

## INTISARI

Senyawa 4-hidroksikalkon adalah salah satu golongan senyawa flavonoid yang memiliki aktivitas sebagai tabir surya karena dapat menyerap sinar UV. Penelitian ini bertujuan untuk optimasi basis formula *lotion oil in water (o/w)*, stabilitas fisik *lotion oil in water (o/w)*, dan menguji aktivitas *lotion oil in water (o/w)* senyawa 4-hidroksikalkon sebagai tabir surya secara *in-vitro*.

Penentuan formula basis *lotion oil in water (o/w)* senyawa 4-hidroksikalkon dilakukan dengan metode *Simplex Lattice Design* (SLD) dengan bantuan *software Design Expert* versi 10 dengan kombinasi asam stearat, propilen glikol dan setil alkohol. Sebanyak 13 formula basis *lotion oil in water (o/w)* dievaluasi sifat fisiknya untuk menentukan formula optimum. Sifat fisik yang diuji dari basis *lotion oil in water (o/w)* yaitu viskositas, pH dan daya sebar. Stabilitas fisik diuji dengan metode *cycling test* dan sentrifugasi. Aktivitas senyawa 4-hidroksikalkon sebagai tabir surya dengan cara menentukan nilai *Sun Protecting Factor* (SPF), persen transmisi eritema, dan persen transmisi pigmentasi secara *in-vitro*. Data dianalisis secara statistik dengan bantuan *software IBM SPSS Statistic 25*.

Hasil penelitian menunjukkan formula optimum basis *lotion oil in water (o/w)* terdiri dari asam stearat 4,83%, propilen glikol 15%, dan setil alkohol 3,17 % dengan nilai viskositas  $88,3 \pm 2,517$  dPa.s, pH  $5,97 \pm 0,122$ , dan daya sebar  $19,53 \pm 0,02$  cm<sup>2</sup>. Formula *lotion oil in water (o/w)* stabil selama penyimpanan 4 minggu. *Lotion oil in water (o/w)* 4-hidroksikalkon dengan konsentrasi 10% dengan konsentrasi kalkon 0,02% menghasilkan nilai SPF sebesar 21,878, %TE sebesar 1,251, dan %TP sebesar 0.

Kata kunci : *lotion*, 4-hidroksikalkon, SLD, *sunscreen*

### **ABSTRACT**

4-Hydroxychalcone is one of the flavonoids class which has sunscreen activity because it can absorb UV. The aims of this research are to optimize the base formula of oil in water (o/w) lotion, assay the physical stability of the optimum formula, and sunscreen activity oil in water (o/w) lotion 4-hydroxychalcone as sunscreen in-vitro test.

Optimization of optimum base formula of oil in water (o/w) lotion 4-hydroxychalcone is conducted using Simplex Lattice Design Method with Design Expert® version 10 based on variation of stearic acid, propylene glycol, and cetyl alcohol. The physical properties of 13 optimization base formulas oil in water (o/w) lotion are evaluated to determine optimum formula. The physical properties of base oil in water (o/w) lotion evaluate viscosity, pH, and spreadability. Cycling test method and centrifugation method are used to evaluate the physical stability. Activity oil in water (o/w) lotion of 4-hydroxychalcone as sunscreen is determined by SPF value, percent transmission of erythema, and percent transmission of pigmentation. The data were analysed statistically with IBM SPSS Statistic 25.

The result showed that the optimum base formula of oil in water (o/w) lotion consisted of a combination of 4,83% stearic acid, 15% propylene glycol, and 3,17% cetyl alcohol that has viscosity of  $88,3 \pm 2,517$  dPa.s, pH of  $5,97 \pm 0,122$ , and spreadability of  $19,53 \pm 0,02$  cm<sup>2</sup>. The oil in water (w/o) lotion is stable in storage for 4 weeks. The oil in water (w/o) lotion at 10% concentration with 4-hydroxychalcone concentration in lotion 0,02% has SPF value equal 21,878, %TE equal 1,251, and %TP equal 0.

**Key words :** Lotion, 4-hydroxychalcone, SLD, sunscreen