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New developments in the diurnal changes of nitrogen metabolism in *Chlamydomonas reinhardtii*

The capability of plants to assimilate nitrogen plays a crucial role in optimising biomass production. This is of particular interest for maximising crop yields as well as for detoxifying stressed soils.

The green algae *Chlamydomonas reinhardtii* renders a suitable model organism, as it is rather easily accessible compared to higher plants and shows circadian oscillations, which are involved in many metabolic and physiological processes [1]. Furthermore, new findings reveal that several RNAs are alternatively spliced in the green algae [2]. We demonstrate that stoichiometric data are sufficient to provide valuable insight into the nature of the nitrogen uptake system. This is achieved by considering different carbon sources, environmental conditions, the repressive behaviour of the circadian regulated mRNA-binding protein CHLAMY1 [3] and the application of Elementary Flux Mode analysis [4]. We retrieved the most efficient fluxes in regard to the biosynthesis of amino acids that show a high nitrogen to carbon ratio. Moreover, we provide clues for the role of CHLAMY1 in the regulation of nitrogen uptake and show a reasonable time course of nitrogen incorporation throughout the day.

An investigation of the overall distribution of amino acids in *C. reinhardtii* reveals a rather high abundance of simple amino acids in the green algae. Thus, we included these amino acids into our metabolic pathway analysis as they constitute a potential alternative nitrogen deposit.

References

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