The transience of DNA-damaging effects induced by herbicide formulations (Roundup® and Garlon®) in fish (*Anguilla Anguilla*) upon cessation of exposure

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The huge increase of pesticides use in agricultural fields is considered a major problem worldwide. Due to crops seasonality, periodic terrestrial applications imply typically intermittent inputs of these agrochemicals into the aquatic systems. Consequently, fish exposure to this type of contaminants can be short and followed by a period of permanence in non-contaminated areas. Bearing this in mind, the assessment of genotoxic endpoints in fish after removal of the contamination source appears as a crucial step to improve the knowledge on the dynamics of herbicide induced genotoxicity, as well as to determine the actual magnitude of risk posed by these agrochemicals to fish. Therefore, the present study intended to shed light on fish ability to recover from the DNA damage induced by short-term exposures to the herbicide formulations Roundup® (glyphosate-based) and Garlon® (triclopyr-based) upon the exposure cessation. European eel (*Anguilla anguilla*) was exposed to the previous commercial formulations, for 3 days, and allowed to recover for 1, 7 and 14 days (post-exposure period). The comet assay was used to identify the DNA damage in blood cells during both exposure and post-exposure periods. As an attempt to clarify the DNA damaging mechanisms involved, an extra-step including the incubation of the nucleotides with DNA lesion-specific repair enzymes (Endonuclease III - EndoIII and formamidopyrimidine DNA glycosylase - FPG) was added to the standard comet protocol. The genotoxic potential of both herbicides was confirmed, concerning the exposure period. In addition, the involvement of oxidative DNA damage on the action of Roundup® (pointed out as pyrimidine bases oxidation) was demonstrated, while for Garlon® this damaging mechanism was less evident. Fish exposed to Garlon®, though presenting some evidences towards a recovery tendency, didn't achieve a complete restoration of DNA integrity. In what concerns to Roundup®, a recovery was evident when considering non-specific DNA damage, on day 14 post-exposure. In addition, this herbicide was able to induce a late oxidative DNA damage (day 14). It was also recognized that blood cells of *A. anguilla* exposed to Roundup® appeared to be more successful in repairing damage with a non-specific cause, than that associated to bases oxidation. Overall, the present findings highlighted the genetic hazard to fish associated to the addressed agrochemicals, reinforcing the hypothesis of long-lasting damage.