

UNCOVERING THE POTENTIAL OF CRICKETS GRYLLUS BIMACULATUS AS ANIMAL MODELS OF HUMAN NEURODEGENERATIVE DISEASES THROUGH ALUMINIUM INDUCTION: NEUROBEHAVIOUR AND SURVIVABILITY STUDIES

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ABSTRACT

Alzheimer's disease (AD) is the largest contributor to dementia cases in the world, for which no treatment has yet been found. Efforts are ongoing for drug discovery, and animal models are a suitable approach for screening new drug candidates. In addition, the high utilization of mice and rats as experimental animals is related to the ethical issues of research. Thus, researchers are now turning to the use of the fruit fly *Drosophila melanogaster* as an insect model instead of rodents. However, behavioral and cognitive assessments in *Drosophila* are often time-consuming to analyze and the conclusions that can be drawn regarding humans are very limited. This study was then conducted to find a new animal model with better specifications and find out a cheap and fast method of inducing neurodegeneration using the neurotoxic compound aluminium chloride (AlCl₃). The study began with acclimatisation of crickets, then continued with the induction of AlCl₃ in various concentrations, including; 40 mMol, 60 mMol, 80 mMol, 100 mMol, and 120 mMol. Induction was given via ingestion and observed for comparison of memory decline based on spontaneous alternation test and memory recognition using Y maze and brain organ observation. Results were analyzed with the Kruskal-Wallis statistical test and Dunn's Post-Hoc to find the best treatment based on the spontaneous alternation test. The results obtained the higher the concentration, the lower the memory ability, and reduce the life span of crickets. The best treatment by P3 and P4 has the greatest statistical significance ($P < 0.0033$) in the alternation behaviour, and the recognition memory test obtained the lowest average occurred in P4. Meanwhile, observations of brain organs showed abnormalities in the brain of P4 in the form of a collection of white plaques that did not occur in other treatments.

Keywords: Aluminium chloride, Alzheimer's Disease (AD), animal model