The effects of organochlorine pesticides such as endosulfan, on growth, locomotion and feeding behaviour of *Xenopus laevis* tadpoles: a link with neurotoxicity biomarkers.

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Since decades, the decline of amphibians has been worldly reported. Use of agricultural chemicals, such as organochlorines, could explain this populations' decrease. Endosulfan is classified as RUP (Restricted Use Pesticide) but it is still used against pests in many areas of the world, above all in tropical countries. By run-off to wetlands, it induces toxic effects for many aquatic organisms. In this study, groups of 30 *Xenopus leavis* tadpoles (stage 46 according to Nieuwkoop and Faber classification) were submitted to a chronic water contamination of 27 days with endosulfan (alpha 70%/beta 30%) at environmental doses of [0,1µg/L] and [1µg/L]. A control treatment containing Fetax solution served as a reference and an ethanol treatment ($1{,}3.10^{-5}$%) was used as solvent control. Effects were reported in terms of growth and mortality. Moreover, on day 14 and day 27, swimming parameters were recorded for 30 minutes while the video-tracking software *Ethovision* was measuring tadpoles' mean velocity, distance moved and levels of mobility. After these 27 days, physiological analyses were done on tadpole brain homogenates to highlighting potential relationships between behavior and four markers of toxicity. The concentrations of brain neurotransmitters (serotonin, dopamine and Gamma amino-butyric acid) were assayed with ELISA. Expression of genes coding for the same neurotransmitter receptors is currently under analysis (Dopamine D1-D2-5HT1-5HT2-GABAa-Acetylcholine alpha). Acetylcholinesterase (AchE) activity was also determined in tail muscles by Ellman's method as this enzyme controls movement by neuromuscular junction. There is an adverse effect of endosulfan on survival with levels of 70% and 60% of survival for the groups [1µg/L] and [0,1µg/L] respectively. Tadpoles from solvent and contaminated groups had significantly lower body size compared to the control, following a dose-dependent decrease. This could be linked with an observed reduced feeding frequency. Locomotor parameters showed no significant differences between the four treatments. On the other hand, there is a highly significant increase of serotonin in a dose-dependent way in contaminated groups. Concentrations of dopamine and GABA display profiles with only significantly higher concentrations in brains from the group [0,1µg/L] only. AchE activity showed a decrease in the solvent group only. According to our preliminary data, feeding patterns, growth, monoamines concentrations in brain could be considered as good markers of neurotoxicity caused by endosulfan. Additional data from molecular analyses are needed to establish the relationships between transcriptomic, physiological and behavioural responses of *Xenopus laevis* tadpoles exposed to chronic environmental contamination endosulfan

Key words: endosulfan, organochlorine, *Xenopus laevis*, tadpole, behavior, velocity, neurotoxicity, biomarkers, serotonin, dopamine, acetylcholinesterase.

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