

Ecotoxicological effect of 1-(2-hydroxyethyl)-3-methylimidazolium chloride and cetylpyridinium chloride towards the microalgae *Chlorella vulgaris*

ELISABETE PACHECO^{1,2}; RICARDO FERRAZ^{1,2,3}; CRISTINA PRUDÊNCIO^{1,2,4}; PIEDADE BARROS^{1,2}

1 - ESS|IPP – School of Health, Polytechnic Institute of Porto, Porto, Portugal 2 - CISA – Research Centre in Health and Environment, School of Health, Polytechnic Institute of Porto, Porto, Portugal 3 - LAQV-REQUIMTE, Departamento de Química e Bioquímica, Faculdade de Ciências, Universidade do Porto, Portugal

4 - i3S-Instituto de Investigação e Inovação em Saúde, Universidade do Porto, Porto, Portugal

Ionic liquids (ILs) are salts that are stable over their melting temperature and are made exclusively of ions. ILs have received considerable interest due to their unique properties. The growing interest in ILs predicts an increase of their manufacture and use at industrial scale, which may result in the increased release of these compounds into the environment. In the past years, ILs have been used as a greener alternative to hazardous conventional solvents.

Microalgae play an important role in the equilibrium of aquatic ecosystems. Since they belong to the first level of the trophic chain, perturbations to its welfare may have repercussions on the higher levels of the ecosystem.

In the present work, we assessed the ecotoxicological effect of two ILs, 1-(2-hydroxyethyl)-3-methylimidazolium chloride ([C2OHMIM][Cl]) and cetylpyridinium chloride ([C16Pyr][Cl]), to the microalgae *Chlorella vulgaris* growth, according to the OECD guidelines number 201.

Growth inhibition was quantified from measurements of the algal biomass as a function of time by optical density and the effective concentration that causes a 50% inhibition in the algae growth (EC50) was determined.

The results demonstrated that *C. vulgaris* growth rate inhibition increased with the increase of the tested concentration. The 96h EC50 mean value of [C16Pyr][Cl] was 0.011 mM, being classified as moderately toxic to *C. vulgaris*. The 96h EC50 mean value of [C2OHMIM][Cl] was 34.03 mM, which classifies it as relatively harmless to *C. vulgaris*.

It is possible to conclude that [C16Pyr][Cl] presents a higher toxic effect than [C2OHMIM][Cl] towards *C. vulgaris*.

Keywords: Ionic liquids, 1-(2-hydroxyethyl)-3-methylimidazolium, cetylpyridinium, *Chlorella vulgaris*