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Blood biochemical profile in carbohydrate metabolism in desi rabbit of Madhepura district of Bihar

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Abstract- The desi rabbit of Madhepura district was selected for biochemical study of the blood parameters. It was found that the total protein content of honey treated rabbits was found to be increased significantly as compared to control, suggesting anabolic effect of honey in rabbit. However no effect on sex was observed. There is highly significant effect of honey treatment is event as increased level of blood glucose was found which provide energy and non-significant effect on sex was observed. There is significant effect of honey on total cholesterol content among group's increases but non-significant effect on sex was observed. In total lipid content show non-significant effects on group but have significant effect on sex. There is non-significant effect of honey on serum phospholipids among group and sex.

Key words: Desi Rabbit, Biochemical blood parameters, carbohydrate metabolism

INTRODUCTION

India is a vast country. The rapid growth of the human population results in continued widening up the gap between demand and supply of the required quantity and quality of food. The problem of malnutrition resulting from food shortage is bound to grow more and more acute with the increase in the human population, to bridge the wide gap between large requirements and low animal protein availability. It is essential to improve and multiply all meat-producing animals in the country.

The rearing of domestic rabbits is an established micro livestock industry in many countries. In many European and Asiatic countries, rabbits are domesticated for meat. Broiler breeds of rabbits have also been introduced in India to explore its avenue as an alternative source of animal protein. The physiological responses of animals are almost crucial in a better understanding of environmental stress and adaptability, which will significantly enhance managerial capability.

Rabbit farming is a widespread livelihood practice across the country. This livestock industry is becoming popular in Bihar also due to its ease of business. Rabbits are best known for being prolific; these herbivores efficiently convert fodder to food. The motive behind meat production is to convert plant proteins of little use to people as food into high-value animal protein. Inefficient production systems, rabbits can turn 20 per cent of the proteins they eat into edible meat. Comparable figures for other species are 22 to 23 per cent for broiler chickens, 16 to 18 per cent for pigs and 8 to 12 per cent for beef.

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Rabbits are reared for their meat, but their hair and skin are also important. Their meat is rich in protein and can be part of a good diet. They have very little fat and are almost cholesterol-free. They are palatable, easily digestible, and consumed in any weather condition, making them a good source of nutrition.

The rabbit meat becomes more prevalent among people requiring less fat, cholesterol, and sodium. So it is not harmful to the heart patient. The cholesterol content of Rabbit meat is lower than other meat; it is suggested because of the inter-relationship between cholesterol, saturated and polyunsaturated fatty acid and caloric value.

The magnitude and trend of rabbit mortality in various seasons and age groups are vital for commercial rabbit farming. Proper nutrition is one of the essential aspects of broiler rabbit production. The protein and energy content of the diet plays a vital role in rabbit nutrition.

The information on biochemical blood profiles for cholesterol, lipid and protein in desi rabbits of Bihar is lacking. The present studies were made to see the effect on these parameters supplemental with antistress or immunomodulatory agent like honey on Rabbit, which will give an additional guide line for future planning or general health status of the Rabbit. Honey is a natural sweetish substance prepared by honey-bee from the nectar of flower contains majority (70-75%) of simple sugars as glucose and fructose, water (18-20%) small amount of sucrose (3-4%) and trace (1-2%) of vitamins, mineral, enzymes, acids and unknown factors including antibacterial effects. In addition, it serves as an instantaneous source of energy, vitamins and trace mineral.

Biochemical characterization of Rabbits in India or tribal belt will help better understand Rabbit in relation to growth, meat, fur and wool quality. In perspective, the present study was undertaken with 'active to assess the gross biochemical constituents including the enzymes of serum in control and honey treatment group and to characterize genetically in desi rabbits available in Madhepura through biochemical polymorphism study'.

MATERIALS & METHODS

Desi rabbits six each of either sex, were divided into two groups. One is honey treated group and the other is the control group. Group II had given 5% simple sugar level in drinking water. All the Rabbit were kept under uniform management practices till the end of the experiment. Blood samples were collected at the end of the investigation directly from Rabbit's heart with or without anticoagulants into a sterile test tube. Serum was harvested from whole blood and kept refrigerated until analyzed. Biochemical parameters were studied with the help of separated serum. Estimation of total blood glucose: The Nelson Somogyi method (1945) estimated blood glucose. 0.1 ml of blood in a test tube was taken, and 9.5 ml of zinc sulphate solution was added and mixed by rotation. Then alkaline copper reagent was mixed by tapping the top of the tube. It was covered with a marble. It was placed upright in a boiling water bath for 5 minutes. Then 1 ml arsenomolybdate coloring reagent was added and mixed, and then it was diluted to 10 ml with distilled water. A blank and standard was run simultaneously. Then absorbance was recorded at 540 nm in photoelectric colorimeter model AE-11 Japan.

Estimation of serum cholesterol: Total serum cholesterol in blood was estimated by method of Zlatkis, *et.al*. (1953)[1]. 0.1 ml serum sample was taken in a test tube. Glacial acetic acid 6.0 ml and coloring reagent 0.4 ml were added. The contents were mixed well. Simultaneously, 0.1 ml of water as blank and 0.1 ml of standard cholesterol solution 2 mg /ml were run similarly treated. Then tubes were allowed to cool at room temperature. The optical density was recorded at 540 nm in photoelectric colorimeter model AE-11 Japan.

Estimation of serum lipid: The total serum lipid estimation was done by using the method of Mandal (2002)[2]. 1 ml of serum was taken with 19 ml of chloroform:methanol (2:1 v/v) mixed well and allowed to stand overnight. The extract was filtered by using Watsman no.1, filter paper in 50 ml of conical flask. Filter paper with residue was cut into pieces and again transferred into 19 ml chloroform kept overnight. This procedure was repeated 3 times. The filtrate was combined with previous extract.

The extract was evaporated at 45^{o}C - 50^{o}C in Sand bath for breaking the volume of original lipid extract in chloroform:methanol:water (64:32:4 v/v) and evaporated to dryness in Sand bath at 45^{o}C - 50^{o}C. This step was repeated thrice and dried residue was dissolved in chloroform:methanol (2:1 v/v) and transferred to separating funnel for removing nonlipid impurities. The

lipid extract was layered with 1/ 5th volume of normal saline (0.9% NaCl) and mixed several times by gentle inversion. It was allowed to stand for 6 to 8 hours at room temperature. The lower chloroform layer was collected, evaporated to dryness in sand bath at 45°C-50°C and was repeated thrice. The extract was dissolved in known volume of chloroform. The total lipid extract were determined aluminium/stainless steel planchets and dried at 40°C - 50°C in an oven until constant weight were reached. Increased weight gives total serum lipid. Estimation of Phospholipids. The total phospholipid in the serum was estimated by method of Post and Sen (1967)[3]. An aliquot 0.1 of lipid extract was taken into micro kjeldahl flask and 0.4 ml of 60% perchlororic acid solution was added. It was digested directly on a sand bath for 20 minutes. Glass beads (2-3) were added to each flask to avoid bumping during digestion. The 0.1 ml of digested solution was taken in a tube and was added to 8 ml water. It was then mixed with 2.0 ml coloring reagent (1 part of 10% ascorbic acid and 6 part of 0.42%) was added. It was incubated in heated water bath at 37°C for 1 hour, after mixing absorbance was taken at 660 nm in colorimeter AE model Japan against H_2O. Which was expressed as Mg lecithin/ml blood data collected, different traits were analyzed as per the standard statistic techniques.[4-6]

RESULTS & DISCUSSION

Total serum protein content of treatment and control group of Rabbits are presented in Table 1. The analysis of variance of this data in presented in Table - 2. The result showed significant difference ($P < 0.01$) in total serum protein content between treatment and control group. The significantly higher value in treatment group was observed but non-significant differ between sexes were find such differences in protein content of serum was clearly evidenced.

The value of total blood glucose level of control and treatment groups of rabbits are summarized in Table - 3. The analysis of variance of this data is presented in Table-4. The finding indicated significant ($P < 0.01$) difference between groups. But no any changes between sexes were observed.

The total serum cholesterol levels of different groups of rabbit are summarized in Table-5. The analysis of variance of this data presented in Table - 6. The finding showed significant differences ($P < 0.01$) in total serum cholesterol level among treatment and control group and non significant between sexes. However increased trend was observed.

The total lipid level in serum of treatment and control groups are presented in Table - 7. The analysis of variance of this data presented in Table - 8. The presented findings showed no significant difference in total lipid level between control and treatment group. But significant ($P < 0.01$) difference found between male and female. Male showed higher value than female, such observation are clearly visible.

The total phospholipid content in serum is presented in Table 9. The analysis of variance of this data presented in Table - 10. The present findings showed non-significant difference between control and treatment group also did not showed difference between sexes. The decreased levels of total phospholipd are clearly visible.

Table-1: Showing the values* of total serum protein (gm %) of different groups of rabbit.

Group No.	Sex	Total serum protein	
		Sex	Group
Control	Male	5.44±0.134	5.15±0.184
	Female	4.82±0.167	
Treatment	Male	6.58±0.134	6.41±0.106
	Female	6.24±0.167	

* Value (Mean ± SE) bearing the same superscript did not differ significantly.

Table-2: Analysis of variance of the data presented in table 1 showing the effect of treatment and sex on total serum protein content in rabbit.

Source of Variation	d.f.	S.S.	M.S.S.	F
Between group	1	4.78	4.78	29.87**
Between Sex	1	0.75	0.75	4.7^{NS}
Error	9	1.45	0.16	

**- Significantly at 1% level ($P < 0.01$)
NS- Non significant

Table-3: Showing the values* of total blood glucose (mg %) of different groups of rabbit.

Group No.	Sex	Total serum protein	
		Sex	Group
Control	Male	139.3±7.86	142.38±10.89
	Female	145.4±4.24	
Treatment	Male	206.03±7.86	193.91±7.65
	Female	181.40±4.24s	

*Value (Mean ± SE) bearing the same superscript did not differ significantly.

Table-4: Analysis of variance of the data presented in table 3 showing the effect of treatment and sex on total glucose content in rabbit.

Source of Variation	d.f.	S.S.	M.S.S.	F
Between group	1	7967.05	7967.05	11.78**
Between Sex	1	248.43	248.43	0.36^{NS}
Error	9	6085.19	676.13	

**- Significantly at 1% level (P < 0.01)
NS- Non significant

Table-5: Showing the values* of total serum cholesterol (gm %) of different groups of rabbit.

Group No.	Sex	Total serum protein	
		Sex	Group
Control	Male	48.50±1.96	46.08±4.54
	Female	43.83±1.23	
Treatment	Male	65.16±1.96	59.75±2.6
	Female	54.33±1.23	

* Value (Mean ± SE) bearing the same superscript did not differ significantly.

Table-6: Analysis of variance of the data presented in table 5 showing the effect of treatment and sex on total serum cholesterol content in rabbit.

Source of Variation	d.f.	S.S.	M.S.S.	F
Between group	1	572.28	572.28	6.81**
Between Sex	1	233.12	233.12	2.77^{NS}
Error	9	755.51	83.94	

**- Significantly at 1% level (P < 0.01)
NS- Non significant

The total protein content of honey treated rabbits was found to be increased significantly as compared to control, suggesting anabolic effect of honey in rabbit. However no effect on sex was observed.

There is highly significant effect of honey treatment is event as increased level of blood glucose was found which provide energy and non-significant effect on sex was observed.

There is significant effect of honey on total cholesterol content among group's increases but non-significant effect on sex was observed. In total lipid content show non-significant effects on group but have significant effect on sex. There is non-significant effect of honey on serum phospholipid among group and sex. The anabolic effect of honey evident from present result is on protein, lipid and carbohydrate metabolism.

There are significant differences in the level of lactate dehydrogenase and succinic dehydrogenase among groups. LDH shows significant and SDH shows non-significant effect on sex, these observations indicating variation on glycolytic pathway. On the other hand effect of treatment as found on Kreb's cycle which provide the major source of energy to the animals.

The effect of treatment on ALT & AST were non-significant indicating no influence on protein atabolism only ALT value slightly increase between groups.

The effect of treatment evident on ATPase activity as well as alkaline phosphatase such inding suggested significant effect of honey on energy transfer process in rabbit. There is no significant differences were observed in biochemical haemoglobin polymorphism which suggested further details studies using different breeds.

REFERENCES

1. **Zlatkis, A; Zak, B. and Boyl, A.J. 1953.** A new method for determination of serum cholesterol. *J. Lab. Clin. Med.,* **41(3): 4**86-492.

2. **Mandal, S.; Bhowmik, M.K.; Roy. S.; Mukhopadhyay, S.K. and Chandra S. 2002.** Haematobiochemical changes of cutaneous acariosis in rabbits. *Indian J. Anim. Hlth.,* **41(2):** 95-98.

3. **Post, R. L. and Sen, A. K. 1967.** Sodium and potassium ATPase. Estrabrook, R. W. Eds. Academic Press, New York and London. *Methods in Enzymology.* **10:**762-768.

4. **Snedecor, G. W. and Cochran, W. G. 1989.** Statistical Methods, 8th ed., Ames, IA: Iowa State University Press.

5. **Bertorello, Alejandro and Aperia, Anita. 1989.** Regulation of sodium potassium ATpase activity in kidney proximal tubules : involvement of GTP binding proteins. *Am. J. Physiol.,* **256 (1 part 2) :** F57-F62. (Cited from Biol. Abstr., 989, **84 (8):** 88691).

6. **Bhat, Pran P. 1987.** Studies on biochemicla polymorphism of blood serum proteins and enzymes in Pashmina goats. *Indian J. Anim. Sci.*, **57 (6):** 598-600.