USING RAMAN SPECTROSCOPY FOR IDENTIFICATION OF THREE MICROALGAE SPECIES

- Poster
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Microalgae are photosynthetic organisms rich in lipids, proteins and pigments [1]. These biomolecules are important to the cosmetic, food, pharmaceutical, etc. In particular, the potential of microalgae as a commercial source of pigments was widely recognized and studied [2]. In this work, we propose to use Raman spectroscopy (ER) combined with multivariate analysis to study three species of microalgae (Chlamydomonas sp. (CA), Chlorella s. (CO) and Nannochloropsis o. (NN)) to determine the relative content between carotenoids and chlorophyll in these species. Usually, when performed with the laser line tuned around 520 nm, the algal Raman spectrum were dominated by three intense bands at ~ 1005, 1157 and 1527 cm-1. These bands were attributed to the stretching vibrations v(C-CH_3), v(C-C) e v(C=C) associated to carotenoids. However, when obtained with a laser line tuned close to the Soret absorption band, the Raman spectrum of the same sample shows new characteristic bands of the porphyrin molecule in the region of 1200 - 1400 and 1550 - 1700 cm-1 , these new bands can be associated with the chlorophyll Raman signal [3]. Raman spectra obtained for the three microalgae species have very similar characteristics. Thus, in order to determine whether Raman spectra can be used to distinguish different species of algae, principal component analysis (PCA) tools were employed. The result of this analysis showed variances greater than 98%. This study show that the carotenoid content is lower in CO microalgae and higher in NN microalgae when compared to CA microalgae. The Raman results were confirmed by the UV / VIS, technique used often for this purpose. References: [1] Borowitzka, M., et al. Elsevier Applied Science, 1988. 371-381. [2] Shixuan, H., et al. Molecular Spectroscopy 190 (2018): 417-422. [3] Feiler, Ute, et al. Journal of Raman spectroscopy (1994): 365-370.

Comentários: