MIXTURE OF PESTICIDES AFFECTS LOCOMOTION OF ADULT ZEBRAFISH

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INTRODUCTION: Numerous chemical compounds are found in aquatic environments; among them are pesticides. Pesticides are widely used worldwide, and their use has progressively increased in recent decades, resulting in the accumulation of toxic compounds in surface waters. Dimethylamine-based herbicides (DBH) and imidacloprid-based insecticides (IBI) have low absorption in soil and high solubility in water, facilitating the arrival of these compounds in aquatic environments. Behavioral biomarkers are widely used methods to assess the effects of contaminants in the environment, since behavioral changes occur even at relevant environmental concentrations, thus behavior can directly influence survival, growth and reproduction.

OBJECTIVES: Our objective was to analyze whether two pesticides, DBH and IBI at environmentally relevant concentrations of 320 μg/L for each compound, and their mixtures impact the behavioral and endocrine parameters of adult zebrafish, verifying the effect of pesticides on exploratory and social behavior and analyzing hormonal parameters related to stress.

MATERIALS AND METHODS: We used 60 mixed sex “wild type” adult zebrafish, from the Fish Physiology Laboratory of the Veterinary Hospital, located in the University of Passo Fundo. Fish were distributed into four groups: G1 control with clean water only, G2 DBH+, G3 IBI+ and G4 mixture. Fish were exposed acutely for 30 min in a beaker containing 1 L of the test solution according to the group. Immediately after exposure, the Novel Tank (NTT) and Social Preference (SPT) behavioral tests were performed. After the tests, the animals were desensitized in ice-cold water and killed by euthanasia by sectioning the spinal cord. The whole-body samples were stored at -20°C for later cortisol analysis.

RESULTS AND CONCLUSIONS: Acute exposure to the mixture of DBH and IBI pesticides reduced the locomotor activity of zebrafish. The pesticides alone and in combination did not affect cortisol levels in the exposed animals. Pesticides, when tested together, may cause different effects on non-target organisms when compared to

pesticides individually, reinforcing that the evaluation of the mixture of these compounds is extremely important.

KEYWORDS: Behavior; Pesticides; Cortisol.

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