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The Potential of Astaxanthin in Addressing Inflammation Caused by IL-1β Induced in A549 Cell Lines

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Structured Abstract

Background: Inflammation is a complex physiological response crucial in various diseases and health conditions. In finding the treatment for inflammation, the treatment is focused on inhibiting the production of inflammatory markers. Astaxanthin, a carotenoid derived from *Haematococcus pluvialis,* exhibits promising anti-inflammatory properties by effectively inhibiting the production of inflammatory markers, making it a potential compound for various diseases and health conditions characterized by inflammation.

Methods: In this study, A549 cells were cultured in DMEM-F-12K Medium supplemented with 10% fetal bovine serum for cell multiplication. Astaxanthin stock solutions were prepared by dissolving astaxanthin in soybean oil. Upon reaching confluency, A549 cells were seeded and allowed to grow for 24 hours. Then, the cells were infected with 10 ng/mL of IL-1β for 4 hours, followed by a 24-hour treatment with astaxanthin. Cell viability was assessed using the MTT assay, and NO levels were measured using the Griess assay.

Results: The results show that astaxanthin can significantly increase cell viability at various concentrations without inducing cytotoxicity after 24 hours of incubation. Astaxanthin also demonstrates that it effectively inhibits NO production at all concentrations tested. At a 40 µg/mL concentration, astaxanthin shows the optimum result in reducing inflammation caused by IL-1β induced in A549. Although concentrations of 80 µg/mL and 120 µg/mL resulted in lowered NO production compared to 40 µg/mL, there is no significant difference compared to the effects observed at 40 µg/mL in terms of their effects.

Conclusion: In conclusion, astaxanthin had been found to have exerted anti-inflammatory and antioxidant effects in IL-1β stimulated A549 cells. At an optimal concentration of 40 µg/mL, it significantly increased cell viability and inhibited NO production, demonstrating its potential in mitigating inflammation in A549 cell lines induced with IL-1β.

Keywords: Astaxanthin, inflammation, A549

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