

Investigation of Amino acids profile in *Desmodesmus* sp.

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Key words: Microalgae, amino acid, HPLC-MS/MS

Abstract

To determine the composition of free amino acids in *Desmodesmus* sp., microalgae extract was analyzed using HPLC-MS/MS.

Introdução

Microalgae are unicellular organisms, found in either colonies or individual cells, that can produce many compounds as pigments and fatty acids by photosynthesis. Among this compounds are the proteins with structural and metabolic functions. Proteins play a important role as a commodity for animal food and the amino acids (AAs) composition is a critical factor, as a number of AAs are dietary essentials for mammals and they are unable to synthesize them¹.

Many studies have been published showing microalgae as an alternative fatty raw material for biodiesel production^{2,3}. However, producing microalgae only for fuel production is not economically plausible, and others products must to be added to the production chain to make the process profitable¹.

Aiming to determine the AAs profile in *Desmodesmus* sp. microalgae a HPLC-MS/MS system was used to analyze them and a factorial planning 2³ was performed to set the best conditions to extract these AAs.

Resultados e Discussão

An LC-MS/MS method was develop and validated according to ICH guide lines for the quantitative estimation of the AAs, and found to be fast (20 min run), accurate, precise and robust.

The extraction was fulfilled in a ultrasound bath at room temperature varying the length of stay in the bath, the pH of the extractor solvent and the ratio solvent / biomass as demonstrated in Table 1.

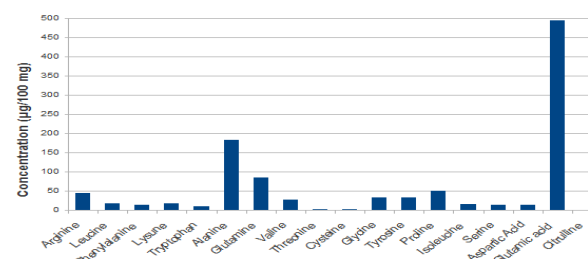
Table 1. Factors and levels of the experimental design.

Factors	Levels	
	-	+
Time (min)	30	60
pH	2	3
Solvent (mL) / Biomass (100 mg)	0.03	0.05

For the extractor solvent, pH 2 using the ratio solvent / biomass of 0.05 showed the best condition. The extraction time is at the discretion of the analyst. The increase in extraction time of 30 to 60 minutes did not show pronounced effect as compared with the other factors.

AAs composition and relative concentrations for *Desmodesmus* sp. microalgae are shown in Graphic 1.

Graphic 1. AA content.



Regarding the composition, *Desmodesmus* sp. presents essential AAs (6 AAs) in addition to non essential AAs (11 AAs).

Conclusões

This work represents an initial study of the AA profile for microalgae and will be subject to further investigation to evaluate the nutritional value of this specie and others related.

Agradecimentos

The authors would like to thank the FAPEG, Ministry of Science, Technology and Innovation (MCTI) for financial support provided by FINEP (Process No. 01.10.0457.00) and CNPq (Process No. 407556/2013-3) CAPES and CNPq for a research productivity grant to Nelson R. Antoniosi Filho (Process No. 312019/2013-0) and FUNAPE for management of financial resources.

¹ Williams, P.J.; Laurent; L.M.L., *Energy Environ. Sci.* **2010**, *3*, 554.

² Menezes, R.S.; Soares, A.T.; Lopes, R.G.; Magnotti, C.; Derner, R.B.; Mori, C.C.; Vieira, A.A.H., Antoniosi Filho, N.R. *J. Renewable Sustainable Energy* **2015**, *7*, 043117.

³ Soares, A.T.; Costa D.C.; Silva, B.F.; Lopes, R.G.; Derner, R.B., Antoniosi Filho, N.R., *BioEnergy Res.* **2014**, *7*, 1035