ATTEMPTS TO IDENTIFY NATURAL ANTIOXIDANTS BEARING DNA PROTECTION FEATURES, PRODUCED BY *SCENEDESMUS OBLIQUUS*

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The latest decade has witnessed a growing interest for compounds possessing antioxidant properties, and which can be obtained from natural sources – as such natural compounds can play relevant roles upon health, via ingestion as part of one's diet. Evidence gathered through a large number of studies has indeed supported the hypothesis that antioxidants help prevent and control growth of certain tumors, as well as incidence and severity of cardiovascular and degenerative diseases. Supplementation of normal foods with natural antioxidants (e.g. like carotenoids) will thus be beneficial to the consumer, in terms of active contribution toward his health condition (Goldberg, 1996; Guerin, 2003).Microalgae and cyanobacteria are potential sources of the aforementioned (high-added value) antioxidant ingredients – and they hold the further advantage that they are autotrophic (and so not energy-demanding) and can be cultivated in large-scale bioreactors (and so economically feasible).The major aim of this research effort was to find (novel) antioxidant features in intracellular extracts of a microalga, *Scenedesmus obliquus* (M2-1) – which had revealed the highest intracellular antioxidant capacity in previous comprehensive screenings, particularly upon DNA integrity.

Hence, the antioxidant and pro-oxidant capacity of several amounts of said microalgal extract were analyzed. No pro-oxidant effect was observed, and all extracts exhibited antioxidant activity; the strongest DNA protection was provided by 200 μL of extract. Our experimental results, supplemented by available bibliography, raised the possibility that carotenoids were the main responsible for the *in vitro* DNA protection effect. To check whether that situation held, carotenoids were extracted and analysed by HPLC; the major compounds identified were lutein (2.69 ± 0.09 mg_{lutein} /g $_{microalga}$), neoxanthin (0.56 ± 0.02 $mg_{lutein\ eqivalent}$ / $g_{microalga}$), β-carotene (0.40 ± 0.03 $mg_{lutein\ equivalent}$ /g $_{microalga)}$,, and violaxanthin (0.14 ± 0.01 $mg_{lutein\ equivalent}$ /g $_{microalga}$). Our microalga has therefore a rich content of lutein and neoxanthin, as well as relevant amounts of violaxanthin and β-carotene – which may account for, at least in part, its antioxidant capacity.

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2. Guerin, M., Huntley, M. E., Olaizola, M. 2003; *Haematococcus* astaxanthin: applications for human health and nutrition. Trends Biotechnol. 21: 210-215.