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Carrageenan and its potential use as a photoprotective agent: Anti-inflammatory and apoptotic cell death

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The use of marine resources for photoprotection is heightened at present. Carrageenan, the polysaccharide from red algae which is used in food and medicine is also a widely used excipient in cosmetics and skincare products. Carrageenan has shown to have prospective photoprotective effect against UVB irradiation on immortalized normal human keratinocyte (HaCaT) cells *in vitro* by preventing excessive cell death, exhibiting antioxidant and free radical scavenging effect while stimulating the skin's natural antioxidant enzymes. In this study, we aim to evaluate the anti-inflammatory action of iota (ι), kappa (κ) and lambda (λ) carrageenan and the favor of apoptotic cell death over necrotic cell death after UVB exposure in HaCaT cells. Results indicated that carrageenan pretreated cells had significantly ($p < 0.05$) reduced levels of interleukin-1 α (IL-1 α) by 41.67-100% in comparison to the cells without treatment where IL-1 α increased 22.84-61.46% after irradiation. Successively, carrageenan pretreated cells had lower occurrence of cell death and the nature of cell death in these cells showed a higher percentage (6.16-29.06%) of apoptotic cell death rather than necrotic. At 100 mJ per cm² an increase of 21.79% of necrotic cell death was observed in the untreated cells. This signifies the potential use of carrageenan as an anti-inflammatory agent along with its promising antioxidant property and its ability to reduce necrotic cell death thus preventing excessive inflammatory reactions. The combination of these properties and the additional value of carrageenan deduced from this study would enhance the performance of skin care regimes and the prospective role in photoprotection.

Biography

Haema Thevanayagam has completed her A-Levels in INTI International College and her Tertiary Education at Management and Science University in Bachelor of Biomedical Science. She then completed her Master of Science Degree (MSc Medical and Health Sciences) in International Medical University and graduated in 2013. She is currently pursuing her PhD in the same field concentrating on marine derivatives, photo aging and skin cancer.

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