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INHIBITION OF AGES FORMATION AND CYCLOOXYGENASE -2 BY SODIUM 9-AMINO-4- METHOXYUNDECANOATE FROM LYNGBYA SP

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Abstract

Microbial natural products are important secondary metabolites which have potentials anti-cancer, anti-diabetic and anti-inflammatory activity. In this study, *Lyngbya* sp., a marine cyanobacterium, collected from Gulf of Mannar, Rameswaram was prospected for novel bioactive compounds with anti-diabetic and anti-inflammatory potentials. The compound was purified from the extracts of *Lyngbya* sp. by column chromatography and its structure was elucidated by FT-IR, HPLC, ESI-MS and NMR to be *Sodium 9-amino-4-methoxyundecanoate* (VS). The anti-oxidant activity potential of the compound was lower IC₅₀ (25.89±0.21 µg) comparison to standard ascorbic acid (46±0.8 µg) by DPPH method. This compound showed significant anti-diabetic and anti-inflammatory activity by *in vivo* and *in vitro*. The anti-diabetic activity of the compound was examined *in vitro* by BSA-glycation inhibition assay where IC₅₀ value of VS (16.42±0.28 µg/mL) was lesser than phloroglucinol used as control. The compound showed anti-diabetic activity in *C. elegans* used as animal model, *in vivo* conditions, where hyperglycemia was induced in the nematodes by cultivating under high glucose conditions and then treated by the compound VS. The compound VS showed protective effect against AGE formation in hyperglycemia induced *C. elegans*. The effect of purified compound on expression of COX-2 in LPS induced RAW 264.7 macrophage cell lines was further tested using fluorescence activated cell sorting (FACS) analysis, and a significant reduction in COX-2 expression in the induced RAW cells were observed. This study implicates that the VS may be prospected as a potential therapeutic drug against inflammatory diseases. These results showed that VS has significant inhibition against the formation of AGE's in hyperglycemic *C. elegans* and it also showed potent anti-inflammatory activity by inhibiting COX-2 expression in LPS stimulated RAW 264.7 macrophage cell-lines.

Conclusively, the new bioactive compound VS from *Lyngbya* sp. was explored for protective action against diabetic complication as well as anti-inflammatory responses and hence it is of high interest as a promising natural therapeutic molecule for treating diabetes mellitus and inflammatory diseases.

Keywords: anti-diabetic; COX-2; anti-inflammation.