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Effect of carbendazim induced toxicity on histopathological alterations and ameliorative effect of cow urine distillate in albino rats

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Abstract
The present investigation was undertaken to study the histopathological alterations caused by administration of carbendazim and to evaluate the ameliorative effect of cow urine distillate in albino rats. The study reveals that the toxic effect of dietary fungicide was suppressed by cow urine distillate to an appreciable extent.

Keywords: Carbendazim, Cow urine distillate, histopathological, Albino rats

Introduction
Carbendazim is a broad spectrum carbamate fungicide used in the control of various fungal pathogens. Indegenous cow urine widely used for its medicinal properties (Dhama *et al.*, 2005) [1].The present work studied the effect of cow urine distillate extract (CUD) on carbendazim-induced histopathological alterations in albino rats. Histological results revealed congestion and increased sinusoidal space in liver, tubular degeneration in kidney and degeneration of seminiferous tubules in testis. Coadministration of cow urine distillate with carbendazim improved the histomorphological and histopathological changes observed in rats treated with carbendazim. Histopathology revealed moderate to severe degenerative changes in liver, kidney and testis. The toxic effect of dietary fungicide was suppressed by CUD to an appreciable extent.

Materials and Methods
Commercially available carbendazim (Bavistin) and cow urine distillate (Divyagodhan ark) were used in the experiment.
In the present study, a total of 36 healthy two months old male albino rats weighing 140-150g were procured and used for the experiment. The rats were randomly divided into six groups, each group containing six rats. The rats of different groups kept separately and maintained under similar hygienic conditions and fed the standard diet. Group I, served as normal control. Group II served as test control and given only cow urine distillate (CUD). Group III received Carbendazim @ 400 mg/kg, b.wt, orally. Group IV received Carbendazim @ 400 mg/kg, b. wt. along with CUD. Group V received a higher dose of Carbendazim @ 600 mg/kg, b. wt, orally. Group VI received Carbendazim @ 600 mg/kg, b. wt. along with CUD. Total period of this study was 28 days. Histopathological studies were carried out at 28th day of study.

Results and Discussion
In the present study, histopathological examination of carbendazim exposed rats showed congestion, sinusoidal dilatation, degenerative changes with vacuolation in liver, degeneration of convoluted tubules, reduction in the Bowman's space in kidney, degenerative changes in seminiferous tubules were noticed. Pathomorphological findings in liver, kidney, testis are in accordance with findings of Gray *et al*. (1990) [3], Nakai *et al*. (1992) [6], Robert *et al*. (2004) [7], Muthuviveganandavel *et al*. (2007) [5], Shalaby and Shakr (2012) [3, 6, 7, 5, 8]. Increased oxidative stress leads to diminished effectiveness of the antioxidant defense system and the decreased energy level in cells might be associated with tissue damage which may eventually lead to cell death (Flora *et al.*, 2012) [2]. Histomorphological alteration in liver, kidney and testis were mainly due to carbendazim induced free radical injury. In free radical injury enzyme phospholipase causes lipid peroxidation leading to impaired membrane function,

decrease in membrane fluidity and inactivation of a several membrane bound enzymes (Gutteridge and Halliwell, 2000) [4]. However, magnitude and severity of microscopic lesions were less pronounced in rats which received carbendazim along with cow urine distillate.

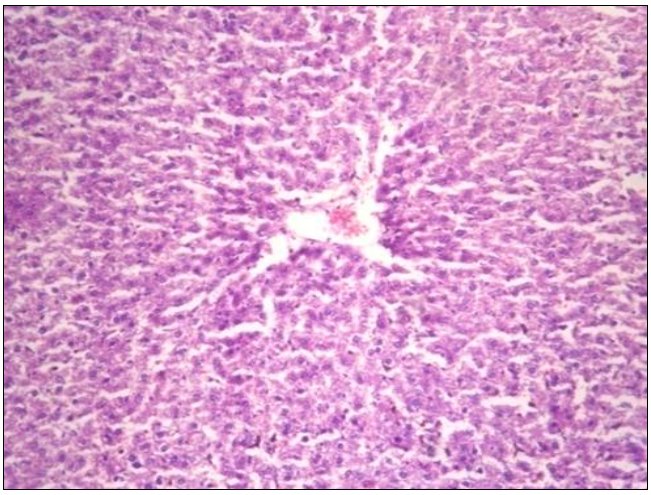

Fig 1: Section of liver of Carbendazim group (III) showing congestion on 28thday of experiment. H &EX 100

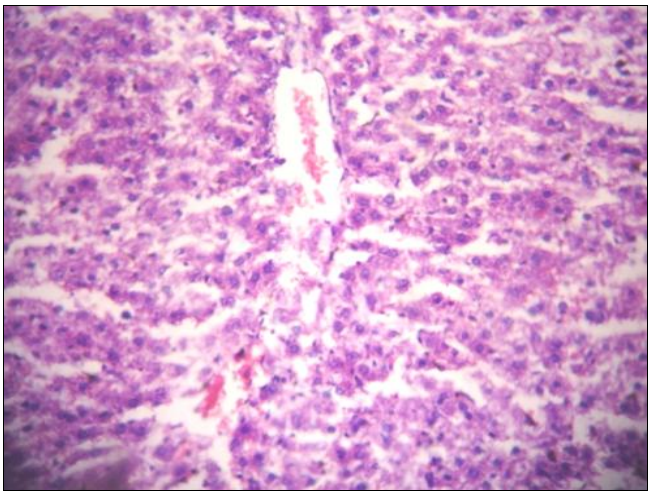

Fig 2: Section of liver of Carbendazim group (V) showing congestion and increased sinusoidal space on 28thday of experiment. H& E X 200

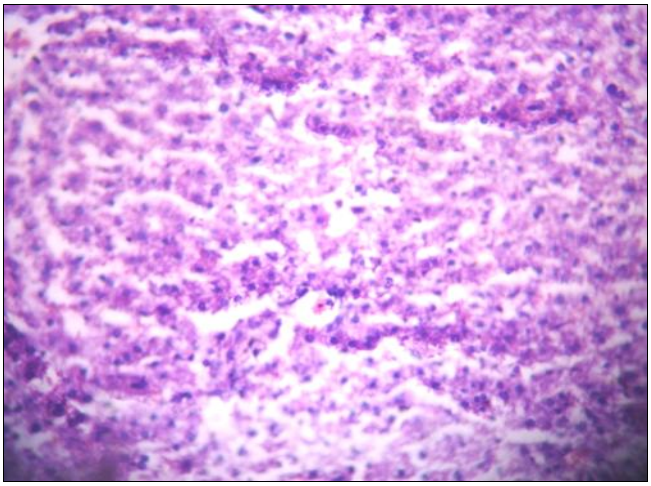

Fig 3: Section of liver of Carbendazim group (V) showing Degenerative changes with vacuolation on 28th day of experiment. H & E X 200

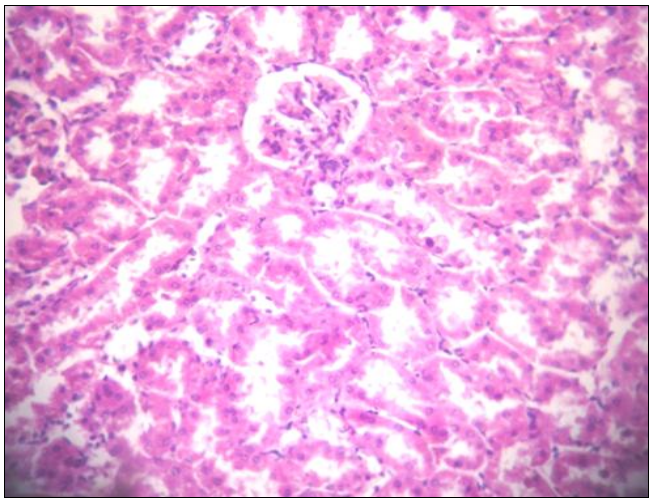

Fig 4: Section of kidney of Carbendazim group (V) showing tubular degeneration on 28th day of experiment. H & E X 200

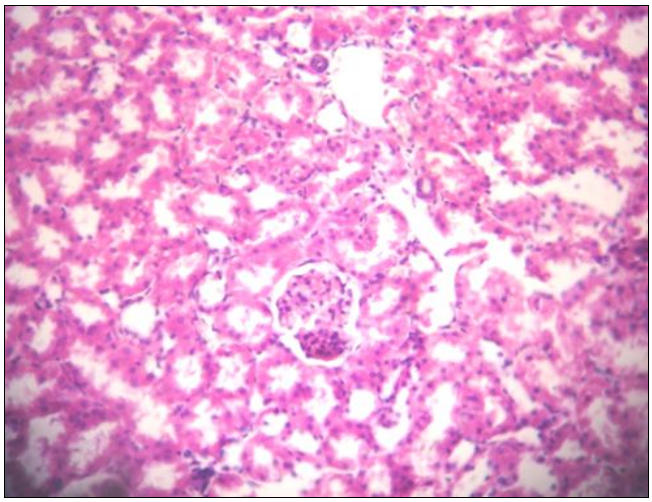

Fig 5: Section of kidney of Carbendazim group (III) showing swollen glomeruli and tubular degeneration on 28th day of experiment. H & E X 200

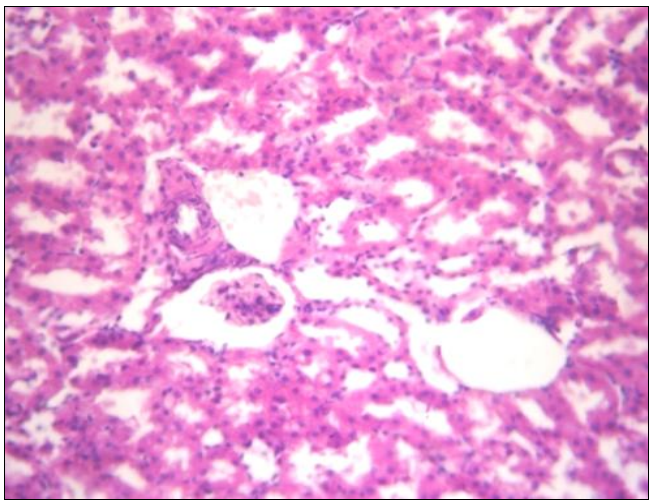

Fig 6: Section of kidney of Carbendazim group (V) showing shrunken glomeruli, increased Bowman's space and tubular degeneration on 28th day of experiment. H & E X 200

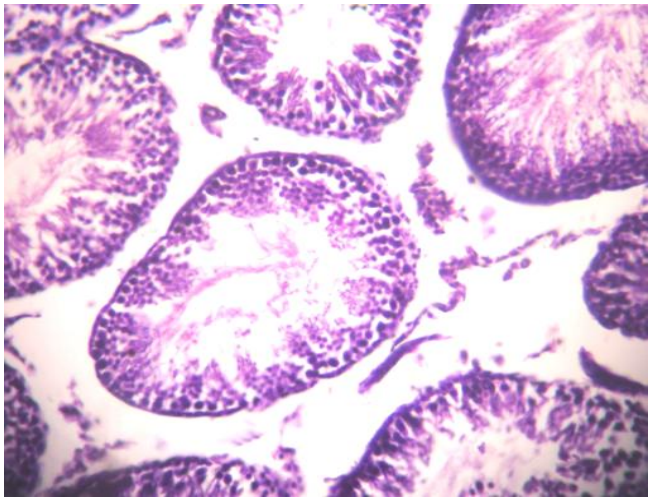

Fig 7: Section of testis of Carbendazim group (III) showing degenerative changes in seminiferous tubules on 28th day of experiment. H & E X 200

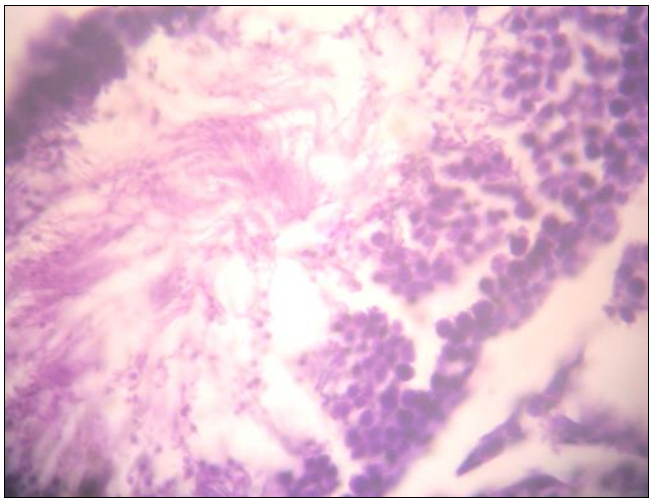

Fig 8: Section of t estis of Carbendazim group (V) showing degenerative changes in seminiferous tubule and large quantity of flagellum on 28th day of experiment. H & E X 400

Conclusion

From this study it may be concluded that the histological alterations were suppressed to an appreciable extent by administration of cow urine distillate which shows the positive effect of cow urine distillate.

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