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Effect of Furadan on Histological Alteration of Liver and Kidney of Hemidactylus Flaviviridis

KEYWORDS: Hemidactylus flaviviridis, furadan, liver, kidney

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ABSTRACT *Hemidactylus flaviviridis were collected locally and divided into control and experimental group. The experimental .animal were administered orally with 1 µl of furadan (0.005gm of furadan dissolved in 1ml of acetone)/g body weight. The animals were sacrificed after different time intervals (0h, 24h, 48h and72h) and the target organs (liver and kidney) were dissected out, then processed for microtome section, observed under the microscope and compared for the histological alteration in response to furadan.*

INTRODUCTION
Pesticides are widely used substances in current agricultural practices. Owing to their toxic effects on non target organisms, most of them may produce serious detrimental effects on ecosystems (Dobsikova, 2003). Carbofuran (2,3-dihydro-2,2-dimethylbenzofuran- 7-yl methylcarbamate) is a broad-spectrum systemic insecticide, nematicide, and acaricide used throughout the world. As a result of its widespread use, carbofuran (furadan) has been detected in ground, surface and rain waters, in soils, air, foods and wildlife (Richards et al. 1987; Waite et al. 1992; Fisher et al. 1999). Reptiles are particularly suitable as contaminant biomonitors due to their persistence in a variety of habitats, wide geographic distribution, longevity and, in many cases, site fidelity. Additionally, reptiles exhibit a sensitivity to contaminants similar to that reported for birds and mammals (Hall and Clark, 1982) and they bioaccumulate and biomagnify contaminants to levels equal to or greater than that reported for birds and mammals (Olafsson et al., 1983; Bryan et al., 1987; Hall and Henry, 1992).

Histological changes have been widely used as a potential toxicity marker for different environmental pollutants including insecticides (Bhuiyan et al., 2001). It is well known that the liver and kidney are the target organ in toxicological prospects regarding its role in detoxification, biotransformation and excretion of xenobiotic. After enteric uptake of injurious materials, these organs are exposed to such hazards via the portal circulation. It is reported that furadan alter the histology of liver (Parida et al., 2013) and kidney (Parida et al., 2013) of Psamophillus blanfordanus. In the present work furadan was given orally to Hemidactylus flaviviridis and histological alteration in liver and kidney were examined at different time intervals (0h, 24h, 48h and 72h).

MATERIALS AND METHOD
Hemidactylus flaviviridis were divided into four groups as A, B, C and D. Eeach group comprising of five animals. Animals of group A (control) were given orally 1 µl of acetone/g body weight. The experimental animals of group B, C and D were administered orally with 1 µl of furadan (0.005gm of furadan dissolved in 1ml of acetone)/g body weight. The animals were sacrificed after different time intervals such as 0h (group A), 24h (group B), 48h (group C) and 72h (group D). The target organ (Liver and Kidney) were dissected out from both control and experimental group by scarifying the animal after 0h 24h,48h,72h time interval. Both the liver and kidney were fixed in Bouin's fluid and then processed for microtome sections. The thin sections were stained with eosin and haematoxylin and observed under microscope.

RESULTS AND DISCUSSION
Section of liver (control) Hemidactylus showing the normal structure such as large number of polyhedral hepatic cells containing a granular cytoplasm and the masses of inflammatory leucocytic infiltrations comprise mainly of lymphocytes and spare eosinophils in several areas (Fig. 1). However, in the experimental group at 24h showing the T.S. of liver have some histological alteration such as the intra hepatic blood vessels were congested and hyperplasia of bile ducts associated with central blood vessel and macrophages and their small nuclei ranged in their degenerative changes from karyopknosis to severe karyorrhexis and complete pyknosis. (Fig. 2), at 48h the T.S. of liver also showing histological alteration such as the intra hepatic blood vessels partial glycogen hepatic depletion and central veins were congested and their lining epithelia were eroded. The sinusoidal spaces were some what dilated and infiltrated by lymphocytes. (Fig.3). Similarly, at 72h (time interval) showing the T.S. of liver have some histological alteration such as the infiltration of lymphocytes to sinusoidal spaces are dilated and blood sinusoidal and congested blood vessels are seen. (Fig. 4).

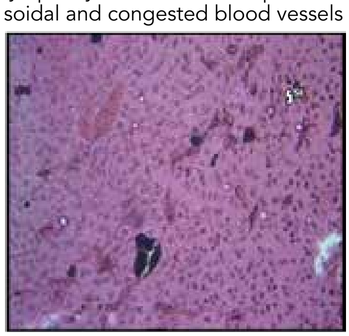

Fig1. T.S of liver of Hemidactylus (control, 0h) (HE stain, 40X)

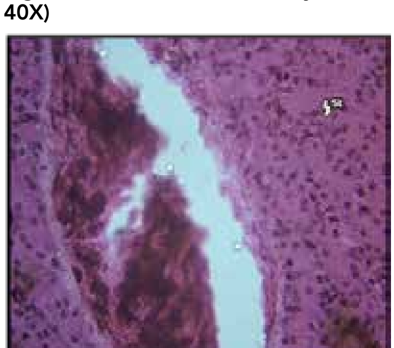

Fig2. T.S of liver of Hemidactylus (experimental, 24h) (HE stain, 40X)

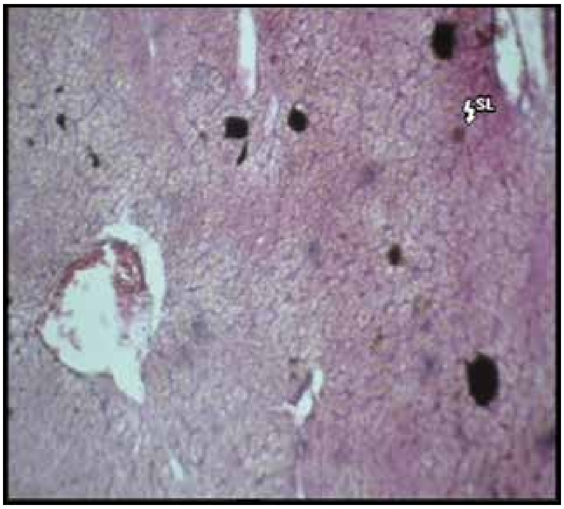

Fig3. T.S of liver of Hemidactylus (experimental, 48h) (HE stain, 40X)

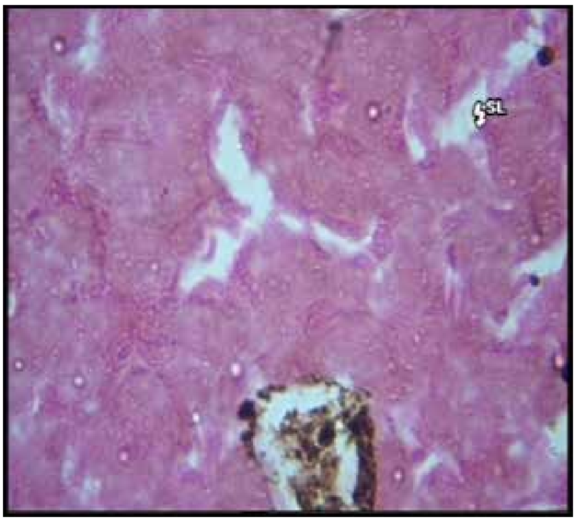

Fig4. T.S of liver of Hemidactylus (experimental, 72h) (HE stain, 40X)

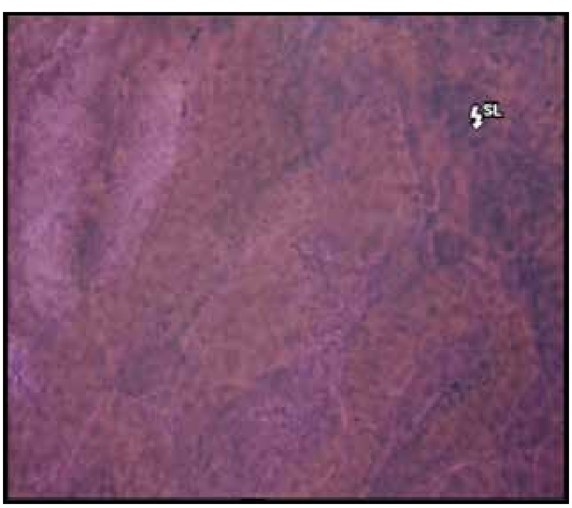

Fig5. T.S of kidney of Hemidactylus (control, 0h) (HE stain, 40X)

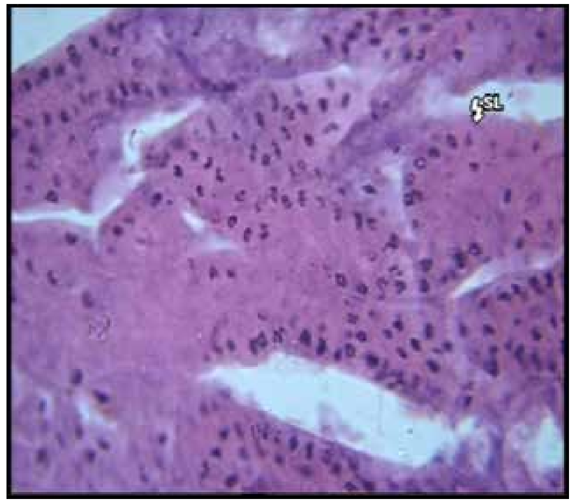

Fig6. T.S of kidney of Hemidactylus (experimental, 24h) (HE stain, 40X)

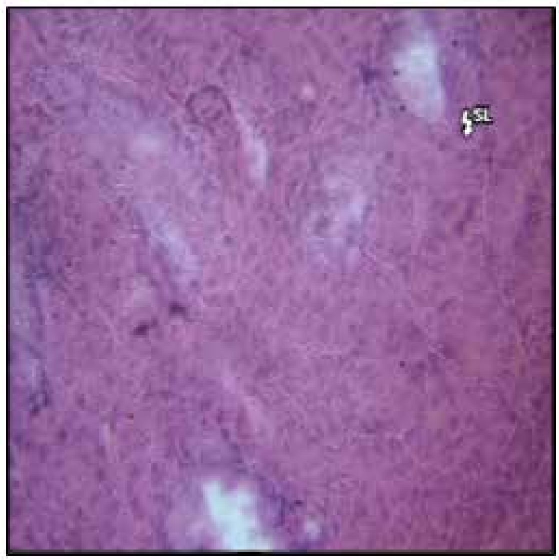

Fig 7. of kidney of Hemidactylus (experimental, 48h) (HE stain, 40X)

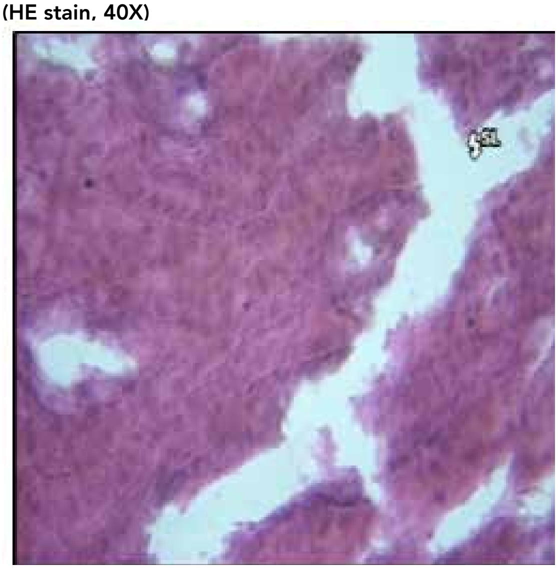

Fig 8. of kidney of Hemidactylus (experimental, 72h) (HE stain, 40X)

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Section of kidney (control) Hemidactylus showing the normal structure such as an increase in the number and volume of the mesangial cells appeared in the glomeruli. The chase was increased in severity with increasing the furadan doses and period of exposure and became prominent. Focal cellular necrosis was observed in the renal proximal tubules. The degenerative tubules showed swelling, cytolysis and thining or absence of the proximal tubular brush border and tubular irregularity. Necrosis was more prominent in the cortex than medulla.(Fig. 5). In the experimental group Hemidactylus at 24h (experimental) showed the T.S. of kidney have some histological alteration such as the inter tubular connective tissue of the Hemidactylus became widely separated from one another due to accumulation of the edematous fluid and appeared early in the form of nuclear and cytoplasmic pleomorphism, particularly in the proximal convoluted tubules. The section of kidneys developed pyknosis in some epithelium lining cells of the proximal tubules with lesser extent in the distal ones. (Fig. 6). At 48h (experimental) T.S. of kidney showed some histological alteration such as many tubules showed dilation. This alteration appeared first in the inner edge of the cortex and progressed into the remaining part of the cortex with the high doses. Some of the dilated tubules contain densely eosinophilic casts. The meseangial proliferation structure of the glomeruli became more obvious in the kidneys and the glomerular space became almost full. (Fig. 7). Also at 72h (experimental) the T.S. of kidney have some histological alteration such as the vacuoles increased in size and pushed the nuclei to the periphery. The severity of vacuolation increased with necrosis and were associated with the inter tubular blood capillaries dilation. (Fig. 8).

In conclusion, the findings of the present histological investigations demonstrate a direct correlation between pesticide exposure and histopathological disorders observed in liver and kidney tissues.

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