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Comparative analysis of two inducible promoters for controlled nuclear transgene expression in *Chlamydomonas reinhardtii*

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Genetically, well characterized microalgae like *Chlamydomonas reinhardtii* offer the potential to photosynthetically produce high value products such as recombinant proteins for the pharmaceutical and chemical industry. Several attempts have been made to enhance expression of foreign genes in this green alga and in principle, allow protein production at large scale. However, satisfying and economically attractive levels of recombinant gene products have not been achieved yet. Inducible promoters represent a useful alternative to optimize protein yield. By providing regulated gene expression, they allow the biosynthesis of gene products at most suitable moments of cultivation, guaranteeing higher space-time yields. In this study, two inducible promoters were compared. We demonstrate the kinetics of induction and deactivation of the iron-responsive *Fea1* promoter and the ammonium/nitrate-responsive *Nit1* promoter in the green alga *C. reinhardtii* via the fluorescent protein mCherry and detection of mRNA levels through qPCR. Our work lays the foundation for the establishment of a cyclic process in which promoter activity is activated and deactivated alternately by changes in the iron and ammonium concentrations in the culture media. Fluorescence microscopy picture of *C. reinhardtii* cells expressing mCherry under the control of the *FEA1* promoter

Biography

Paula Barjona do Nascimento Coutinho has her expertise in genetic transformation of the green alga *Chlamydomonas reinhardti* and the methods developed for the detection of the fluorescent reporter protein mCherry (flowcytometry, western blot and fluorescence microscopy).

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