

PYRIPROXYFEN CAUSES OXIDATIVE STRESS AND DISRUPTS FOLLICULAR DYNAMICS IN DANIO RERIO OVARIES¹

Vanessa Staldoni de Oliveira², Katiuska Marins³, Ariane Zamoner Pacheco de Souza⁴, Ana Karla Bittencourt Mendes⁵, Gabriel Adan Araujo Leite⁶, Fátima Regina Mena Barreto Silva⁷

¹ Pesquisa institucional desenvolvida no grupo de pesquisa Laboratório de Hormônios e Transdução de Sinais (LHTS), Programa de Pós-Graduação em Bioquímica da Universidade Federal de Santa Catarina, Florianópolis, Brasil.

² Doutora egressa do Programa de Pós-Graduação em Bioquímica da Universidade Federal de Santa Catarina, Florianópolis, Brasil.

³ Aluna de doutorado do Programa de Pós-Graduação em Farmácia da Universidade Federal de Santa Catarina, Florianópolis, Brasil

⁴ Professora Adjunta do Departamento de Bioquímica da Universidade Federal de Santa Catarina, Florianópolis, Brasil.

⁵ Aluna de doutorado do Programa de Pós-Graduação em Farmácia da Universidade Federal de Santa Catarina, Florianópolis, Brasil

⁶ Professor Adjunto do Departamento de Biologia Celular, Embriologia e Genética da Universidade Federal de Santa Catarina, Florianópolis, Brasil.

⁷ Professora Titular do Departamento de Bioquímica da Universidade Federal de Santa Catarina, Florianópolis, Brasil.

Introduction: Pyriproxyfen is the most recommended larvicide by health agencies to combat mosquitoes that transmit diseases such as dengue and malaria in Brazil. The confidence in the safety led to the recommendation of direct use of pyriproxyfen in the drinking water reservoirs. However, recent studies have reported the potential of this compound as an oxidative stress inducer and an endocrine disruptor in invertebrates and also in male *Danio rerio* fish. **Aim:** This study aimed to analyze the oxidative stress and ovaries morphology after an *in vivo* short-term exposition of pyriproxyfen. **Methodology:** Female *Danio rerio* fishes were exposed to a 10^{-9} M pyriproxyfen final concentration in the aquarium for 7 days. After, the influence of pyriproxyfen was evaluated on the ovaries in the reactive oxygen and nitrogen species (ROS and RNS) formation, lipid peroxidation, reduced glutathione content (GSH), glutathione S-transferase (GST), superoxide dismutase (SOD) and catalase (CAT) enzyme activity. In addition, gonadosomatic index (GI) and morphological and morphometric analyses of the ovaries were carried out after exposure. The experiments were performed using protocols approved by the local Ethical Committee for Animal Use (Protocol CEUA/PP00968). **Results:** *In vivo* exposure to pyriproxyfen increased RNS content, SOD and CAT activity, decreased GSH content in the ovaries, and increased GI. Ovaries from larvicide-exposed fishes showed histological and morphometric alterations, such as: decrease in the number and area of vitellogenic oocytes, increase in the number of pre-vitellogenic oocytes type I and also

the tendency to increase the number of preovulatory atretic oocytes ($p = 0.06$). **Conclusion:** These findings indicate that short-term *in vivo* exposure to pyriproxyfen in *Danio rerio* causes oxidative stress and impairs the ovarian tissue by changing the follicular dynamics, thus suggesting a potential endocrine disruptive action of this larvicide.

Keywords: larvicide; zebrafish; female; endocrine disruption.

Acknowledgements: This work was supported by grants from CNPq #305799/2019–3, CAPES/PPG-Biochemistry. The authors are grateful to the Laboratório Multiusuários de Estudos em Biologia of Universidade Federal de Santa Catarina (LAMEB /UFSC) for providing its infrastructure for carrying out the experimental assays.