THESIS

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BSc Environmental Engineering

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Hungarian University of Agriculture and Life Sciences

Szent István Campus

Institute of Aquaculture and Environmental Safety

Environmental Engineering Bachelor's

Assessment of Toxic Effects of 2-Ethylhexanoic Acid on Zebrafish Embryos Using an Automated Phenotyping Method

Insider consultant: Illés Bock

Assistant research fellow

Insider consultant's Institute/department: Institute of Aquaculture and Environmental Safety, Department of Environmental Toxicology

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Gödöllő

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Assessment of the toxic effects of 2-ethylhexanoic acid on zebrafish embryos by automated phenotyping method.

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Insider subject leader: Illés Bock, Assistant Research Fellow

This study uses an automated phenotyping method to investigate the toxic effects of 2-ethylhexanoic acid (2-EHA) on zebrafish (*Danio rerio*) embryos. Concerns have been raised over 2-EHA's possible developmental toxicity due to its widespread industrial use and structural similarities to the teratogenic substance valproic acid. Automated phenotyping method was used with FishInspector software to improve the consistency of toxicological assessment. Different concentrations of 2-EHA were administered to zebrafish embryos under OECD 236 Fish Embryo Acute Toxicity (FET) test guidelines and effects were observed on multiple developmental endpoints. The KNIME and R were used for statistical analysis of morphological data, to identify phenotypic patterns and responses. The exposure to 2-EHA changed the jaw-to-eye distance, decreased swim bladder inflation, and resulted in craniofacial abnormalities. The morphological changes observed were as expected, the valproic acid, also caused malformations in the same body parts and organs. These results support the theory of grouping compounds according to their phenotypic patterns of action and add to the increasing amount of data demonstrating the effectiveness of automated toxicological approaches, which may have potential applications for regulatory practices in assessing chemical safety.