

MOI UNIVERSITY
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EFFECT OF AMITRAZ ON THE NERVOUS SYSTEM OF RATS))

BY

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A B S T R A C T

Female albino rats ranging in age from 4-5 months were used to evaluate the neurotoxicity potential of Amitraz. The objectives of this study were to identify whether the nervous system is altered by the toxicant and to characterize the nervous alterations associated with exposure. The hypotheses that the study tested were that Amitraz causes structural changes in nerve cells in the areas of the cerebral cortex, cerebellum, brain stem and spinal cord; and that Amitraz induces gross morphological changes in the brain.

Experimental rats received 10mg/kg and 20mg/kg body weight of Amitraz in their drinking water for six weeks and the control rats were given plain tap water. The animals were sacrificed by transcardial perfusion using phosphate buffered glutaraldehyde (2%)- paraformaldehyde (2%) pH 7.24; their brains excised and weighed; the brain weight(BrW) in grams/ body weight(BW) in grams ratio was calculated. Tissues from the cerebral cortex; cerebellum; brain stem and spinal cord were sampled and processed for histological examination by light microscopy.

Compared to the controls the BrW/BW of 10mg/kg Amitraz treated rats were significantly different ($P < 0.01$) after six weeks. The differences between ratios of those fed on 20 mg/kg and the control were significant after 2 and 4 weeks of treatment ($P < 0.01$), and after 6 weeks of treatment ($P < 0.001$). Differences between the two groups of treated animals were found significant after 2, 4, and 6 weeks.

Animals treated with 20 mg/kg displayed generalized muscle weakness and muscle tremors after 6 weeks of treatment. The tremors were probably caused by uncontrolled impulse transmission due to accumulation of acetylcholine at neuromuscular junctions as Amitraz inhibits the junctional enzyme, cholinesterase. Amitraz was found to destroy brain cells as evidenced by decrease in the number of cells of treated animals, the effect being determined by the amount of drug ingested and the duration of exposure. Examination of sections from the brain stem revealed swelling of astrocytes and the neurons displayed chromatolysis.

The results suggest that Amitraz is neurotoxic at the concentrations used in this study. Therefore there is need to exercise precautions or the users need to be warned of the dangers it could cause if ingested. Further studies are needed so as to determine the exact effects Amitraz would have on man.