

Researches Regarding the Influence of the Ethinylestradiol (Ee₂) on Zebra Fish (*Danio rerio*) Growth and Development

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SUMMARY

Ethinylestradiol is considered to be one of the most powerful estrogenous compounds, its toxic effect being demonstrated *in vivo* as well as *in vitro*, even in very low concentrations (few nanograms/L). This paper is part of a complex study of our research team that studies the toxic effect of the ethinylestradiol, and some of the polyethoxylated alkylphenols on the growth and reproduction of the Zebra fish (*Danio rerio*) and of the common Carp (*Cyprinus carpio*). The experiment was carried out on a period of 26 weeks, starting with hatching until 182 days, on a number of 1200 Zebra fishes, divided in three experimental groups, 400 individuals in each group (1 control group and 2 experimental groups). Ethinylestradiol was used in a concentration of 1.5 ng EE₂ L⁻¹ for group 2, and 7 ng EE₂ L⁻¹ for group 3. A sample of 10 individuals were taken from each aquarium at 41 and 75 days after the fertilization and at the beginning of spawning time in order to measure the growth of the Zebra fish exposed to ethinylestradiol. The growth was measured by weighing and biometric measurements (total length, standard length, head length, maximal height, minimal height and body weight), and the survival rate was established at the end of every period and at the end of the experiment. Compared to the control group, where the death rate for the whole period was 16.66%, in the group 2 it was 26.66%, and in the group 3 the death rate was 80%, of which 46.66% was recorded in the first two weeks of exposure. From the analysis of the biometric study carried out in the 41st day, the greatest differences for the studied biometric parameters are observed between the groups 2 and 3, which suggests that in the case of group 3 – where there was administered a concentration of 7 ng of ethinylestradiol – the development process for this specific age has been affected. After a period of 75 days of exposure to ethinylestradiol, very significant differences ($p < 0.01$) regarding the biometric parameters are recorded between groups 1 and 3, aspect suggesting that in this case the high concentration of ethinylestradiol has a negative influence on the growth and development process within this ontogenetic period. From the analysis of the obtained results, it was demonstrated that, beside the fact that a concentration of 7 ng EE₂ L⁻¹ determines an increase of the mortality rate, the juvenile growth (from the period between the 41st and 75th days after fertilization) is slightly diminished in the group 2 compared to control group. The biometric study carried out at maturity reveals that between group 1 and group 2 there are significant differences ($p < 0.05$) only for the head length, the maximal height, the minimal height and the body weight. Between group 1 and group 3 there are very significant differences ($p < 0.01$) regarding the total length, the standard length, the head length and significant differences ($p < 0.05$) regarding the body weight. Between the group 2 and group 3 there are no important differences for all the studied biometric parameters. In conclusion, a concentration of 7 ng EE₂ L⁻¹, besides the fact that determines an increase of the mortality rate to 80%, also influences the juvenile growth during the period from 41 to 75 days after fertilization.