Fayoum University
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BIOCHEMICAL STUDY ON CARCINOGENICITY OF ACRYLAMIDE

By

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A thesis submitted in partial fulfillment

Of

The requirement for the degree of

Master of Science

In

Biochemistry

Department of Chemistry

Faculty of Science, Fayoum University

2008

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Faculty of Science,
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Summary and conclusion

Acrylamide is α, β unsaturated carbonyl compound with a significantly high chemical activity. It is an important industrial chemical used primarily in the production of polyacrylamide which used in water treatment, cosmetic, paper and textile industries, and in the research laboratories which include gel electrophoresis and gel chromatography. Acrylamide does not occur naturally, acrylamide was formed in foods cooked at high temperature. It's formation involves the Maillard browning reaction between reducing sugars and amino acid asparagine. Acrylamide had been shown to cause neurotoxic effects in human and neurotoxic, genotoxic, reproductive and carcinogenic effects in laboratory animals when it was given in drinking water or by other means. But epidemiologic studies of possible health effect from exposure to acrylamide had not produced consistent evidence of increase cancer risk. Acrylamide was oxidized by cytochrome p450 2E1 (CYP2E1) to its epoxide form, glycidamide, which was believed to be responsible for the mutagenic and carcinogenic activity of acrylamide. The present study was carried out to investigate the toxic and carcinogenic effects of acrylamide via inducing oxidative stress on vital endocrine glands including testis, thyroid and adrenal glands in

experimental rat model. This may represent the potential hazard for human health. 100 adult Sprague Dawley male rats were divided into 10 experimental groups where 10 male rats/group. Group 1: untreated control animals. Groups 2, 3 and 4: animals treated orally with 5mg/kg/day b.w. of acrylamide for 4, 8 and 12 weeks. Groups 5, 6 and 7: animals treated orally with 10mg/kg/day b.w. of acrylamide for 4, 8 and 12 weeks. Groups 8, 9 and 10: animals treated orally with 15mg/kg/day b.w. of acrylamide for 4, 8 and 12 weeks then the animals were decapted at the end of the experimental period. The results indicated that treatment with acrylamide resulted in a significant increase in lipid peroxidation and tumor marker Carcinoembroyonic Antigen (CEA) levels compared with control, and it caused a significant decrease in total antioxidant capacity, T_3, T_4, corticosterone, free and total testosterone levels compared to control animals. It could be concluded that acrylamide is a multiorgan carcinogen in experimental rat model caused oxidative stress on testis, thyroid and adrenal glands caused hormonal disorder. This may represent the potential hazard for human health.