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**Understanding the mechanisms of lipid extraction from microalga  
*Chlamydomonas reinhardtii* after electrical field solicitations and  
mechanical stress within a microfluidic device**

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**Abstract**

One way envisioned to overcome part of the issues biodiesel production encounters today is to develop a simple, economically viable and eco-friendly process for the extraction of lipids from microalgae. This study investigates the lipid extraction efficiency from the microalga *Chlamydomonas reinhardtii* as well as the underlying mechanisms. We propose a new methodology combining a pulsed electric field (PEF) application and mechanical stresses as a pretreatment to improve lipid extraction with solvents. Cells enriched in lipids are therefore submitted to electric field pulses creating pores on the cell membrane and then subjected to a mechanical stress by applying cyclic pressures on the cell wall (using a microfluidic device). Results showed an increase in lipid extraction when cells were

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