,64$  sedangkan untuk piperin didapatkan pada DP *drug load* 31% sebesar  $52,569\% \pm 12,15$ .

**Kata kunci:** BCS, kurkumin, piperin, PVP K-30, *spray drying*, dispersi padat, disolusi.

## ABSTRACT

*Biopharmaceutical Classification System (BCS) classified curcumin, the main active substance in Curcuma longa Linn. as class II drug due to the fact it has high permeability but low solubility in water. This affects low bioavailability of curcumin. Efforts to increase the bioavailability of curcumin can be performed by adding bioenhancers such as piperine from Piper nigrum Linn., and increasing the solubility and dissolution rate by forming solid dispersions in hydrophilic polymers (PVP K-30) using spray drying method. Nevertheless, there is a tendency of supersaturation reducing in the combination of two amorphous active substances which could caused low dissolution and absorption rate.*

*This study aim to determine the effect of drug loading, polymer concentration and piperine addition in the C. longa Linn., isolate of P. nigrum Linn. (piperine) and PVP K-30 solid dispersions on the dissolution rate of curcumin and piperine. The ratios of drug load used in this study were 40%, 35%, 31% and 30%. The results of this study indicate that the increase of dissolution rate is linear with the increase of polymers concentration. It also found that slight addition of piperine affects low dissolution rate of curcumin but didn't affect significantly at the concentration of 1-10%. The higher the drug load, the lower the dissolution rate of curcumin. The highest  $DE_{120}$  (dissolution efficiency) value was obtained in the SD (solid dispersions) with drug load of 30% for curcumin and SD with the drug load of 31% for piperine which is  $61,418\% \pm 3.64$  and  $52,569\% \pm 12.15$  respectively.*

**Keywords:** *BCS, curcumin, piperine, PVP K-30, spray drying, solid dispersion, dissolution.*