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Effects of using local feed resources on milk performances of the Sicilo-Sarde ewes farmed in Northern Tunisia

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Abstract - This study aim to evaluate the effect of using local feed resources (Faba bean, Barley, White sorghum) as an alternative to imported resources (Soya bean, Corn) in the concentrates formulation for dairy sheep on the milk performances of sicilo-sarde dairy ewes during the suckling period (10 weeks). In the first experiment thirty ewes were divided into two homogenous groups for live weight (51.3 kg ± 5.7 vs 52 kg ± 5.4), the rank of lactation (2.4 ± 0.5 vs. 2.6 ± 0.8) and litter size (1.46 ± 0.9vs. 1.5 ± 0.5). Animals were lodged in similar boxes and received 1.5 kg/ewe/day of oat hay. Ration was complemented by 500 g of one of two concentrates. (i) The first concentrate contained 82.5 % barley, 13.5% soybean meal and 4% vitamin and mineral mixture (VMC) for the control group (CG) and (ii) a second concentrate that included 71.5 % barley, 17.5% Faba bean meal,7% Soybean meal and 4 % VMC for the experimental group (EG). In the second experiment a total of 20 ewes were divided into two homogenous groups for live weight (33.83 ± 5.63 vs33.95 ± 5.58 kg), the rank of lactation (4.3 ± 1.25 vs.4.6 ± 0.96) and litter size (1.1 ± 0.31vs 1.15 ± 0.4). Animals were lodged in similar boxes and received 1.5 kg DM /ewe/day of oat hay. Ration was complemented by one of two concentrates : (i) 500g/ewe/day of a concentrate that incuded 10 % barley, 43.3 % corn,25 % Wheat bran, 17,7 % soybean meal, 4% and mineral and vitamin mixture for the control group (CG) and (ii) a second concentrate that included 66% white sorghum, 30% Faba bean meal and 4% vitamin mixture for the experimental group (EG). Ewes remained on the experiment until 10 weeks post-partum. In each expériment results showed that daily milk yield was higher ($p< 0.05$) in ewes fed the EG concentrate than in those fed the CG supplement (1115 ± 383.7 ml vs 987 ± 281.7 ml) and (545 ± 183 ml vs 468 ± 148 ml) in the first and the second experiment, respectively. Likewise, milk fat content was higher ($p< 0.05$) for the EG ewe

group (5.67 ± 0.98 % vs 5.40 ± 1.04 %) and (7.58 ± 0.6 % vs 7.21 ± 0.4 %) in the first an second experiment, respectively. The protein content did not differ between the two groups (EG:5.59 ± 0.19 % and 6.04±0.57 % , CG: 5.58± 0.21% and 5.86 ± 0.54%). On the other hand, the amount of lactose was lower ($p < 0.05$) in the CG groups (3.80 ± 0.09 and 3.48 ± 0.21) than that in the EG groups (3.86 ± 0.08 and 3.61± 0.13). It is possible to replace Soybean and corn by Fababean and White sorghum in the Sicilo- Sarde ration without compromising either quality and milk production.

Key words : Barley / Ewes / Faba bean / dairy sheep / Sicilo-Sarde / Soybean / Milk yield / Milk quality / Milk performances / Suckling.

1. Introduction

The dairy ovine breeding in Tunisia is made up mainly by the Sicilo–Sarde herd, which is found, almost exclusively, in the north of the country, particularly, in the areas of Béja and Bizerte. This breeding knows a renewed interest on behalf of the breeders as technical and political authorities today. The female population of this breed has declined from 200,000 in 1990 to 14,000 in 2004.

These last years, the signs of a relaunching appeared these last years: increase of the price of the milk, a real craze of the Tunisian consumer for cheeses, programs of improvement of the genetic potential by means of the artificial insemination, a new organization of the producers in the healthy of the professional groups of the breeders (Moujahed, 2009). In this context , the performances of dairy production of the Sicilo–Sarde ewes depend largely on a targeted food requiring a food complementation especially during the period of gestation and suckling (Bocquier et Caja, 2001).In the last few years, the economic world conjuncture involved rising prices of soybean and corn meal (imported feed ressources). Therefore, the research for local feed ressources (Vicia faba, Barley, White Sorghum etc.) is compulsory.Several works were led by the team of Professor Rouissi (Tunisia) to test the effect of the incorporation of the local feed resources (Faba bean meal , Barely, White Sorghum) on the dairy performances of Sicilo-Sarde ewes. (Rouissi et al., 2008 ; Hammami et al., 2010 ; Selmi et al., 2010 ; Selmi et al., 2011 ; Karoui et al., 2011 ; Hammami et al., 2013). The objective of this study is to determine the effect of using local feed resources (Scotch beans, Barley, White sorghum) as an alternative to imported resources (Soya beans, Corn) in dairy ewes rations on the sicilo-sarde ewes milk during the suckling period.

2. Materials and methods

The study corresponds to two experiments, each carried out separately: the objectives of the first and second studies were to determine the effect of using local feed resources (Faba bean, Barley, White sorghum) as an alternative to imported resources (Soya bean, Corn) in the formulation of concentrates for dairy sheep on the milk performances of sicilo-sarde dairy ewes during the suckling period (10 weeks).

2.1. Experiment 1

A total of 30 ewes were divided into two groups homogenous for live weight (51.3 kg ± 5.7 vs 52 kg ± 5.4), the rank of lactation (2.4 ± 0.5 vs. 2.6 ± 0.8) and litter size (1.46 ± 0.9 vs 1.5 ± 0.5). Animals were lodged in similar boxes and in environmentally controlled sheepfold. After 2 weeks of adaptation, ewes received 1.5 kg /ewe/day of oat hay. Ration was complemented by 500 g of one of two concentrates. Centesimal composition (%) of concentrates of the Control (CG) and experimental (EG) groups are presented in Table 1. Ewes remained on the experiment until 10 weeks post-partum. Diets were iso-energetic and were given in restricted amounts according to the feed intake of the two groups.

2.2. Experiment 2

A total of 20 ewes were divided into two groups homogenous for live weight (33.83 ± 5.63± vs.33.95 ± 5.58 kg), the rank of lactation (4.3 ± 1.25 vs.4.6 ± 0.96) and litter size (1.1 ± 0.31vs 1.15 ± 0.4). Animals were lodged in similar boxes and received 1.5 kg DM /ewe/day of oat hay. Ration was complemented by one of two concentrates : i) 500g/ewe/day of a concentrate that incuded barely, corn,soya beans, wheat bran and mineral and vitamin mixture for the control group (CG) and ii) a second concentrate that included barely, white sorghum and vitamin mixture for the experimental group (EG). Ewes remained on the experiment until 10 weeks post-partum. Diets were iso-energetic.

Table 1 : Centesimal composition (%) of concentrates of the control (CG) and experimental (EG) groups

Ingredients (%)	C.G	E.G
Experiment 1		
Barley	82.5	71.5
Soybean meal	13.5	7
Faba bean meal	-	17.5
VMC	4	4
Experiment 2		
Barley	10	-
Corn	43.3	-
White sorghum	-	66
Wheat bran	25	-
Faba bean meal	-	30
Soybean meal	17.7	-
VMC	4	4

2.3. Milk yield and physico-chemical analyses

The ewes were milked by hand one time per day (at 2p.m). Ewe milk production and physico-chemical analyses were determined at seven - day intervals during eleven-week lactation period. For each group, the milk samples collected from the différent ewes were mixed an aliquot of 100 ml was taken to determined the différents parameters : fat, protein , non fat in dry matter and lactose by using Lactoscan (Milkotronic LTD, Serial n° 4696, Hungary).

3. Results and discusion

3.1. Milk yield

Avarage means and daily milk yield for ewes of the control (CG) and experimental (EG) groups are presented in Table 2. Daily milk production differed between ewe groups. In the first experiment total and test-day milk yields for groups (EG) were numerically higher than those for groups (CG) though the differences were not significant ($P > 0.05$). These results disagreed with those reported by Selmi et al. (2010). The slightly higher milk yield obseved for groups (EG) could be due to the fact that whole faba bean contains methionine and lysine taht are essential amino acids which stimulate milk secretion (Baldwin et al., 1993; Sevi et al., 2002). The low levels of dairy production observed to the ewes of the éssai 2 can be explained by the high content of the milk in fat but especially to the anomalies of conduct and accommodation of the animals which limited their potential of production.

Table 2 : Milk yield production of ewes by diets

Parameter	C.G	E.G	ES
Experiment 1			
Total milk yield (l)	67,16[a] (19.4)	75,21[a](31)	10.8
Test-day yield (ml)	987[a] (281.7)	1115[a] (383.7)	0.72
Experiment 2			
Total milk yield (l)	31.82 (13.5)	37.06 (15.6)	8.6
Test-day yield (ml)	468 (148)	545 (183)	0.68

3.2. Physico-chemical analyses

The results for fat, protein, non fat dry matter and lactose of sicilo-sarde ewe's milk of the two ewe's groups in each experiment showed that the composition and levels of some parameters differed between milk samples. Milk fat content was higher for the EG ewe group (5.67 vs 5.40) and (7.58 vs 7.21) in the first and second experiments, respectively. These results disagreed with those reported by Maâmouri et al.(2008). The highest values of the fat content of milk were observed with milks collected from ewes fed white sorghum and Faba bean meal. No significant difference of the two feeding systems in each experiment on the protein content of milk. An increase of lactose amount was observed of ewe's milk fed white sorghum and Faba bean meal.

Table 3: Quality of milk by ewes fed control (CG) and experimental (EG) concentrates.

Parameter	C.G	E.G	ES
Experiment 1			
Fat (%)	5.40 (1.04)	5.67 (0.98)	0.187
Protein (%)	5.58 (0.21)	5.59 (0.19)	0.025
SNF (%)	10.39 (0.31)	10.36 (0.24)	0.045
Lactose (%)	3.80 (0.09)	3.86 (0.08)	0.025
Experiment 2			
Fat (%)	7.21 (0.4)	7.58 (0.6)	0.165
Protein (%)	5.86 (0.54)	6.04 (0.57)	0.033
SNF (%)	11.04 (0.18)	11.37 (0.2)	0.042
Lactose (%)	4.15 (0.5)	4. 27(0.43)	0.027

4. Conclusion

This study showed that daily milk yield was higher ($p< 0.05$) in ewes fed the EG concentrate than in those fed the CG supplement (1115 ± 383.7 ml vs 987 ± 281.7 ml) and (545 ± 183 ml vs 468 ± 148 ml) in the first and the second experiment, respectively. Milk fat content was higher ($p< 0.05$) for the EG ewe group (5.67 ± 0.98 % vs 5.40 ± 1.04 %) and (7.58 ± 0.6 % vs 7.21 ± 0.4 %) in the first and second experiment, respectively. There is no difference for protein content between the two groups (EG:5.59 ± 0.19 % and 6.04±0.57 % , CG: 5.58± 0.21% and 5.86 ± 0.54%). Lactose content was lower ($p < 0.05$) in the CG groups (3.80 ± 0.09 and 3.48 ± 0.21) than that in the EG groups (3.86 ± 0.08 and 3.61± 0.13). It is possible to replace Soybean and corn by Fababean and White sorghum in the Sicilo- Sarde ration without compromising either quality and milk production.

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