

# Thyroid Profile of New Zealand White rabbits on Feeding of Cabbage waste

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*Abstract*— The study was carried out to evaluate the effect of cabbage waste on thyroid profile of New Zealand White breed of Broiler Rabbits. Thirty weaned New Zealand White breed of rabbits aged between seven to eight weeks were randomized into 5 treatments with 6 replicates (one male and five females) in each. The treatments were concentrate (rabbit) feed with desmanthus (T1), concentrate with 50% cabbage and 50% desmanthus (T2), concentrate with 100% cabbage (T3), concentrate with 50% cabbage and 50% desmanthus with 100 µg per day per animal of iodine supplementation (T4), concentrate with cabbage and 100 µg per day per animal of iodine supplementation (T5). The iodine was provided as potassium iodide containing 76.9 per cent iodine. The iodine salt (130 µg per day) was mixed in the concentrate feed offered to each animal. The T<sub>3</sub> (ng/dl), T<sub>4</sub> (µg/dl) and TSH (IU/litre) in the T1, T2, T3, T4 and T5 groups were 39.09, 42.12, 38.23, 52.93 and 43.94; 1.27, 0.84, 0.56, 1.30 and 1.76; 0.19, 0.20, 0.21, 0.54 and 0.65, respectively. Supplementation of Iodine did not influence the serum thyroid profile in cabbage waste fed rabbits.

Key words : Broiler rabbits, thyroid profile, cabbage waste, *Desmanthus virgatus*, Iodine supplementation

## I. INTRODUCTION

Broiler rabbits are the alternate animal protein source for the developing countries like India because of its high prolificacy. Recent All India Livestock Population statistics showed that the rabbits population is increasing by 37.33 per cent compared to previous census on livestock though an overall reduction in livestock population of 3.33 per cent [1]. New Zealand breed rabbits are better suited to our wide varying Indian climatic condition. Most of the farmers involved in rabbit farming are landless labours feeding their rabbits with vegetable waste available at cheaper cost and throughout the year. Very few farmers are feeding their rabbits with concentrate mixture and cultivated fodders like Bajra Napier hybrid grass or *Desmanthus virgatus*. The vegetable waste predominantly consists of cabbage head and waste. In India it was estimated that 2.81 MT cabbage head and leaves are being wasted every year [2]. Since the cabbage waste contains glucosinolates, an antinutritional factor which affect the iodine uptake and thereby the thyroid function, influence the productive and reproductive performances, the present research work was carried out to study the effect of cabbage waste with

or without iodine supplementation on thyroid profile of rabbits.

## II. MATERIAL AND METHODS

### A. Animals and study place

The animals for the study were taken from Rabbit Breeding Unit of Post Graduate Research Institute in Animal Sciences, Kattupakkam, Tamilnadu.

The rabbits were maintained in cage system of rearing. The male and females were housed in individual Galvanised Iron cages with the dimension of 2' x 1.5' X 1.5' kept above 3 feet from the ground level. The side walls were constructed up to 1' height and above that 1" weld mesh was placed. Fresh air was circulated in the rabbit house by using exhaust fans.

Thirty weaned New Zealand White breed of rabbits aged between seven to eight weeks were randomized into 5 treatments with 6 replicates (one male and five females) in each. The treatments were concentrate (rabbit) feed with desmanthus (T1), concentrate with 50% cabbage and 50% desmanthus (T2), concentrate with 100% cabbage (T3), concentrate with 50% cabbage and 50% desmanthus with 100 µg per day per animal of iodine supplementation (T4), concentrate with cabbage and 100 µg per day per animal of iodine supplementation (T5). The iodine was provided as potassium iodide containing 76.9 per cent iodine. The iodine salt (130 µg per day) was mixed in the concentrate feed offered to each animal.

At the end of the growth trial, the blood was collected from the ear vein of all the six rabbits in a treatment. The blood was allowed to clot and serum was separated and estimated for thyroid profile (Triiodothyronine and thyroxine level) at Department of Veterinary Physiology, Veterinary College and Research Institute, Namakkal using commercial radioimmunoassay kit (Immunotech, Czech Republic).

The data collected were analyzed using statistical software package SPSS<sup>17</sup>.

## III. RESULTS AND DISCUSSION

The T<sub>3</sub>, T<sub>4</sub> and TSH levels were not influenced by feeding of cabbage waste or supplementation of iodine. The standard error of the mean was considerably higher in all the groups. The level of T<sub>3</sub> was higher in 50 per cent cabbage fed group compared to control and iodine supplementation increased the level by 10.8 ng dl<sup>-1</sup> (P>0.05). In 100 per cent, the three levels were nearer to control group and less than the 50 per cent group. Iodine supplementation improved the T<sub>3</sub>

level by  $5.7 \text{ ng dl}^{-1}$  over the unsupplemented group. The  $T_4$  was found to decline linearly at 50 and 100 per cent cabbage fed groups compared to control. Supplementation of iodine in 50 per cent cabbage fed group increased the  $T_4$  level ( $0.84 - 1.3 \text{ ng/ml}$  ( $P > 0.05$ )) over the unsupplemented group and nearer to the control ( $P > 0.05$ ). Iodine supplementation in 100 per cent cabbage fed group, the level of  $T_4$  increased from  $0.05 - 1.4 \mu\text{g dl}^{-1}$  and this value was higher than the control ( $1.2 \mu\text{g dl}^{-1}$ ). The TSH was not influenced by both the levels of cabbage feeding. However, iodine supplementation increased the TSH in 50 per cent cabbage waste fed group from 0.2 to 5.4 and in 100 per cent from 0.21 to 0.65. The level of  $T_3$  and  $T_4$  reported by [3] was found to be  $108 \text{ ng dl}^{-1}$  and  $38 \text{ ng ml}^{-1}$  for  $T_3$  and  $T_4$ , respectively and these values were widely varying from this study. The variation might be due to the difference in kits used. The present study was carried out with human  $T_3$ ,  $T_4$  and TSH kit. The overall mean glucosinolate intake in the rabbit at 50 and 100 per cent groups was 82.50 mg and 158.43 mg, respectively. This has not influenced the  $T_3$  or TSH level, but it had reduced the  $T_4$  level and this reduction was compensated efficiently by iodine supplementation. The specific response of iodine to only in  $T_4$  and lack of response in terms of performance in iodine supplemented group suggests that the iodine supplementation has not addressed the full effect of thyroid expression in animals. However, [4] and [5] reported that the iodine supplementation in glucosinolate fed animals increased the serum  $T_3$  and  $T_4$  concentration.

**Table 1: Thyroid weight of rabbits fed higher levels cabbage waste with/without iodine supplementation (Mean  $\pm$  SE)**

	Thyroid weight (mg)
Group - I	$136.80 \pm 4.41$
Group - II	$144.40 \pm 4.45$
Group - III	$141.20 \pm 9.06$
Group - IV	$147.80 \pm 10.31$
Group - V	$135.60 \pm 7.23$

**Table 2: Serum  $T_3$ ,  $T_4$  and TSH level in rabbit fed cabbage waste at higher levels with / without iodine supplementation (Mean  $\pm$  SE)**

	Group - I	Group - II	Group - III	Group - IV	Group - V
$T_3$ (ng/dl)	$39.09 \pm 3.84$	$42.12 \pm 4.37$	$38.23 \pm 6.41$	$52.93 \pm 9.55$	$43.94 \pm 9.39$
$T_4$ ( $\mu\text{g/dl}$ )	$1.27 \pm 0.28$	$0.84 \pm 0.19$	$0.56 \pm 0.18$	$1.30 \pm 0.26$	$1.76 \pm 0.35$

TSH (IU/litre)	$0.19 \pm 0.04$	$0.20 \pm 0.06$	$0.21 \pm 0.03$	$0.54 \pm 0.09$	$0.65 \pm 0.39$
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Each value is the mean of six observations

Group I - Concentrate + 100 % *Desmanthus virgatus* fed group

Group II - Concentrate + 50 % Cabbage + 50% *Desmanthus virgatus* fed group

Group III - Concentrate + 100 % Cabbage fed group

Group IV - Concentrate + 50 % Cabbage + 50% *Desmanthus virgatus* + 100  $\mu\text{g}$  Iodine supplemented group

Group V - Concentrate + 100 % Cabbage + 100  $\mu\text{g}$  Iodine supplemented group

#### IV. CONCLUSION

This study revealed that cabbage waste can be effectively fed as sole green roughage source without affecting the thyroid profile, replacing *Desmanthus virgatus* at 100 per cent levels. Iodine supplementation is not required while feeding cabbage waste which contains 365 mg/100 g of total glucosinolates.

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