

## Crocini decreased acrylamide – induced neurotoxicity in wistar rat through oxidative stress and apoptosis pathway

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**Background and Aims:** Acrylamide (ACR) is a water-soluble monomer that is used in different industries. ACR has been found in carbohydrate – rich food cooked at high temperatures. ACR monomer is a potent neurotoxic and damages the central and the peripheral nervous system in humans and animals. Crocin is an active and important compound of *Crocus sativus* L. (saffron). In different in vitro and in vivo models crocin has shown high antioxidant activity. Crocin can decrease ACR- induced cytotoxicity in PC 12 cells via reduction of ROS production and decreased apoptosis. Therefore in this study neuroprotective effect of crocin in ACR- induced neurotoxicity in wistar rats was investigated through evaluation of stress oxidative and apoptosis pathway.

**Methods:** Male wistar rats were treated with ACR (50 mg/kg ip) alone or with crocin (12.5, 25 and 50 mg/kg ip) for 11 days. Then malondialdehyde as a marker of lipid peroxidation and total glutathione were determined in cerebral cortex tissue. Caspase – 3, 8, 9, bax and bcl-2 protein expression was evaluated using Western blotting. Real time PCR was used for determination of bax and bcl- 2 gene expressions.

**Results:** ACR increased level of MDA while reduced GSH level. Crocin in a dose-dependent manner prevented ACR- induced lipid peroxidation ( $P < 0.001$ ). In apoptosis pathway, ACR increased bax, caspase 3, 9 protein expression. There were not significant changes in bcl- 2 and caspase 8 protein expression. RT- PCR results showed no changes in bax and bcl-2 gene expression. Crocin decreased apoptosis protein expression in a dose-dependent manner.

**Conclusions:** Oxidative stress and apoptosis played important role in ACR- induced neurotoxicity in rats. Treatment with crocin significantly reduced ACR neurotoxicity via suppression of lipid peroxidation and elevation of GSH content. Crocin decreased ACR- induced apoptosis especially through intrinsic apoptosis pathway.

**Keywords:** Crocin; Acrylamide; Stress oxidative; Apoptosis