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# INSERTIONAL MUTAGENESIS OF THE GREEN ALGA *HAEMATOCOCCUS PLUVIALIS* FOR THE MANIPULATION OF ASTAXHANTIN PRODUCTION AND BIOMASS PRODUCTIVITY

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Astaxanthin is a ketocarotenoid with high anti-oxidant activity and lipid soluble nature which allows it to efficiently penetrate into the cell membrane. This compound has been shown to be very efficient in maintaining human skin healthy by preventing photo-aging, skin pigmentation as well as improving its elasticity and barrier integrity. Natural astaxanthin is obtained mostly from the green algae *Haematococcus pluvialis*, upon exposure to stress conditions, but its production is quite ineffective and expensive. Strategies for increase the biomass and astaxanthin productivity of H. pluvialis could be the reduction of the photoprotective mechanism called Non-Photochemical Quenching (NPQ), as was previously observed in the green alga *Chlamydomonas reinhardtii*[1], or produce mutants with different timing of astaxanthin production. The development and consolidation of a solid transformation method for H. pluvialis could be of relevant interest for the expression of heterologous genes and in order to better understand and to use the biological pathway of this alga for the production of high value products. In this work mutants with reduced level of NPQ and with different response to high light were generated using *Agrobacterium tumefaciens* mediated transformation in order to identify genes involved in those mechanism and to establish if also in this species the manipulation of this energy dissipative mechanism could increase the biomass productivity[2].

1. Berteotti, S., Ballottari, M. & Bassi, R. Increased biomass productivity in green algae by tuning non-photochemical quenching. *Sci. Rep*. 6, 21339 (2016).
2. Kathiresan, S., Chandrashekar, A., Ravishankar, G. a. & Sarada, R. Regulation of astaxanthin and its intermediates through cloning and genetic transformation of β-carotene ketolase in *Haematococcus pluvialis*. *J. Biotechnol*. 196–197, 33–41 (2015).