

## EFEK FOTOPROTEKTIF SERISIN *Samia ricini* (Drury, 1773) TERHADAP VIABILITAS DAN PRODUKSI KOLAGEN PADA SEL *HUMAN DERMAL FIBROBLAST* YANG DIIRADIASI SINAR UVB

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### INTISARI

Serisin merupakan polimer protein alami dari kokon ulat sutera. Serisin diketahui memiliki berbagai aktivitas biologis seperti efek antioksidan, ultraviolet (UV) protektan dan anti penuaan. Radiasi UVB (290–320 nm) pada sel kulit dapat memicu stres oksidatif yang mengakibatkan menurunnya viabilitas sel dan degradasi kolagen. Aktivitas perlindungan ekstrak serisin *Samia ricini* terhadap kerusakan kulit akibat sinar UVB masih belum banyak dieksplorasi di Indonesia. Penelitian ini bertujuan untuk mempelajari potensi ekstrak serisin kokon ulat sutera *Samia ricini* sebagai UV protektan sel *Human Dermal Fibroblast* karena paparan sinar UVB dengan mengetahui aktivitas viabilitas sel dan produksi kolagen. Serisin diuji *in vitro* terhadap sel HDF pada 2 jenis kerapatan sel ( $5 \times 10^3$  dan  $10^4$ /sumuran) yang diiradiasi sinar UVB ( $280 \text{ mJ/cm}^2$ ). Uji viabilitas sel dilakukan dengan MTT assay dan uji produksi kolagen menggunakan pewarnaan *Sirius Red*. Konsentrasi serisin yang digunakan dalam penelitian ini mulai dari 15,625 hingga 1000  $\mu\text{g/mL}$ . Hasil menunjukkan pada kerapatan  $5 \times 10^3$  dan  $10^4$  sel/sumuran, serisin dengan konsentrasi 500  $\mu\text{g/mL}$  mampu mempertahankan viabilitas sel masing-masing hingga  $>80$  dan  $>90\%$ . Viabilitas sel kerapatan  $5 \times 10^3$  dan  $10^4$  sel/sumuran meningkat pada konsentrasi 1000  $\mu\text{g/mL}$  masing-masing sebesar  $123,86 \pm 16,77\%$  dan  $128,39 \pm 13,22\%$ . Pada uji produksi kolagen, perlakuan serisin pada sel HDF yang diiradiasi UVB paling optimal pada konsentrasi 900  $\mu\text{g/mL}$  dengan nilai sebesar  $146,30 \pm 27,20\%$  pada kerapatan sel  $5 \times 10^3$ /sumuran, dan  $189,04 \pm 9,66\%$  pada kerapatan sel  $10^4$ /sumuran. Serisin terbukti melindungi kerusakan sel HDF dari paparan UVB dengan meningkatkan viabilitas dan produksi kolagen, sehingga memiliki aktivitas fotoprotektif.

Kata kunci: Sel HDF (*Human Dermal Fibroblast*), *photoaging*, sinar UVB, kokon ulat sutera, serisin

## PHOTOPROTECTIVE EFFECT OF *Samia ricini* (Drury, 1773) SERICIN ON VIABILITY AND COLLAGEN PRODUCTION OF HUMAN DERMAL FIBROBLAST INDUCED BY UVB IRRADIATION

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### ABSTRACT

Serisin is a natural protein polymer from silkworm cocoons. Sericin is known to have various biological activities such as antioxidant, ultraviolet (UV) protective and anti-aging effects. UVB radiation (290–320 nm) on skin cells can trigger oxidative stress which results in decreased cell viability and collagen degradation. The protective activity of *Samia ricini* sericin extract against skin damage caused by UVB rays has not yet been widely explored in Indonesia. This research aims to study the potential of sericin as a UV protectant for Human Dermal Fibroblast cells due to exposure to UVB light by determining cell viability activity and collagen production. Sericin was tested in vitro against HDF cells at 2 types of cell density ( $5 \times 10^3$  dan  $10^4$  cells/well) irradiated with UVB light ( $280 \text{ mJ/cm}^2$ ). Cell viability testing was carried out using the MTT assay and collagen production testing using Sirius Red staining. Sericin concentration used in this study ranged from 15,625 to 1000  $\mu\text{g/mL}$ . The results showed that at a density of  $5 \times 10^3$  dan  $10^4$  cells/well, sericin with a concentration of 500  $\mu\text{g/mL}$  was able to maintain cell viability up to >80 and >90%, respectively. Cell viability at densities of  $5 \times 10^3$  and  $10^4$  cells/well further increased at a concentration of 1000  $\mu\text{g/mL}$  amounting to  $123.86 \pm 16.77\%$  and  $128.39 \pm 13.22\%$ , respectively. In the collagen production test, sericin treatment on HDF cells irradiated with UVB was optimal at a concentration of 900  $\mu\text{g/mL}$  with a value of  $146.30 \pm 27.20\%$  at a cell density of  $5 \times 10^3$ /well, and  $189.04 \pm 9.66\%$  at a cell density of  $10^4$ /well further. Based on that, serisin can protect HDF cell damage from exposure to UVB light, so it has photoprotective activity.

Keywords: human dermal fibroblast cells, photoaging, UVB irradiation, silkworm cocoon, sericin