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Ionic Liquid and Chemical Denaturants Effects on the Fluorescence Properties of the Laccase

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Abstract : In this work, we have interested in the investigation of the chemical denaturants and synthesized ionic liquids effects on the fluorescence properties of the laccase from Trametes versicolor. The fluorescence properties of the laccase result from the presence of Tryptophan, which has an aromatic core responsible for the absorption in ultra violet domain and the emission of the photons of fluorescence. The effect Pyrrolidinuim Formate ([pyrr][F]) and Morpholinium Formate ([morph][F]) ionic liquids on the laccase behavior for various volumetric fractions are studied. We have shown that the fluorescence spectrum relative to the [pyrr][F] presents a single band with a maximum around 340 nm and a secondary peak at 361 nm for a volumetric fraction of 20% v/v. For concentration superiors to 40%, the fluorescence intensity decreases and a displacement of the peaks toward higher wavelengths has occurred. For the [morph][F], the fluorescence spectrum showed a single band around 340 nm. The intensity of the principal peak decreases for concentration superiors to 20% v/v. From the plot representing the variation of the λ_{max} versus the volumetric concentration, we have determined the concentration of the half-transitions C1/2. These concentrations are equal to 42.62% and 40.91% v/v in the presence of [pyrr][F] and [morph][F] respectively. For the chemical denaturation, we have shown that the fluorescence intensity decreases with increasing denaturant concentrations where the maximum of the wavelength of emission shifts toward the higher wavelengths. We have also determined from the spectrum relative to the urea and GdmCl, the unfolding energy, ΔGD. The results show that the variation of the unfolding energy as a function of the denaturant concentrations varies according to the linear regression model. We have demonstrated also that the half-transitions C1/2 have occurred for urea and GdmCl denaturants concentrations around 3.06 and 3.17 M respectively.

Keywords : laccase, fluorescence, ionic liquids, chemical denaturants
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