ACUTE TOXICITY ASSESSMENT OF FLUOXETINE HYDROCHLORIDE (PROZAC®) WHEN SUBMITTED TO ELECTRON BEAM IRRADIATION

D.R.A. Santos[1], V.S.G. Garcia, A.C.S. Vilarrubia, S.I. Borrely[1]

dymesrafael@gmail.com.br

Instituto de Pesquisas Energéticas e Nucleares
Av. Lineu Prestes 2242 - Cidade Universitária – Zip code: 05508-000 - São Paulo - SP – Brazil

The large-scale production of medicinal products is directly related to the presence of pharmaceutical drugs in sewage and water. The continuous input of medicines and its residues into the environment especially by sewage and wastewater generates an increasing need of new methods for its treatment and suitable control. The fluoxetine hydrochloride (FH), also known as Prozac®, is an active ingredient used in the treatment of depressive and anxiety disorders [1]. The present study focused on applying the ionizing radiation in order to reduce the acute toxicity of the FH drug solution, under its manipulated formula, to aquatic organisms. *Hyalella azteca* and *Daphnia similis* were the organisms used in the biological assays applied for the toxicity studies. It was used a Dynamitron electron beam accelerator and its energy was fixed at 1,4MeV for 5kGy and 10kGy doses [2]. For the calculation of the effective concentration (EC50) it was used the statistic program Trimmed Spearman – Karber. The average values for acute toxicity of FH were 0.59mg.L^{-1} ($EC50_{96h}$) for *Hyalella azteca* and of 1,44mg.L^{-1} ($EC50_{48h}$) for *Daphnia similis*. After irradiation of the FH aqueous solution, the following EC50 average values were obtained: 7.81mg.L^{-1} (5kGy) and 7.97mg.L^{-1} (10kGy) for *Hyalella azteca*; 8,46mg.L^{-1} (5kGy) and 7.31mg.L^{-1} (10kGy) for *Daphnia similis*. The obtained results revealed the FH as a very toxic compound. These results are confirmed by the EU - Directive 93/67/EEC (Commission of the European Communities) [3]. A significant reduction of the acute effects was obtained when 5kGy and 10kGy were applied.

1. *Baldessarini RJ. Drugs and treatment of psychiatric disorders: psychosis and anxiety. In: Hardman JG, Gilman AG, Limbird LE. Ed: Goodman & Gilman's the farmacological basis of therapeutics (1995). New York. McGraw Hill.9;18:399– 430.*
2. *Romanelli, MF, Moraes MCF, Villavicencio ALCH, Borrely SI. (2004). Evaluation of toxicity reduction of sodium dodecyl sulfate submitted to electron beam radiation. Radiation Physics and Chemistry.71:411-413.*
3. *Blaise C, Gagné F, Eullaffroy P, Férard JF. (2006). Ecotoxicity of Selected Pharmaceuticals of Urban Origin Discharged to the Saint-Lawrence River (Québec,Canada): A Review. Brazilian Journal of Aquatic Science and Technology. 10(2):29-51.*