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EFFECT OF 2% FENUGREEK (*Trigonella foenum graecum* L.) SUPPLEMENTATION ON PERFORMANCE AND THE LACTATION CURVE OF RABBIT DOES

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ABSTRACT

The influence of adding the fenugreek (*Trigonella foenum graecum* L.) on the lactation curve was studied in the rabbits does (New-Zealand X Californian X local). Thirty does were randomly divided into three groups (n=10) considering live weight, parity. Two types of diets were used: A control group was fed a normal diet (C), while the treated groups (E_1 and E_2) received the diet (C) supplemented with 2% of fenugreek (E). The does of group E_1 consume the E diet and those of E_2 consume the diet E only during two weeks before weaning otherwise does eat diet (C). The groups were nursed until weaning at 35 days of age. Milk yield was measured daily until day 35 with separation of kits and weighing immediately before and after controlled sucking. Findings of induction of 2% fenugreek in diet establish that the mortality at the birth is lower than the control groups. It is observed especially in group E_1 that the weight of the rabbits before weaning is 58, 14g±9, 86; and the quantity of milk produced is significantly important ($p<0.05$) than the other groups with a peak of 237, 17g for the group E_1 and 163, 95g for the control group.

Keywords: rabbit does, fenugreek, lactation curve, reproductive performance.

INTRODUCTION

Growth of sucklings depends on the nursing capacity of their mothers. With improving doe's milk yield an appropriate milk supply for the kits can be ensured (Eiben *and al*., 2006). The lactation starts very quickly. The doe rabbit produces an average of 8kg of milk in 40 days. The doe rabbit gives to suckle once a day, normally early morning (Henaff and Jouve, 1988). This output is dependent on the number of kits at the birth and the practice of the adoption technique (Casado *et al.* 2006). Several herbs and spices are assumed to have beneficial effects on milk secretion (Eiben *et al.,* 2006). The active substances in fenugreek seed (*Trigonella fœnum grœcum* L.) are trigonelline, choline, vitamine C, galactomannan, steroid saponins and flavonoids. This condiment is used in a traditional Indian dish for pregnant and lactating women to stimulate appetite and boost milk production (Petit *and al*., 1995). Anathor properties of fenugreek seed are its hypoglycemic and hypocholesterolemic (Rao *et al*., 1996) anti-inflammatoric and antipyretic effects (Ahmadiani *and al*., 2001), antioxidant potential (Choudhary *et al*., 2001, McCarthy *et al*., 2001, Suja *et al*., 2002), stimulation of activities of pancreatic digestive enzymes and stimulation of the liver to produce and secrete bile acids (Platel *and al.,* 2001). In the previous study of Rashwan (1998) expressed by (Eiben *et al*., 2006), the inclusion of fenugreek seeds in a level of 12g/kg diet improved ($P<0.05$) the 1-21 days litter weight gain and reduced the pre-weaning mortality in New Zealand white rabbits.

The aim of this study was to determine the effects of 2% doses of fenugreek seeds diet supplement on the lactation performance of does.

MATERIAL AND METHODS

A total of 31500 tests of milk yield have been weighed, that corresponds with 90 births achieved on 30 rabbit mothers of breed "New-Zealand X Californian X local" made during 3 consecutive lactations. The middle age of the mothers is 7 months ± 11 days and their middleweight is 3734, 36 g ± 103, 82. They are inseminated naturally with males of local breed.

The rabbit does were randomly divided into three groups (n =10): Control (C), Experimental (E_1) and the Experimental (E_2).

The does were housed in wire-mesh breeding cages (61x48x30cm) under controlled conditions (15-24°C, 16L: 8D photoperiod).

In the control group (C) rabbit feed contains 15, 5% crude protein, 4% crude fat, 15, 5% crude fibre and 2600 kcal DE. In the treated group (E_1) rabbits received the (C) diet supplemented with 2% of fenugreek (*Trigonella fœnum grœcum* L.). In the treated group (E_2) rabbits received the (C) diet supplemented with 2% of fenugreek only for fifteen days before weaning kits otherwise they received diet (C). The seeds were purchased from Tunisia.

Fenugreek was added in the feed formula for the treated groups and was presented in the form of caps.

Milk yield was daily measured until weaning with separation of kits in addition to weighting the doe just before and after controlled suckling.

Kit mortality was recorded daily until weaning. Dead kits were not replaced. Doe's live weight, feed intake and litter weight were weekly measured. Feed and milk, conversion weight gain of kits and suckling mortality were calculated.

Statistically, analysis of variance was used to estimate the effect of treatment on curve of lactation with SPSS ver.13. The following model was used for each trait:

$Y_{ij} = \mu + R_i + L_j + (R*L)_{ij} + e_{ij}$

where

Y_{ij} = an observation, μ= overall mean, R_i = effect of i^{th} treatment (i= 1, 2 and 3), L_j = effect of the parity or age $(R*L)_{ij}$ = interaction between two parameters effect of the food and the parity or age and e_{ij} = random error.

RESULTS AND DISCUSSIONS

The statistical analysis of the effect of diet on the quantity of milk produced by mode showed a significant difference (P<0, 05) between the two experimental group and the control group. The studies showed that there is no significant difference in production of milk for the three groups during the first five days of breast feeding (P > 0, 05) moreover the 23rd day until the end of lactation the curves of lactation does of the E_1 and E_2 are superimposed. This can be with the same food mode presented at the two groups and the rhythm of reproduction.

The increase in quantity of milk produced especially to the level of the E_1 is due to the presence of the fenugreek in the experimental modes which amplifies the dairy output in the female. Thus the galactogene effect of the fenugreek is proven; indeed we recorded a peak of 237, 17g for the batch E_1 followed by 190, 62g for the E_2 and 163, 95g for the control group (Figure-1).

From the 23rd day; one observes a general fall of production of milk on the level of the three groups, this fall is abrupt and more remarkable for the does of the E_1 this is due on the one hand to the change of the feed behavior of the young rabbit which is from the 21st day begins by consumption of feed in addition to milk and on the other hand to a more significant production of milk for the does of this group.

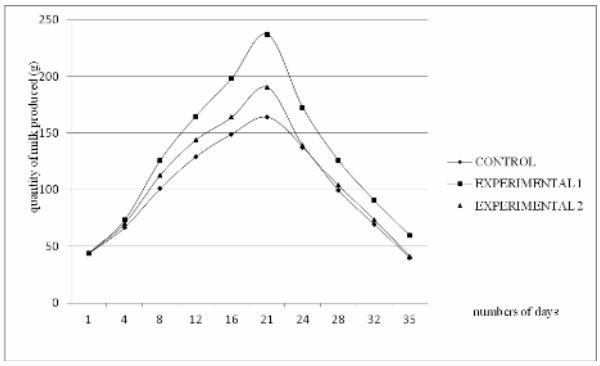

Figure-1. Evolution of the milk production according to the groups.

The age of the does influences the dairy production indeed the statistical study showed that these two parameters are strongly correlated (R^2 = 0, 85 for α = 0, 01). The curves of (Figures 2, 3 and 4) illustrate the variation of dairy production of the does according to the batches and the number of lactation carried out.

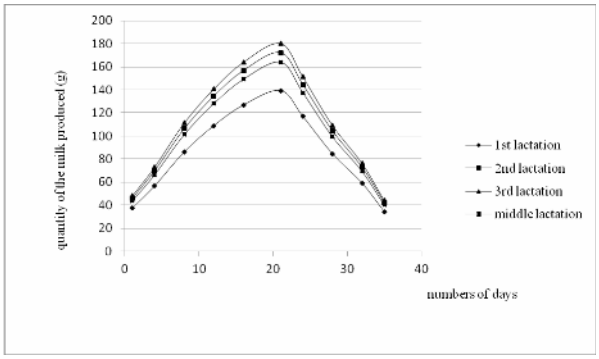

Figure-2. Variation of the milk production according to the number of lactation (C group).

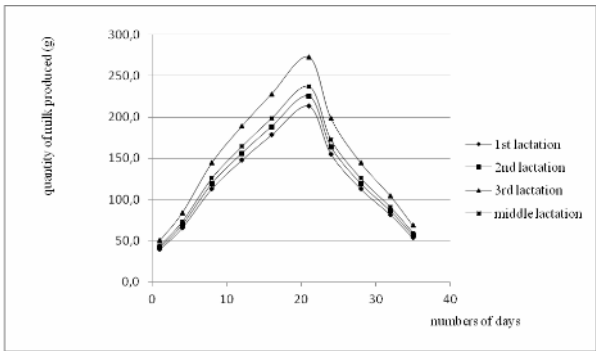

Figure-3. Variation of the milk production according to the number of lactation (E_1 group).

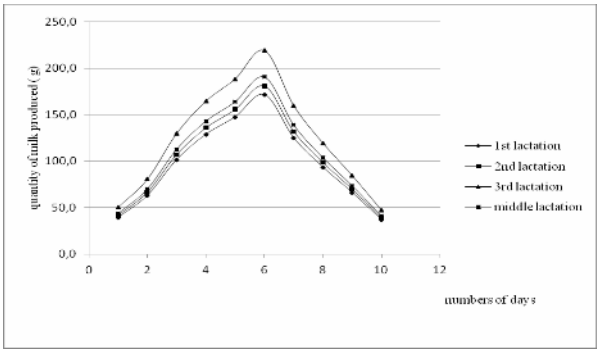

Figure-4. Variation of the milk production according to the number of lactation (E_2 group).

The statistical study proved that the measurement of the dairy productivity of the mothers and the quantity of milk consumed by the young rabbits are strongly correlated (R^2 = 0, 75 for α = 0.01).

It was noticed that the young rabbits of the C and the E_2 groups consume quantities of milk closer than the E_1 group. We find that the curves of the two experimental groups take the same form of milk consumption (Figure-5). The quantity of milk consumed by the young rabbits is lower than produced by the mothers. This is due to the fact that the young rabbits urinate immediately after the catch of milk.

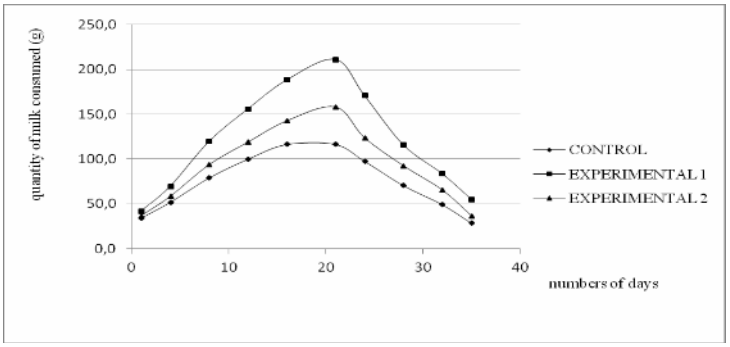

Figure-5. Evolution of the milk consumption according to the groups.

The middleweight of birth recorded on the groups C, E_1 and E_2 are: 49, 46g; 58, 14g and 41, 84g. These measurements are not affected by the feed mode, in spite of the superiority of the weight of the group E_1 while comparing it with the two other groups C and E_2. The variation of weight to the birth can be related to number of kids carried (Pascual *and al.*, 2000).

Table-1. Effect of the alimentation on the parameters of reproductions.

	Control « C »	**Experimental « E_1 »**	**Experimental « E_2 »**
Number of born alive	9, 22±2 [a]	8, 57±2 [a]	6, 33± 3 [b]
middleweight of birth (g)	49, 46±5, 14	58, 14±9, 86	41, 84±11, 61

[a, b]: the values of the same line followed by different letters are significantly different for $\alpha = 0.05$

CONCLUSIONS

The study of the incorporation of the fenugreek in the diet of the rabbit does reveal an improvement of the reproductive performances. Indeed the addition of 2% of fenugreek in normal diet has permitted to increase the weight of the young rabbits to the birth 58, 14g±9, 86 and to increase as well the dairy production of does with a peak of 237, 17g on 21st day of lactation.

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