

**BIOCHEMICAL AND HISTOLOGICAL CHANGES IN RETINA AND LIVER OF MALE
RABBITS TREATED WITH DIOXIN**

Submitted By

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B.Sc. of Science (/Chemistry), Faculty of Science, Cairo University, 1990

Diploma in Environmental Sciences, Institute of Environmental Studies and Research,
Ain Shams University, 2001

Master in Environmental Sciences, Institute of Environmental Studies and Research,
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A Thesis Submitted in Partial Fulfillment

Of

The Requirement for the Doctor of Philosophy Degree

In

Environmental Sciences

Department of Environmental Basic Sciences

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APPROVAL SHEET

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ABSTRACT

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BIOCHEMICAL AND HISTOLOGICAL CHANGES IN RETINA AND LIVER OF MALE RABBITS TREATED WITH DIOXIN

Dioxin is the name generally given to a class of super-toxic chemicals, formed as a by-product of the manufacture, molding, or burning of organic chemicals and plastics that contain chlorine. Oxidative stress may play a role in the toxic manifestations of dioxin. The aim of this study was to investigate the dose-dependent effects of dioxin on various indices of oxidative stress along with other biochemical parameters in blood, retina and liver of male rabbits, and to examine the histopathological consequences in the retina and liver. Twenty four male rabbits were divided randomly into three groups. The first group (12 rabbits) served as control and vehicle-carrier. The other two groups, six rabbits each, received oral doses of dioxin (3 and 6 µg/kg body weight) on seven consecutive days. It was found that, rabbits treated with dioxin exhibited significant changes in total antioxidant capacity (TAC), malondialdehyde (MDA), hydrogen peroxide (H₂O₂), and reduced glutathione (GSH) levels. This indicates that, Dioxin can cause oxidative stress and release of ROS. Other biochemical parameters analyzed were also altered either slightly or significantly.

Regarding histological studies, the hepatic tissue displayed several alterations like microvesicular steatosis, degenerative and necrotic changes that were prominent with the high dose. In the retina, the histopathological changes were in the form of detachment between Retinal pigment epithelium (RPE) and retinal layers, disorganization and fragmentation of the photoreceptor layer (PhL), diffusion of many nuclei

of the outer nuclear layer (ONL); some cells appeared pyknotic. Cells of the inner nuclear layer (INL) showed swollen nuclei. In addition, The outer, inner plexiform layers (OPL), (IPL) and ganglion cell layer (GCL) showed edema and swollen cells. Generally, the retinal changes were severe in high dose - treated rabbits. This was clear by electron microscopic examination.

In conclusion, the results indicated that, the treatment of rabbits with dioxin may cause oxidative stress response and changes in some biochemical parameters, hepatic and retinal histological architecture in a dose-dependent manner.

Key words: Tetrachlorodibenzo-p-dioxin ; Oxidative stress ; Histology ; Retina and Liver.

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