



IN VIVO EVALUATION OF CANNABIDIOL OIL'S THERAPEUTIC POTENTIAL FOR AMYOTROPHIC LATERAL SCLEROSIS

Vanessa Tomaz Maciel (G)¹*, Marcelo Duzzioni (Prof)², Thiago Mendonça de Aquino (Prof)³, Ricardo Alessandro de Medeiros Valentim (Prof)⁴, Danilo Nagem (Prof)⁴, Lucas Anhezini (Prof)¹

vanessa.macielt@icbs.ufal.br

¹ Laboratory of *in vivo* Toxicity and Neurodegenerative Disease Analysis – Institute of Biological and Health Sciences, Federal University of Alagoas (Alagoas, Brazil); ² Department of Pharmacology, Federal University of Alagoas (Alagoas, Brazil); ³ Department of Chemistry, Federal University of Alagoas (Alagoas, Brazil); ⁴ Laboratory of Technological Innovation in Health, Federal University of Rio Grande do Norte (Rio Grande do Norte, Brazil).

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ABSTRACT

Amyotrophic Lateral Sclerosis (ALS) is a fatal neurodegenerative disease that affects motor neurons, potentially affecting any muscle under voluntary control. ALS has no cure, and currently, only two drugs are widely available that have been shown to prolong patient survival. Given the need for complementary therapies, research into substances that may contribute to the treatment of this disease is of great importance. Cannabidiol (CBD), a non-psychoactive component of *cannabis*, has emerged as a potential therapeutic model for anti-inflammatory and antioxidant treatments. *Drosophila melanogaster*, a widely recognized model organism with significant genetic homology to humans, is instrumental in studying neurodegenerative diseases. Its advanced genetic tools allow for the expression of the mutant form of the Sig-1R gene (Sig-1R^{E102Q}), which models ALS linked to mutations in the gene encoding the sigma-1 receptor. Therefore, the aim of this study was to evaluate the therapeutic potential of CBD oil in the Sig-1R^{E102Q} type ALS model. To achieve this, assays were conducted to determine lifespan, larval motility, and cellular toxicity. To evaluate potential therapeutic effects, the animals were treated with a concentration of 0.5 mg/ml of CBD oil. The data showed that CBD alleviated disease symptoms during the larval stages. Larval-stage animals treated with CBD exhibited a greater distance traveled, whereas adult animals exposed to CBD had significantly shorter survival times compared to those not treated, that could be due to the flies sticking to the medium, indicating a need to improve the method of oil exposure for the flies. In terms of toxicity data based on expression in the ommatidia, no improvement was observed in the measured area. Therefore, no significant improvements were observed in the adult stages, suggesting that its efficacy may be limited to the early stages of the disease. This difference may result from technical challenges rather than from the effects of CBD itself, highlighting the need for further evaluation to optimize CBD oil application in experiments involving adult animals.