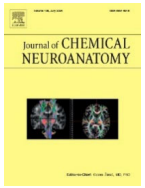


**Expression of the α7 and α4 subunits of nicotinic acetylcholine receptors in ~~hippocamous~~hippocampus damage induced by diazinon in male Wistar rats: modulation by methanolic extract of Verbascum cheiranthifolium and Biebersteinia multifida DC.**

https://www.sciencedirect.com/science/article/abs/pii/S0891061824000115?via%3Dihub

**Abstract**

Diazinon (DZN) ~~is one of the~~an organophosphate~~s~~ (OPs), ~~compounds~~ with the most important mechanism of action of DZN ~~is~~ being~~the~~ induction of oxidative stress (OS) and inhibition of the enzyme acetylcholinesterase (AChE). Verbascum cheiranthifolium (VER) and biebersteinia multifida (BM) belong to the ~~family~~ Scrophulariaceae and Geraniacea family Respectively. These plants are widely used in Iranian traditional medicine due to their beneficial effects. ~~Therefore~~Thus, this ~~Research~~ research aimed to appraise the protective effects of the methanolic extract of the VER and BM on changes in the ~~Level~~ level of expression of α7 and α4 subunits of nicotinic acetylcholine receptors (nAChRs) in treated ~~hippocamous~~hippocampus (HPC) rats with DZN. In this research, 36 male Wistar rats were used and randomly divided into ~~6~~ six groups~~.~~: Control, DZN (40mg/kg), VER (960mg/kg), DZN+VER (40mg/kg+960mg/kg), BM (960mg/kg), and DZN+BM (40mg/kg+960mg/kg). At the end of treatment periods, the animals of all groups underwent the Morris water maze (MWM) test. The rats were anesthetized, and ~~Blood~~ blood sampling was performed. Eventually, the brain was removed for histological study and evaluation of OS parameters. The results ~~of our research showed~~indicated that DZN increased the extent of expression of nAChRs in the HPC and significantly inhibited cholinesterase (ChEs) activity ~~and~~ plus OS parameters. Also, in MWM, the time to find the platform was significantly longer in the DZN group, ~~but~~ while the time and the distance in the probe test were ~~less~~ lower than in the control groups. VER and BM extract in the treatment groups simultaneously improved the extent of expression of nAChRs, ChEs activity, as well as ~~significantly~~ the parameters of OS and spatial memory significantly. In conclusion, our results support the neuroprotective properties of VER and BM extract versus DZN in rats. ~~and it is not without grace to mention that~~Accordingly, the extracts of VER and BM may be useful as an approach for the treatment of learning disorders and memory enhancement.