



## Toxicologic Pathology of Carbaryl in Pigeons in Basrah/ Iraq

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### Abstract

*The present research project was done on toxicological pathology of carbaryl in local pigeons, in four groups: untreated control, low dose (12.5mg/kg), intermediate dose (25 mg/kg) and high dose (50 mg/kg). The study showed varying degrees of histopathological changes in liver, kidney, heart, pancreas, intestine and lung. Those histopathological changes varied from centrilobular vacuolation of hepatocyte in liver, dilated/ vacuolated proximal convoluted tubules in kidney with glomerular with high cellularity, lung showed areas of inflammatory cells, pancreas with congested blood vessels and interstitial fibrosis, heart with vacuolation of myocardial cells, edema and adipose tissue, intestine showed increased number of mucus gland and thickened muscularis externa. In conclusion it appeared that carbaryl can induce various toxicologic pathologic lesions in various visceral organs as above. The changes were more prominent and marked in the high dose treated group.*

**Keywords-** Liver, pigeon and carbaryl.

### Introduction

Neurotoxicity of carbaryl will be of great interest to compare with tri orthocresyl phosphate due to the fact that any neurotoxic effect induced by carbaryl there is possibility of recovery while neurotoxicity of tri orthocresyl phosphate recovery was very difficult due to ageing mechanism induced by tri orthocresyl phosphate in the injured nervous system. Several people studied toxicity of carbaryl as [1] studied the toxicity and toxicokinetics of carbaryl in chicken and rats: a comparative study with [2] investigated immunotoxicity of carbaryl in chicken. [3] investigated chick embryo exposure to carbaryl and neurochemical parameters and behavior. [4] studied effect of in ovo injection of carbaryl in chick embryo hatchability, esterase enzyme activity and locomotion of chicks. [5] studied neurochemical and behavioral effects of aldicarb administration in rat. [6] on carbaryl report on pesticide information, [7] studied carbaryl from the point of human health and ecological risk

assessment. [8] as report on pesticide information [9] studied physical and chemical properties of carbaryl. [10] studied toxicity of carbaryl in fresh water cat fish. [11] studied toxicity of carbaryl and malathion in fish. [12] studied toxicity of carbaryl on shrimp. [13] did toxicity of carbaryl in the rhesus monkey. And [14] did toxicity of chemicals to fish and aquatic invertebrates.

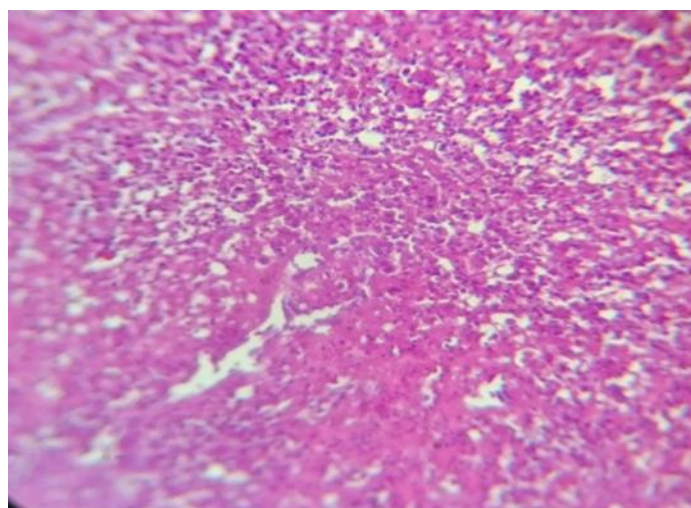
### Materials and Methods

The study was done on 40 pigeons divided into four equal groups of 10 pigeons to each group. The experiment was done on local pigeons by oral intubation of carbaryl using varying dosage levels as follows: untreated control, low dose (12.5 mg/kg), intermediate dose (25 mg/kg) and high dose (50 mg/kg). The experiment was done for 2 months. Pigeons were sacrificed at the end of the experiment. Tissues were taken from various internal organs including liver, kidney, heart, lung, pancreas, and intestine. And fixed in 10% neutral buffered formalin. After fixation material was immersed in

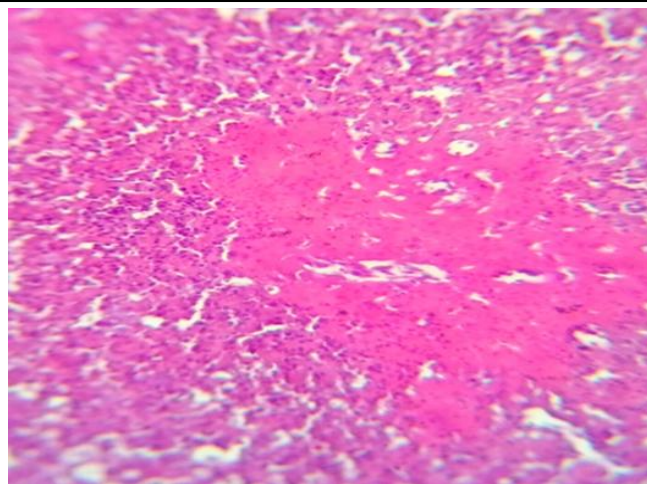
paraffin and paraffin blocks were made sections were prepared by cutting with microtome at  $5\mu$  and then slide made and stain with (H and E).

### Results

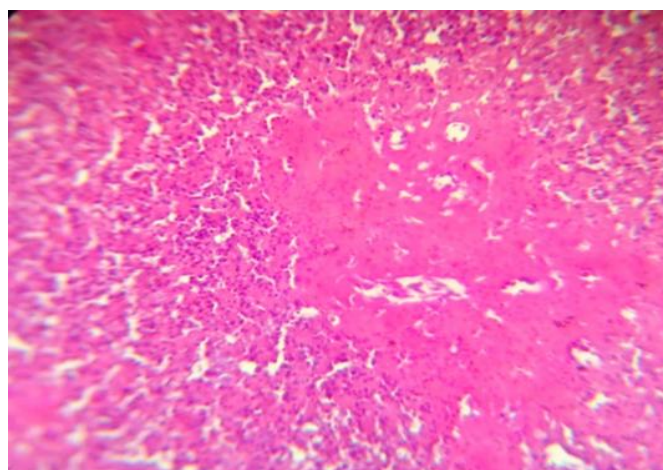
In this study showed, in liver, vacuolated centri lobular hepatocyte in Fig(1) and area of hemorrhage and also vacuolated hepatocyte in Fig (2,3). In pancreas showed, congested blood vessels in Fig (4) and interstitial fibrosis in Fig (5). In kidney showed congestion also dilated tubules in Fig (6) and anumber of cortical aggregate of lymphocyte vacuolate cortical tubules in Fig (7) and mark dilation of bowmans space of glomeruli (cystic glomerulus) in Fig (8). In lung showed area of inflammatory cells and congestion in Fig(9) and area of hemorrhage and dilated bronchi with intra luminal inflammatory cells in Fig( 10) and cellular debris in Fig (11). In heart showed some vacuolated myocardial muscles cells in Fig (12) and large blood vessels with congestion in Fig (13) and presence of areas actopic of adpose tissue between myocardial muscle cells in Fig (14, 15). In intestine showed prominent mucous gland in lamina propriaaappearentthicking of musclarisexterna in Fig(16).



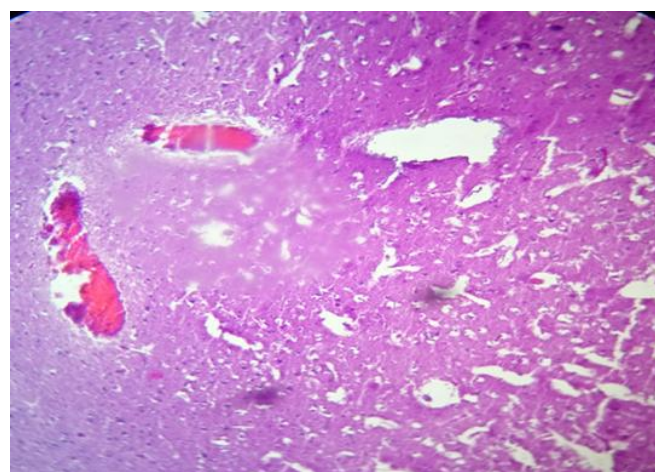
**Figure 1:**liver, area of hemorrhage and also vacuolated hepatocyte (10x)



**Figure 2:** Area of hemorrhage and also vacuolated hepatocyte(40x)

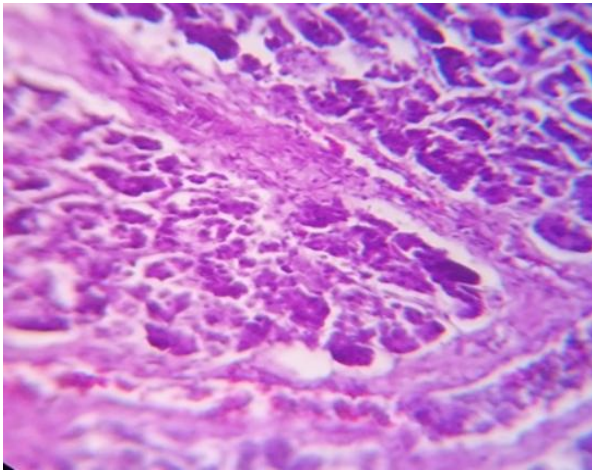


**Figure 3:** Area of hemorrhage and also vacuolated hepatocyte (40x)

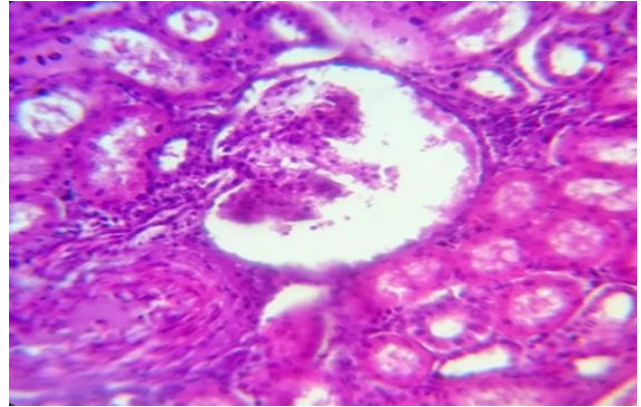


**Figure 4:** Pancreas showed,congested blood vessels(10x)

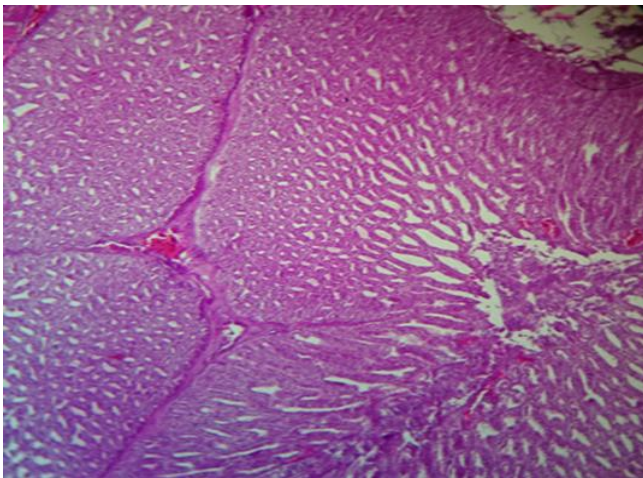




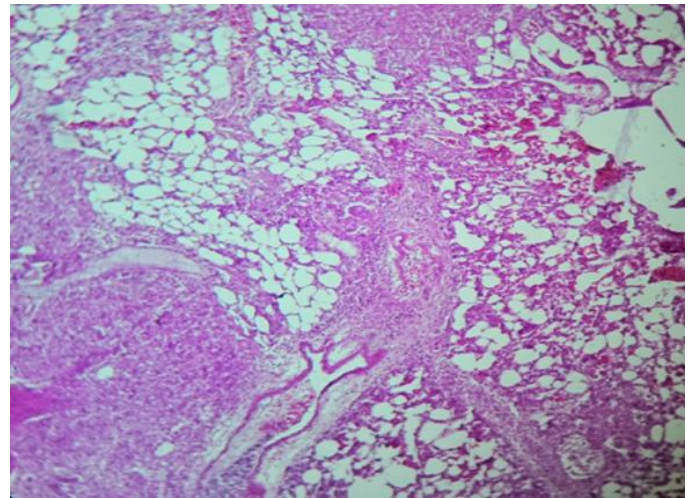
**Figure 5:** Pancreas showed,interstitial fibrosis(40x)



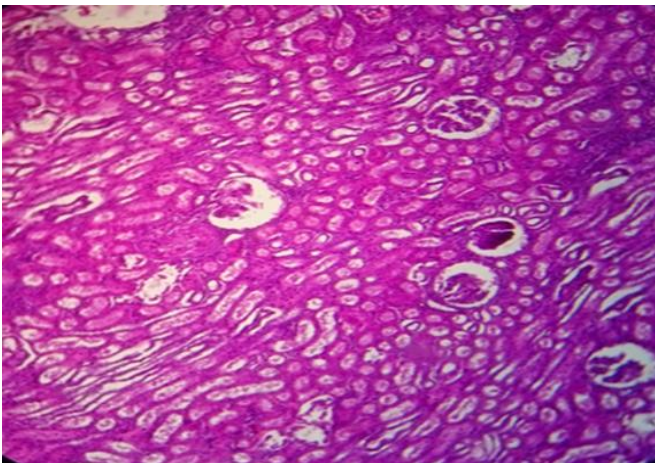
**Figure 8:**Kidney showed mark dilation of bowmans space of glomeruli (cystic glomerulus)(40x)



**Figure 6:** Kidney showed congestion also dilated tubules (10x)

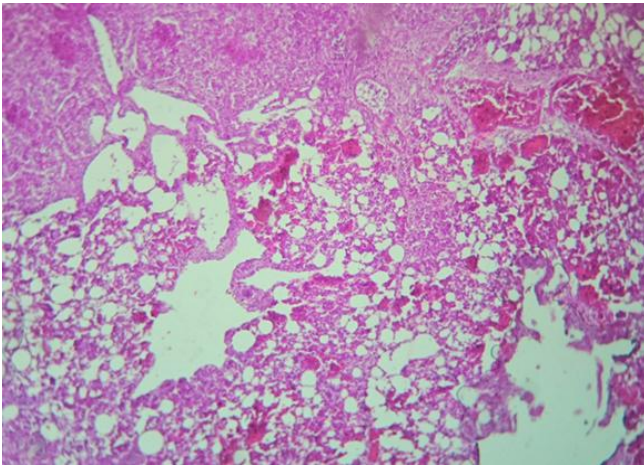


**Figure 9:** lung showed area of inflammatory cells and congestion(10x)

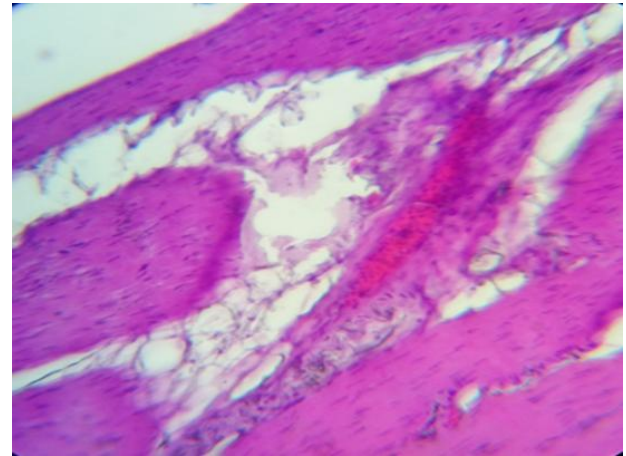


**Figure 7:** Kidney showed anumber of cortical aggregate of lymphocyte vacuolate cortical tubules (10x)

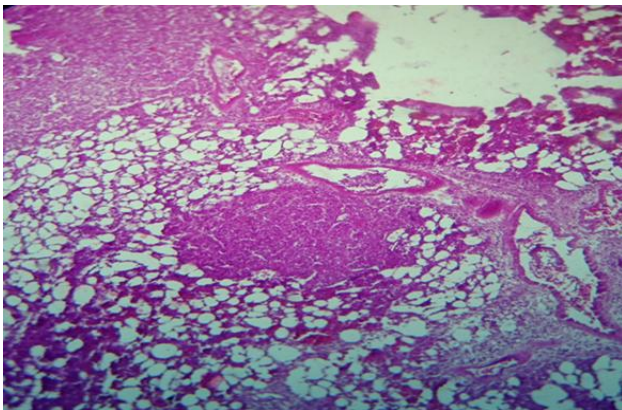




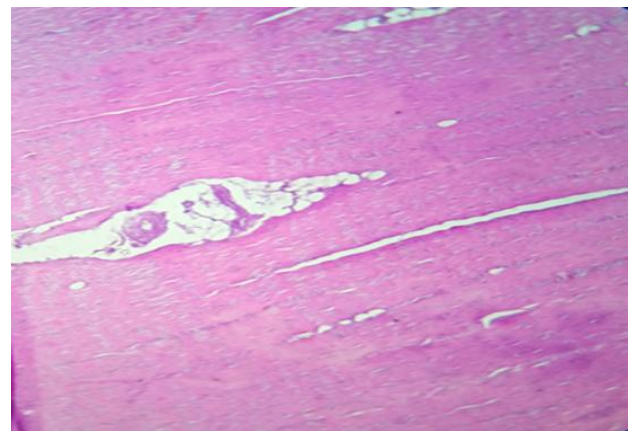
**Figure 10:** lung showed area of hemorrhage and dilated bronchi with intra luminal inflammatory cells(10x)



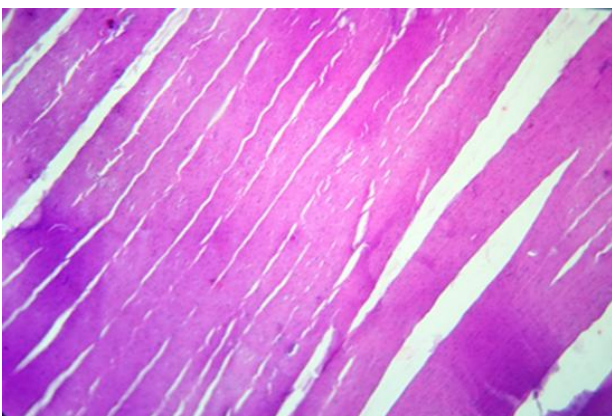
**Figure 13:** Heart showed large blood vessels with congestion(40x)



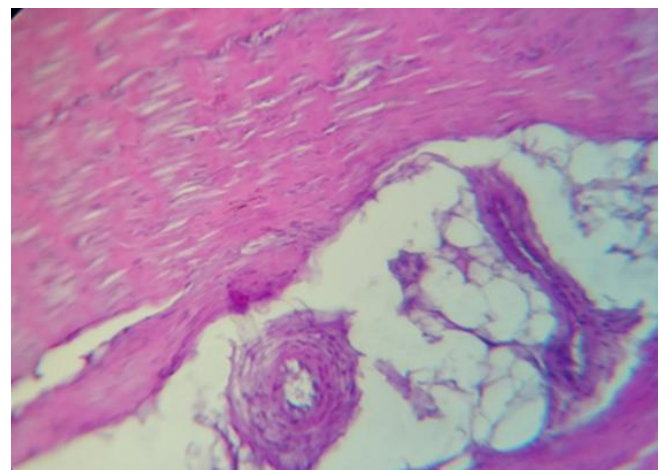
**Figure 11:** lung showed cellular debris(10x)



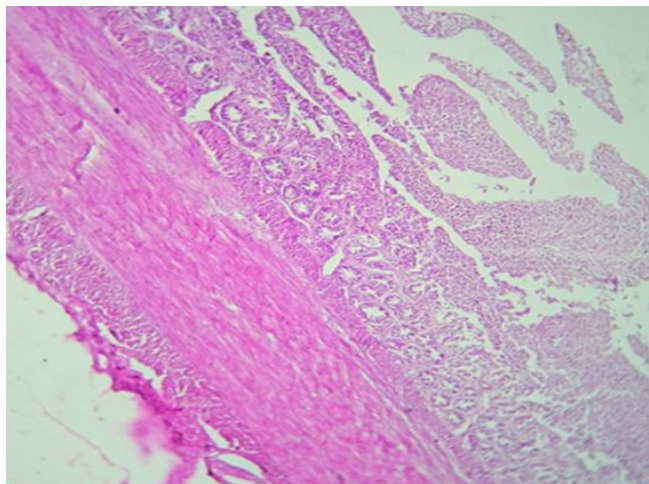
**Figure 14:** Heart showed presence of areas ectopic of adipose tissue between myocardial muscle cells.(10x)



**Figure 12:** Heart showed some vacuolated myocardial muscles cells(10x)



**Figure 15:** Heart showed presence of areas ectopic of adipose tissue between myocardial muscle cells.(40x)



**Figure 16:** Intestine showed prominent mucous gland in lamina propria apparent thickening of muscularis externa (10x)

### Discussion

[1] studied the toxic effect of carbaryl in chicken and reported on effect on the liver microzomes, the present study showed an effect of carbaryl on the liver of pigeons characterized by vacuolation.<sup>[2]</sup> found reduced activity of macrophages due to the toxic effect of carbaryl also found lymphatic proliferation due to treatment with high dose of carbaryl. The present study showed diffuse lymphocytic aggregate in the spleen which could reflect lymphocytic proliferation<sup>[3]</sup> studied the effect of carbaryl of chick embryos and found evidence of toxicity. The present study was done on toxicity of carbaryl in adult pigeon, both studies showed toxic effect of carbaryl on chick embryos and adult pigeons.<sup>[5]</sup> investigated neurochemical and behavioral effect of chronic aldecarb administration in the rat and found toxicity of the compound in rats on neurochemical parameter, behavior and mamary indicating toxic effect of aldecarb in rats, the present study was done on pigeon and found toxic effect of carbaryl on viseral organs which can be compared with above study in rats. <sup>[6]</sup> studied the effect of pesticides including carbaryl in agriculture and reported teratogenic effect, reproductive effect, carcinogenic effect and organ toxicty. The present study was done mainly on toxicity carbaryl on pigeon viseral organs and this could be compared with the above research project. <sup>[7]</sup> studied the toxicity of carbaryl in different animals including

birds, mammals, reptiles and invertibrate, the present study was done on toxicity of carbaryl in pigeon and use in comparism with the study of <sup>[7].</sup><sup>[8]</sup> invesigate toxicity and use of carbaryl as insecticide to study the toxic effect carbaryl in human and animals, the present study was done on toxicity of carbaryl on pigeons and found various lesions in viseral organs. <sup>[9]</sup> reviewed the toxicity and mode of action of carbaryl and reported that carbaryl has a slight toxicity to mammals but more to aquatic organism, the present study was done on pigeon and found that carbaryl can be toxic to viseral organs with varying grades of lesions in liver, kidneys, small intestine, heart, proventricullus, stomach and spleen. <sup>[10]</sup> reported thyroid disfunction due to toxicity of carbaryl in cat fish. The present study was done in toxicity of carbaryl in pigeon and found changes in liver, kidney, stomach, proventricullus, heart, spleen and lung.<sup>[11]</sup> studied the toxicity of carbaryl in fish, the present study was done on toxicity of carbaryl in pigeon.<sup>[12]</sup> did a toxic study of carbaryl on shrimp, the present study was done on toxicity on carbaryl in pigeon.<sup>[13]</sup> did toxicity of carbaryl in rhesus monkey, the present study was done on toxicity of carbaryl in pigeon.<sup>[14]</sup> studied the toxicity of chemicals in fish and aquatic invertibrate to found the preliminary toxic effect on such organism while the present study was more specific was done on toxicity of carbaryl in pigeon.

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Taro Denshi received the B.S. and M.S. degrees in Electrical Engineering from Shibaura Institute of Technology in 1997 and 1999, respectively. During 1997-1999, he stayed in Communications Research Laboratory (CRL), Ministry of Posts and Telecommunications of Japan to study digital beam forming antennas, mobile satellite communication systems, and wireless access network using stratospheric platforms. He now with DDI Tokyo Pocket Telephone, Inc.