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RESEARCH ARTICLE

EFFECT OF GARLIC JUICE ON KIDNEY FUNCTION IN LAYER CHICKEN

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ABSTRACT

This investigation was designed to determine the effect of garlic juice on some kidney function parameters in layer chicken. Blood samples were collected via jugular vein from 20 animals before treatment with garlic juice for check urea, creatinine, uric acid, calcium ion, albumin and amylase in serum. The animals received garlic juice orally in dose (0.02ml/day) for 15 day and blood samples were collected for check the kidney function parameters which mentioned above. The result of this study revealed a significant decrease in all parameters which mentioned above with un significant decrease in serum urea concentration. These results may interpreted that garlic juice may increase glomeruler filtration rate GFR of nephrone and tubular secretion. The conclusion from this study that garlic juice increase kidney performance from the decrease in serum concentration of kidney function parameters.

INTRODUCTION

One of the most active research areas in recent years has focused on finding new feed additives that improving performance on animal (Aljafari *et al.,* 2009) either carcass and egg quality (Sheikh *et al.,* 2003) variety of herbal supplement including garlic have been widely used to maintain and improve health of human it has long been considered that garlic has several beneficial effect for human and animal exhibiting antimicrobial, antioxidant, antiviral, antifungal, anti parasitical and has positive effect on immune and digestive system (Jafari *et al.,* 2009). previous researches suggested that those functions are mainly attributed to the bioactive compound such as allin, diallysulphate and allicin. Allium sativum, commonly known as "'garlic'", is a species in the onion genus, "Allium". Its close relatives include the onion, shallot, leek, chive. Description: "Allium sativum" is a bulb|bulbous plant. It grows up to 0.6M in height. It produce hermaphrodite flowers. Pollination occurs by insects and bees. Garlic is easy to grow and can be grown year-round in mild climates. While sexual propagation of garlic is indeed possible, nearly all of the garlic in cultivation is propagated asexually, by planting individual cloves in the ground. In cold climates, cloves are planted in the fall, about six weeks before the soil freezes, and harvested in late spring. Medical value: Garlic is claimed to help prevent heart disease (including atherosclerosis, high cholesterol, and high blood pressure). garlic supplementation reduced accumulation of cholesterol on the vascular walls of animals Pharmaceutical importance of Allium sativum L. Hypolipemic effects in vitro and in vivo] Another study had similar results, with garlic supplementation significantly reducing aortic plaque deposits of cholesterol-fed rabbits. Effects of garlic extract supplementation on blood lipid and antioxidant parameters and atherosclerotic plaque formation process in cholesterol-fed rabbits garlic extract inhibited vascular calcification in human patients with high blood cholesterol blood lipid and oxidant/antioxidant parameters in humans with high blood cholesterol. The known vasodilative effect of garlic is possibly caused by catabolism of garlic-derived polysulfides to hydrogen sulfide in red blood cells (RBCs), a reaction that is dependent on reduced thiols in or on the RBC membrane. Hydrogen sulfide is an endogenous cardioprotective vascular cell-signaling molecule.Hydrogen sulfide mediates the vasoactivity of garlic (Ried *et al.,* 2008).

"Allium sativum" has been found to reduce platelet aggregation, Garlic is also alleged to help regulate blood glucose| levels. Regular and prolonged use of therapeutic amounts of aged garlic extracts lower blood homocysteine levels and has been shown to prevent some complications of diabetes mellitus. Garlic was used as an antiseptic to prevent gangrene during World War I and World War II. Garlic cloves are used as a remedy for infections (especially chest problems), digestive disorders, and fungal infections such as Candidiasis|thrush Garlic has been found to enhance thiamin absorption, and therefore reduces the likelihood for developing the thiamin deficiency beriberi. (Wang *et al.,* 2010) However, research about effect of garlic juice on kidney performance in layer chicken are insufficient with quit discrepancy, therefore the objective of this study was to evaluate the effect of garlic

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juice on kidney performance and to investigated that the outcome of this study will be used to make decision as to whether or not garlic can be used in layer chicken. Materials and Methods: animals: a total number of 20 layer chicken were used in this investigation, they were fed ordinary pellet diet, the animals were were housed in 4×3m2 at college of veterinary medicine at temperature 23-25C for 15 days. the light dark cycle were (12:12)hr and had free access to food and water. Prior the arrival of chicken the house was disinfected and chicken were weighted on arrival to obtain their initial weight 1400-1600 for determination of dose.

Preparation of garlic juice: the bulb of garlic were cleaned and homogenized by blender, the juice yelid 12ml from 500gram of garlic and the dosage calculated according to human dose. Experimental design: ten layer chicken received (0.02ml/day) of garlic juice for15 days orally by usage gavage needle. Blood sampling were obtained via jugular vein puncture from each layer chicken before treatment and at day 15 of treatment by disposable syringe and put in without anticoagulant tubes. Samples were centrifuged at 3000rpm for 15 min and serum sample were stored in -20 C, each supernatant serum was used for some biochemical kidney function tests such as urea, creatinine, uric acid, calcium ion, albumin and amylase enzyme. All these estimations were carried out to before treatment samples and day 15 of treatment by using spectrophotpmeter and diagnostic kits. Statistical analysis of data performed on T test (Steel and Torrie 1988).

RESULTS AND DISCUSSION

The effect of garlic juice (0.02ml/day) on kidney function in layer chicken.

Kidney function tests	Pretreatment	Postreatment
Urea	0.401±0.04 a	0.314±0.071 b
Creatinine	10.81±0.818 A	8.757±1.75 B
Uric acid	8.92±1.926 A	3.5±1.05 B
Calcium ion	56.908± 5.1 A	27.29±7.72 B
Amylase	666.72±1.79 A	545.105±2.01B
Albumin	7.117±0.66 A	4.424±0.319 B

mean±SE

Capital letters denote significant differences $p<0.05$.
Small letters denote unsignificant differences $p>0.05$.
Statistical analysis T-test.

Serum urea concentration showed un significant decrease $p>0.05$ in post treatment as compare to pretreatment. The kidney play important role in elimination and conservation of several chemical component of blood renal disease may alter these blood chemical values. These alteration are of consideration importance in therapy and prognosis of renal disease. (Guyton 2000) Urea is the chief end product of protein metabolism in the body, the importance of urea concentration in blood lies in its value as an indicator of kidney function .so the interpretation for the result may be due to the garlic juice increase renal extract of urea (Harper 2000). Serum creatinine: the result showed that garlic cause a significant decrease in post treatment as compare to pretreatment. Creatinine synthesis in the body at fairly constant rate from creatine, which is produced during muscle contraction from creatine phosphate, this may be attributed the garlic juice may increase renal perfusion and finally increase creatinine excretion with urine, or due to increase protein extraction for egg production lead to decrease creatinine concentration. (Guyton 2000; Harper 2000) Serum uric acid: at the 15 day of treatment the serum urea acid concentration decreased significantly $p<0.05$ in post treatment.

Uric acid is major product of catabolism of purine nucleoside (adenosine and quanosine) from purine metabolism pathway. Purine may be synthesis endogenously from the break dawn of nucleic acid or may be obtained from sources as diet. (Harper 2000) The decrease in its concentration in this study may be attributed either due to that garlic increase its excretion through kidney are due to decrease purine catabolism or decrease it absorption from gastrointestinal tract. (Suchint *et al.,* 2004) Serum calcium ion concentration:the effect of garlic juice for 15 day or calcium concentration which shown in table. In particular, there was marked decrease ($p<0.05$) in serum Ca concentration of post treatment as compare to pretreatment, thus the reduction of serum Ca ion concentration at day 15 of treatment can be due an increase in its extraction from circulation by oviduct for egg shell synthesis. (Rahman and Ankari 2006)

Serum amylase: the results explain that amylase concentration at day 15 of treatment decrease un significantly $p>0.05$ as compare to pretreatment.

Amylase is normally removed from plasma by renal excretion, in dog and cat serum amylase level may be increase with uremia, result may be attributed with caution ruling out any other possible cause of amylasemia so, in this study the garlic lead to un significant decrease in urea concentration so the amylase concentration shown un significant decrease this may attributed that garlic lead to increase urea excretion and promote renal function (probably by enhance the transport mechanism from blood to renal tubules.(Shehata 2011)

Serum albumin: the result in Table (3) explain that garlic treatment lead to significant decrease in serum albumin concentration at day 15 of treatment.

One of the most important serum protein produced by liver is albumin, total serum protein values are a reflection of renal disease; this result may be attributed that garlic lead to increase albumin extraction by oviduct for egg production. (Shehata 2011)

General renal disease in which there is sever protein urea may resulted I hypoalbumineamia but because of the renal function test recorded in this study show reduction in urea, creatinine and uric acid concentration this mean garlic lead to promote renal function and enhance the extraction for egg production. (Granner 2000)

Conclusion

1. The garlic juice increase renal performance through decrease urea, creatinine, uric acid and amylase serum concentration.
2. The garlic juice increase egg quality through decrease serum calcium and albumin concentration.

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