

Effects of N-acetyl-cysteine and α -tocopherol on diazinon toxicity.

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Objective: Diazinon, an organophosphate insecticide, has been used for agriculture and domestic purposes for several years. Reactive oxygen species (ROS) caused by organophosphates are involved in the toxicity of various pesticides (1). The aim of present study was to analyze the role of diazinon in inducing oxidative stress in adult male Wistar rats and to evaluate the possible protective effects of N-acetyl-cysteine (NAC) and α -tocopherol (TPH) after 4 weeks exposure to sub-lethal dose of diazinon.

Methods: TPH + NAC + diazinon, NAC + diazinon and TPH + Diazinon combinations were given to rats orally for 4 weeks. The thiobarbituric acid reactive substances (TBARS), total thiol molecules, and total antioxidant capacity of plasma were all analyzed. In addition, the acetylcholinesterase (AChE) activity was measured. **Results:**

The results from this study effectively indicated diazinon-induced oxidative stress demonstrated by enhanced TBARS, decreased total thiol molecules, and total antioxidant capacity. In addition, AChE activity was inhibited as a marker of organophosphate toxicity. Data show the protective roles of NAC and TPH in reducing the diazinon-induced oxidative stress and also AChE inhibition as a sequence of diazinon toxicity (Table 1). **Conclusion:** Suppressed AChE activity confirms organophosphate toxicity. The present results indicate diazinon-induced oxidative stress. Also, our data show the protective roles of TPH and NAC in reducing lipid peroxidation and their protective roles in prevention of AChE. In general, the indices obtained with combination therapy well confirm that coadministration of TPH and NAC reduces diazinon-induced toxicity and oxidative stress. It is concluded that supplementation with TPH and NAC can reduce toxicity of organophosphate in human exposure. **References:** 1. Kovacic P. Mechanism of organophosphates (nerve gases and pesticides) and antidotes: electron transfer and oxidative stress. *Curr Med Chem* 2003; 10: 2705-2709.

Table 1. Oxidative stress parameters and AChE activity in control, diazinon, TPH, NAC, TPH + diazinon, and NAC + Diazinon groups

	Control	Diazinon	TPH + Diazinon	NAC + Diazinon	TPH	NAC
TBARS (nmol/mL)	0.19±0.04	0.36±0.02**	0.14±0.04	0.07±0.02*	0.06±0.01**	0.07±0.02**
Total thiol molecules (mM)	0.42±0.02	0.19±0.06**	0.46±0.02	0.32±0.04*	0.56±0.04**	0.64±0.10**
FRAP (μmol/mL)	385.9±15.21	203±24.89*	481.6±71.83	373±52.30	829.8±71.36**	836.6±77.59**
AChE (KU/L)	0.998±0.30	0.22±0.04**	0.73±0.09*	1.14±0.20	2.28±0.42**	2.66±0.19**

Data are mean ± SE of six rats in each group. The difference between control and other treated groups is significant at * p < 0.05 and ** p < 0.01.