

**2.4.44****Growth and metabolic performance of *Scenedesmus pleiomorphus* in biphasic bioreactors****A.P. Carvalho\*, V.H. Martins, F.X. Malcata**

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One of the trends pertaining to the production of specific metabolites with commercial interest by microorganisms is integration of cell culturing and purification methods within the same process. This procedure offers the advantages of cell retention within the bioreactor and rapid product removal from the cell-containing phase, as well as generation of cell-free and concentrated effluent. Extractive biocatalysis can be materialized by bringing two immiscible liquid phases into contact: the production of a specific metabolite takes place in one phase (in our case, an aqueous medium containing suspended microalgae), whereas said metabolite is extracted into the other phase (in our case, an organic solvent). Although these phases are immiscible, they are in close contact at all times due to efficient stirring in the reactor vessel (through bubbling of air and/or mixing blades).

In this research effort, the microalgae *Scenedesmus pleiomorphus* was cultivated in a biphasic system containing dodecane as organic solvent, using a 3-L bioreactor. The influence of the carbon dioxide level and the stirring rate on the fatty acid profile of that microalgae was assessed via cell counting, morphological observation by microscopy and lipid qualitative and quantitative analysis (in both organic and aqueous phases). Although the extraction rate is often smaller in these systems than in conventional ones, growth of microorganisms as well as production and separation of metabolites occur simultaneously and continuously. Therefore, overall productivity can be higher and downstream processing is often easier.

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