EVALUATION OF NEUROTOXICITY OF 4-NONYLPHENOL IN ADULT MALE ZEBRAFISH

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A

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IN

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Dedicated to
My parents &
My guide

ABSTRACT

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ABSTRACT

Keywords**:** 4-nonylphenol, zebrafish, behaviour, oxidative stress, mRNA expression, histopathology.

4-nonylphenol (4-NP) is a phenolic endocrine disrupting compound and used in various industrial products. It possess health threat to both human and aquatic animals. During the study, 360 adult male zebrafish *(Danio rerio*) were used to investigate toxicity of 4-NP on brain and eye tissues of zebrafish after daily exposure for 21 days. For experiment, zebrafish divided into four groups viz. control (C1), vehicle (C2), treatment 1 (T1) and treatment 2 (T2) consists of 90 zebrafish in each group. C1 group kept in R.O. water, C2 group kept in water with absolute ethanol as vehicle at 10 µl/L of water, T1 and T2 groups kept in water with 4-NP @ 100 µg/L and 200 µg/L of water, respectively. Anxiety behaviour and locomotor behaviour of zebrafish evaluated on day 8, 15 and 22 of the experiment using light-dark preference test and novel tank test. During light-dark preference test parameters viz., time spent in light side, time spent in dark side, numbers of entries in dark side and latency to light side were considered. For novel tank test, time spent in upper zone, time spent in lower zone, numbers of entries in upper zone and numbers of entries in lower zone were considered. Exposure of 4-nonylphenol significantly affected behaviour parameters in both of the T1 and T2 groups as compared to C1 group. There was significant increased time spent in dark side and time spent in lower zone in T1 and T2 groups as compared to C1 group. However, time spent in light side, time spent in upper zone, number of entries in upper zone and number of entries in lower zone were decreased significantly in T1 and T2 groups as compared to C1 group. Total number of entries in dark side was non-significantly decreased in T2 group on day 8 and 15, whereas significantly decreased on day 22 of experiment as compared to C1 group. In brain and eye tissue, significant decreased activity of SOD and level of GSH in T1 and T2 groups as compared to C1 group however, MDA level is significantly increased in T2 group as compared to C1 group. The activity of CAT in T1 and T2 groups is decreased non-significantly in brain and decreased significant in eye as compared to C1 group. mRNA expression level in zebrafish brain and eye of T2 group showed significant down regulation of SOD, CAT and Nrf2 levels as compared to C1 group. Microscopic lesions between control and other groups are comparable and no changes were observed.

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CERTIFICATE - I

Date: /09/2021

This is to certify that the thesis entitled **"EVALUATION OF NEUROTOXICITY OF 4-NONYLPHENOL IN ADULT MALE ZEBRAFISH"** submitted for the degree of Master of Veterinary Science in the subject of **VETERINARY PATHOLOGY** embodies bonafide research work carried out by **DESAI JAYKUMAR KANTILAL** under my guidance and supervision and that no part of this thesis or research work has been submitted for any other degree. The assistance, guidance and help received during the course of investigation have been fully acknowledged.

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