

# Reproductive Performance 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 reproductive performance 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 age of successful mating was between 153 to 174 days and the number of matings per conception was not significantly different between treatments. The litter size (4.88 to 5.39) and litter weight (218.4 to 244.3 g) at birth, litter size at weaning (4.58 to 4.92), litter weight at weaning (2650 to 2799 g) and weight of the individual bunnies (564 to 578 g) were not statistically significant.

**Keywords-** rabbit, reproduction, cabbage waste feeding

## I. INTRODUCTION

Broiler rabbits are the alternate animal protein source for the developing countries like India because of its high prolificacy. 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 [1]. 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 reproductive performance 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.

During this trial the animals were allowed to mate within the treatment group. At the start of the experiment the females were mated with the males in the respective treatments, the animals which had been mated successfully were tested for pregnancy on 14<sup>th</sup> day of mating. The females which had not accepted the male were mated on subsequent days till they had successful mating. The successfully mated animals but failed to conceive at 14<sup>th</sup> day of mating was again mated.

### B. Data collection and statistical analysis

The data on age of first successful mating, confirmation of pregnancy and age of first kindling, number of kits born (litter size), litter weight at birth were recorded from 130 days of age to 400 days of age. The individual weight of bunnies at the time of weaning also recorded. The data collected were analyzed using statistical software package SPSS<sup>17</sup>.

## III. RESULTS AND DISCUSSION

The age of successful mating was between 153 to 174 days and the number of matings per conception was not significantly different between treatments.

The litter size (4.88 to 5.39) and litter weight (218.4 to 244.3 g) at birth, litter size at weaning (4.58 to 4.92), litter weight at weaning (2650 to 2799 g) and weight of the individual bunnies (564 to 578 g) were not statistically significant. The above results suggested that cabbage at 50 and 100 per cent or iodine supplementation did not affect the reproduction, foetal performance nor the subsequent performance in the pre-weaning period. This also indicated that the milk yield of the mother was not affected as comparable weight was observed in weaning phase; there

might not be any shortage of iodine in the mother's milk to cause any negative performance of the bunnies.

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

	Group – I	Group – II	Group – III	Group – IV	Group – V
Age at first mating (days)	162.60 $\pm$ 6.47 (5)	160.40 $\pm$ 9.34 (5)	173.20 $\pm$ 6.04 (5)	174.20 $\pm$ 9.49 (5)	153.20 $\pm$ 6.39 (5)
No. of mating per conception	1.40 $\pm$ 0.24 (17)	1.80 $\pm$ 0.37 (18)	1.20 $\pm$ 0.20 (17)	1.40 $\pm$ 0.24 (18)	1.48 $\pm$ 0.24 (18)
Litter size at birth	5.12 $\pm$ 0.29 (17)	5.39 $\pm$ 0.28 (18)	5.00 $\pm$ 0.26 (17)	4.88 $\pm$ 0.31 (18)	5.00 $\pm$ 0.33 (18)
Litter weight at birth (g)	244.35 $\pm$ 10.94 (17)	241.94 $\pm$ 10.52 (18)	219.93 $\pm$ 10.42 (17)	218.41 $\pm$ 10.75 (18)	218.59 $\pm$ 12.29 (18)
Birth weight (g)	48.47 <sup>a</sup> $\pm$ 0.95	45.87 <sup>b</sup> $\pm$ 0.77	44.20 <sup>b</sup> $\pm$ 0.74	45.28 <sup>b</sup> $\pm$ 0.98	44.38 <sup>b</sup> $\pm$ 0.98
Litter size at weaning	4.83 $\pm$ 0.27 (12)	4.92 $\pm$ 0.31 (12)	4.58 $\pm$ 0.31 (12)	4.75 $\pm$ 0.39 (12)	4.92 $\pm$ 0.34 (12)
Litter weight at weaning (g)	2740.1 $\pm$ 140.1 (12)	2777.1 $\pm$ 154.8 (12)	2650.8 $\pm$ 164.5 (12)	2743.6 $\pm$ 194.9 (12)	2799.6 $\pm$ 165.7 (12)
Weight at weaning (g)	576.86 $\pm$ 3.5 (57)	564.83 $\pm$ 3.1 (59)	578.36 $\pm$ 3.6 (55)	577.61 $\pm$ 3.7 (57)	569.42 $\pm$ 3.3 (59)

Mean bearing at least one common superscript within a row do not differ significantly (P<0.05)

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  $\mu$ g Iodine supplemented group

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

The glucosinolate intakes of 82.50 to 162.72 g d<sup>-1</sup> suggested that this level of glucosinolate did not affect the reproductive performance. Similarly, the total glucosinolates at 7.9 mg kg<sup>-1</sup> did not affect the foetal number, ovulation rate and embryonic mortality [2]. But this author observed weight loss of foetus. However, the authors [3], [4], [5] and [6] reported, in pregnant sows, high glucosinolate intake without iodine prolonged the pregnancy and caused still birth, survivability of the embryo and piglets were affected. In this study, the reproductive performances like age of first successful mating, litter size and litter weight not affected and comparable to *Desmanthus virgatus* feeding.

#### IV. CONCLUSION

This study revealed that cabbage waste can be effectively fed as sole green roughage source without affecting the reproductive performance, 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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