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RESEARCH ARTICLE

EFFECT OF CARBAMIDE (UREA) ON HISTOPATHOLOGICAL ASPECTS OF CHICK *GALLUS DOMESTICUS (VANARAJA)*

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Abstract

The present study was conducted on 24 birds divided into 2 groups the control and experimental. Experimental birds were given urea, dissolved in water 4.9% (wt/vol). Recorded observations revealed that at the end of 30th day the birds exhibited de feathering, dullness, and excreted bloody stools, reduced feed consumption and decrease in body weight. Carbamide has been found to produce damage at tissue level of *Gallus domesticus* leading to abnormalities in liver, kidney and intestine histology and there was not much change in controls.

Introduction

Indian Poultry industry has been growing at annual varying rates of 12 to 15% and this growth in the past few decades made India fifth largest producer of eggs and ninth largest producer of poultry. And people of A.P. Tamil Nadu and Maharashtra are relatively depending on animal protein in the form of chicken and meat. Hence poultry has become one of the major industries. But there are many reasons for its slow production out of which important reasons are infectious diseases and indiscriminate use of chemicals, drugs, in formulation of feed. Common feed additives are copper sulphate, carbamide, raw ingredients derived from crops and animal products, for example, Cereals, meal of different seeds, fish meat, urea, as non protein nitrogen substance. Although urea has been recognized as toxicant to poultry, but considerable evidence (Karasawa, 1989a, 1989b, Karasawa and Meada, 1992) have been developed in the recent years in favour of the fact that chicken are able to derive nutritional benefit from this compound.

Studies on utilization of non protein nitrogen by broiler chicks revealed controversial influence. But due to scant literature on histolopathological evidence available, an attempt has been made to study the histopathological aspects of chicken tissue expose to 4.9% of carbamide.

MATERIAL AND METHODS

Gallus domesticus (Vanaraja) of 6 weeks old weighing approximately 650g - 700g were obtained from a standard reputed poultry farm of Rajendranagar, Hyderabad A.P.India. 2 different groups of 12 chickens in each group were maintained as, group I control and group II as experimental exposed to 4.9% (w/v) carbamide/urea (dissolved in water) for 30 days. The birds were housed in deep litter system under laboratory condition in a controlled environment. The birds were kept at 30º±2ºC temperature and 50% relative humidity with perfect conditions of aeration and ventilation. The lighting arrangements were effectively maintained. To study the histological changes in liver, intestine and kidney, after stipulated period of exposure to carbamide/urea, tissues were dissected out from control and experimental birds and were fixed in biuon's fluid. The tissue samples were then processed routinely for paraffin embedding technique. Embedded tissues were sectioned at 6µ and stained with haematoxylin and eosin as per the method of Woods and Ellis (1994). The stained sections were examined under high power microscope and micro photographed (400x).

RESULTS AND DISCUSSION

Microscopic examination of tissues of *Gallus domesticus* exposed to carbamide exhibited alteration and the following observations were made. The Intestines of chick (Vanaraja) exposed to 4.9% carbamide showed variations in the histological structures. The intestine showed focal disquamation of the lyning in the epithelium. The congestion of intestinal mucosa was absorbed. The histology of the intestine of control showed normal mucosa, sub mucosa and mucosa muscularies along with serosa. On exposure to carbamide degeneration in the epithelium lining was observed. (Fig.1,2,3) The liver tissue of experimental chickens has undergone prominent changes in its structure. There was a slight congestion of the central vein and sinusoids. Hepatic cells showed degeneration and vacuolation.(Fig 5). The histology of the liver in the control chickens was perfect, with out any change in hepatocytes. (Fig.4) Histology of renal tissue showed tubular cell degeneration, necrosis and edema of interstitial tissue. (Fig. 6,7)

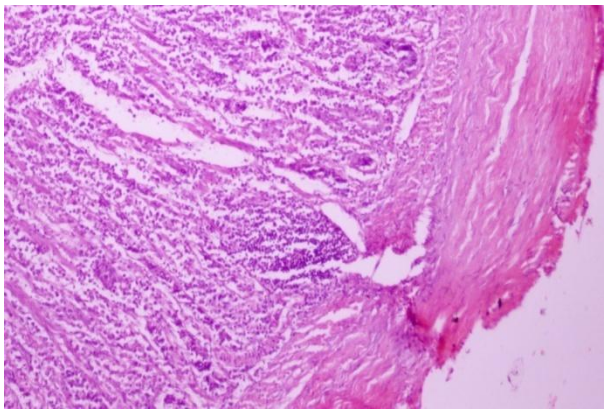

Fig.1. T. S. of Intestine of Control G.*domesticus.* H & E X 400

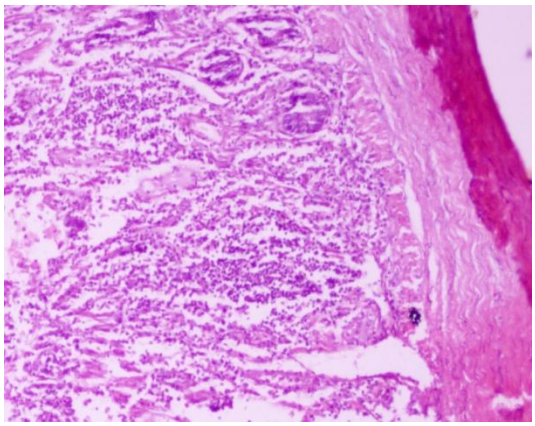

Fig. 2. T.S. of Intestine of G. *domesticus* Exposed to 4.9% carbamide for 30 days H & E X 400

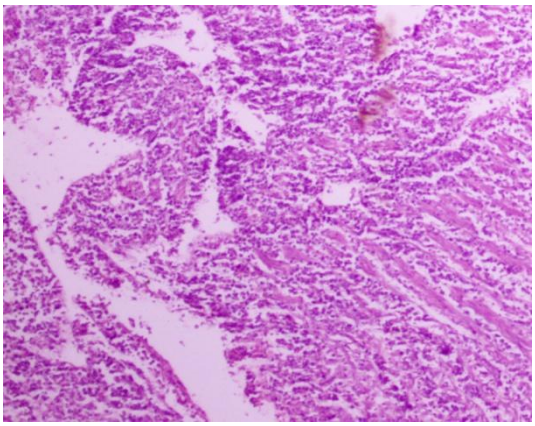

Fig.3. T.S. of Intestine showing villi of G.*domesticus* exposed to 4.9% carbamide for 30 days H & E X 400

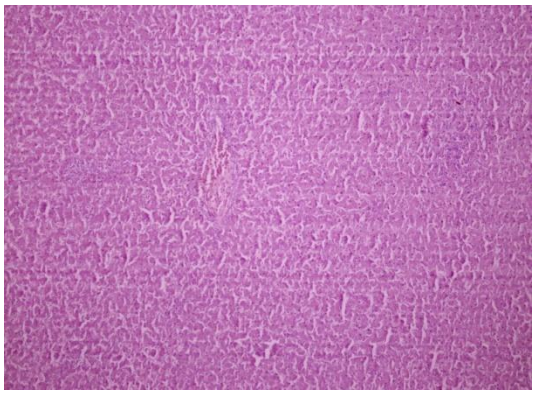

Fig.4.T.S. of Liver of control G. *domesticus* H & E X 400

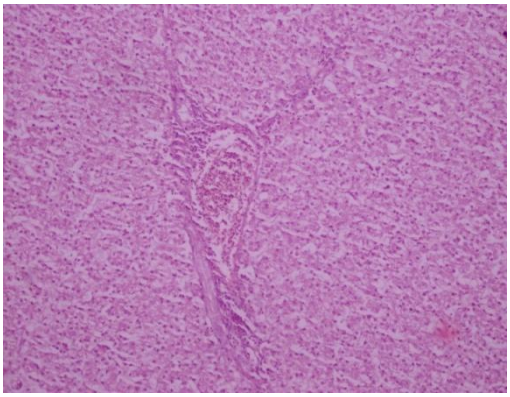

Fig.5. T.S. of Liver of G. *domesticus* exposed to 4.9% carbamide for 30 days. H & E X 400

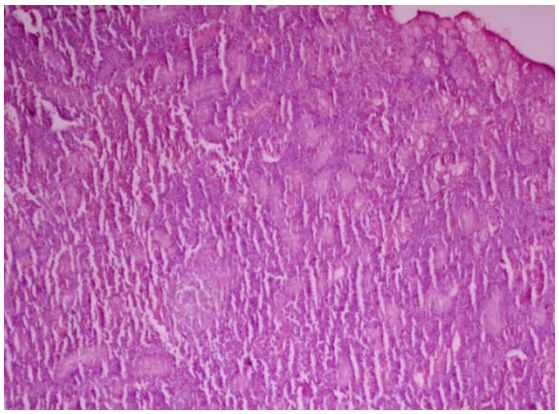

Fig. 6. T.S. of Kidney of control G. *domesticus* H & E X 400

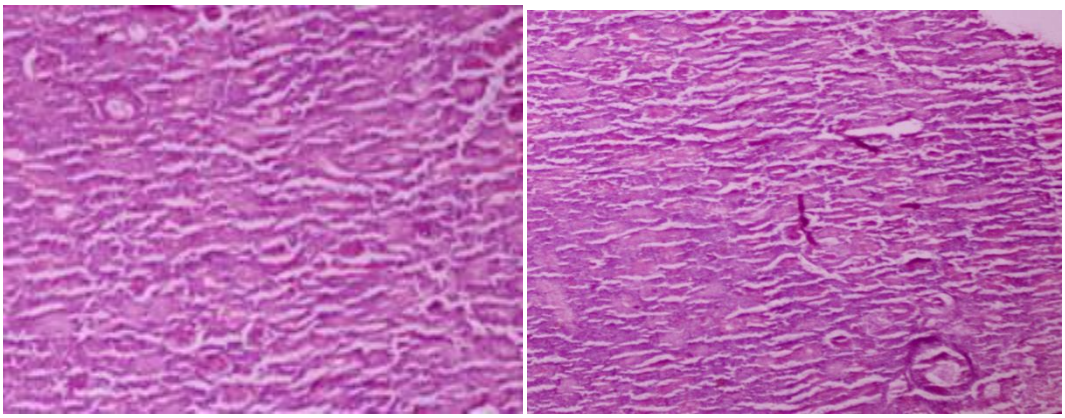

Fig.7. T.S. of Kidney of G.*domesticus* exposed to 4.9% carbamide for 30 days. H & E X 400

In the present study *Gallus domesticus* chickens were exposed 4.9% of urea dissolved in water, this was done to observe the deleterious effect of adulteration of feed by addition of urea. Birds in this study showed clinical signs of urea toxicity. It was observed there was decrease in body weight, feed intake, and more dullness. Similar reports were given by (Abdou et al., 2006. Pervaz et al.,1996. Chandra et al., 1984c, 1984b. Karasawa et al.,1992, 1988a,

1988b.) Noticeable histological changes were observed in liver, intestine and renal tissues. The magnitude of histo pathological changes occurred in liver tissues may be related to detoxification of carbamide. The changes in the SGOT, SGPT (unpublished work of Author) directly speaks on the efficiency of liver which is manifested in a distoration of its histology. Cell shrinkage followed by damage to connective tissue lead to the formation of large vacuolation. Changes in intestine could be due to denaturation of proteins by urea. This might have created empty spaces in mucosal and submucosal regions. The inflammatory responses could be due to increase in fundamental immunological responses towards carbamide toxicity. Similar pathological changes were observed in large animals intoxicated by urea. (Bartik and Piskac 1981). Urea poisoned ruminants showed pathological changes. (Itabisashi 1977) Abdou et.al (2006) reported similar changes in broiler chicks exposed to urea and showed degenerative and inflammatory changes in organ. According to (Chandra et al., 1984 and 1984c) increase in take of nitrogen may result in toxic degenerative changes in various tissues. The ammonia released in caecum due to the action of caecal urease on urea may be absorbed and circulated to liver leading to damaging effect of ammonia. The changes in renal tissue may be due to injurious effects of uric acid. The carbamide exposed chicken showed prominent changes in the renal tissues. The tubular degeneration shows that *Gallus domesticus* could not utilize urea.

Liver: The liver of *Gallus domesticus* exposed to carbamide has undergone prominent changes in structure. There was a slight congestion in central vein and sinusoids. The hepatic cells showed degeneration and vacuolation. The histology of liver in normal chickens were perfect with normal hepatosides and sinusoids containing RBC'S.
Kidney: Prominent pathological changes in a tissues may be due to increase levels of blood urea. Renal changes may be due to injurious effects of uric acid and ammonia production. Changes in glomerulous may be due to urea and ammonia filtration. The above data reveals the serious effects of urea when used as dietary protein. Addition of urea to poultry feeds to replace the more expensive protein nitrogen exhibits serious effects on health condition of birds at tissue level.

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