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## LIST OF ABBREVIATIONS

|                   |                                    |
|-------------------|------------------------------------|
| A                 | : Albumin                          |
| AI                | : Artificial insemination          |
| ALT               | : Alanine aminotransferase         |
| AST               | : Aspartate aminotransferase       |
| BCS               | : Body condition score             |
| BW                | : Body weight                      |
| Ca <sup>++</sup>  | : Calcium ion                      |
| Cho               | : Cholesterol                      |
| CL                | : Corpus luteum                    |
| CSFA              | : Calcium soaps of fatty acid      |
| d                 | : Day                              |
| d.f.              | : Degree of freedom                |
| DIM               | : Days in milk                     |
| DM                | : Dry matter                       |
| FCM               | : Fat corrected milk               |
| G                 | : Globulin                         |
| g                 | : Gram (10 <sup>-3</sup> kilogram) |
| GL                | : Glucose                          |
| GR                | : Growth rate                      |
| h                 | : Head                             |
| Hb                | : Hemoglobin concentration         |
| HD                | : High dose                        |
| HDL               | : High density lipoprotein         |
| Hypo              | : Hypothalamus                     |
| IGF-1             | : Insulin-like growth factor-1     |
| LD                | : Low dose                         |
| LDL               | : Low density lipoprotein          |
| LH                | : Luteinizing hormone              |
| M.S               | : Mean square                      |
| MP                | : Megalac plus                     |
| MPG               | : Megapro gold                     |
| No.               | : Number                           |
| P <sub>4</sub>    | : Progesterone hormone             |
| PCV               | : Packed cell volume               |
| PGF <sub>2α</sub> | : Prostaglandin hormone            |
| PR                | : Pulse rate                       |
| PUFA              | : Polyunsaturated fatty acid       |
| RBCs              | : Red blood cells                  |
| RH                | : Relative humidity                |
| RR                | : Respiration rate                 |
| RT                | : Rectal temperature               |
| S.P.C             | : Service per conception           |
| SE                | : Stander error                    |
| SEM               | : Stander error of mean            |
| ST                | : Skin temperature                 |
| T                 | : Treatment                        |
| T <sub>3</sub>    | : Triiodothyronine hormone         |
| Temp.             | : Temperature                      |

|      |                                |
|------|--------------------------------|
| TG   | : Triglycerides                |
| TP   | : Total protein                |
| VLDL | : Very low density lipoprotein |
| W    | : Weeks                        |
| WBCs | : White blood cells            |
| WT   | : Wool temperature             |
| WW   | : Weaning weight               |

## VII.SUMMARY

The objectives of the present study were to improve the productive and reproductive performance of Barki ewes using fat supplements of calcium soaps of poly- unsaturated fatty acids (CSFA).The study was carried out at Borg El-Arab Research Station, Animal Production Research Institute, Agricultural Research Center, Ministry of Agriculture, Dokki, Egypt, in cooperation with the Department of Animal Production, Faculty of Agriculture, Alexandria University. Sixty mature Barki ewes aging 3-4 years and weighing between 42- 44 kg were used. The animals were randomly divided into two groups of thirty animals each. The first group was used during the period from December 2005 till August 2006, while the second group was used during the period from April 2006 till January 2007. Each animal group was divided into three subgroups of ten animals each as follows: control group received no supplementation, the second and the third groups received 50 and 75g CSFA/head/day respectively. Diet supplemented with (CSFA) was started one month before mating period in which fertile rams were introduced to each ewe group for 45 days; the rams were fitted with dye markers to detect ewes exhibiting estrus. Two blood samples were collected biweekly from the jugular vein of each ewe during pregnancy and lactation periods. The following parameters were measured biweekly in all experimental animals starting from the day after introducing the ram to each group during the experimental period which extended throughout pregnancy and lactation till weaning, including reproductive performance, body reaction data and blood serum analyses. Results obtained can be summarized as follow:

- 1- The reproductive performance parameters including number of services per conception, gestation length, conception rate, lambing rate, pregnancy rate and prolificacy of Barki ewes were not affected significantly using diet supplemented with CSAF in winter.
- 2- Values of body weight of dams were not significantly affected either dose of CSFA compared to control group. However, body weight was affected ( $p<0.01$ ) by weeks throughout pregnancy period, where it recorded the lowest value at the third week of pregnancy and the highest value at the end of pregnancy.
- 3- Diet supplemented with CSFA induced significant ( $p<0.05$ ) effect on skin and rectal temperatures and on respiration rate, while wool temperature and pulse rate were not greatly affected. Furthermore all body reactions were affected ( $p<0.05$ ) throughout weeks of pregnancy.
- 4- Diet supplementation with (CSFA) caused significant ( $p<0.05$ ) increase in both (RBC) and (WBC) counts, but (Hb) and (PCV) were not significantly affected. Values of (Hb, RBC's, and WBC's) but not PCV were significantly ( $p<0.01$ ) changed during weeks of pregnancy.
- 5- Both low and high doses (50 and 75g/head/day) of (CSFA) induced significant ( $p<0.05$ ) increases in serum concentration of (TP) compared to the control group. Other parameters including albumin, globulin and glucose were not affected by this treatment. As pregnancy progressed

- serum concentrations of (TP), albumin, globulin and glucose were changed significantly ( $p < 0.05$ ) but in different manners.
- 6- Serum concentrations of triglycerides, cholesterol, HDL, LDL and VLDL were increased ( $p < 0.05$ ) using diet supplemented with both concentrations of CSFA compared to the control group and the effect was dose- dependent. Values of triglycerides and VLDL tended to increase ( $p < 0.01$ ) as pregnancy progressed, while other parameters were not affected.
  - 7- Serum concentrations of liver enzymes were increased significantly ( $p < 0.05$ ) with both doses of CSFA compared to the control group. AST activity showed similar response to both doses of CSFA, but serum ALT activity responded to CSFA in a dose- dependent manner. As pregnancy progressed serum concentrations of (AST and ALT) increased significantly ( $p < 0.05$ ) recording lower values throughout the first nine weeks of pregnancy and tended to increase to record the highest values at the last week of pregnancy.
  - 8- Serum concentration of calcium was increased significantly ( $p < 0.05$ ) using diet supplemented with the high dose of CSFA (75g/head/day) compared to the control group, while the effect of the low dose was not significant. As pregnancy progressed serum concentration of calcium decreased ( $p < 0.05$ ) to record the lowest value at the last week of pregnancy.
  - 9- The two doses of CSFA did not affect serum concentrations of either  $P_4$  or  $T_3$ . However, blood serum concentration of ( $P_4$ ) tended to increase significantly ( $p < 0.01$ ) as pregnancy progressed until parturition then decreased. Blood serum concentration of ( $T_3$ ) showed an opposite trend, where it tended to decrease ( $p < 0.01$ ) until parturition.
  - 10- Diet supplemented with 50 or 75g/head/day of CSFA did not affect either milk yield or fat yield compared to the control group. During lactation period milk yield increased significantly ( $p < 0.05$ ) to record higher values between weeks (3 and 4) of lactation, then it tended to decrease to the lowest value at the last week of lactation (week 9). On the other hand, fat yield was not affected by lactation period.
  - 11- Supplementation with 50 or 75g/head/day of CSFA did not affect milk composition. However, milk components were affected significantly ( $p < 0.05$ ) throughout lactation period but in different manners. Milk total solids, protein and lactose tended to decrease throughout lactation period, while milk fat decreased during the peak of lactation (weeks 3 to 5) then increased significantly ( $p < 0.05$ ) to record higher values during late lactation.
  - 12- Supplementation with (50g/head/day) of CSFA resulted in significant ( $p < 0.05$ ) decrease in the overall mean of body weight of lambs, but both low and high doses did not affect growth rate. The lowest values

- of body weight were recorded at the first week of lactation (birth weight), then body weights increased progressively to reach the highest values at the last week of lactation (weaning weight). On the other hand, growth rate increased to reach the highest values at weeks (3 to5) of lactation, then it decreased significantly ( $p<0.05$ ) towards the end of lactation to record the lowest value at weaning weight (week 11).
- 13- Body weight of dams was insignificantly affected by CSFA supplementation and stage of lactation.
  - 14- Wool, skin and rectal temperatures and pulse rate of dams were not significantly affected by both doses of CSFA, while respiration rate was significantly ( $p<0.05$ ) increased by the low dose of CSFA. As lactation progressed all body reactions data (wool, skin, rectal temperatures and respiration rate) tended to increase significantly ( $p<0.01$ ) towards the end of lactation period, while pulse rate which was not significantly affected.
  - 15- CSFA treatment increased significantly ( $p<0.01$ ) RBC counts in a dose-dependent manner, while other hematological parameters were not affected. Weeks of lactation showed significant ( $p<0.05$ ) effects on Hb concentration ( $p<0.01$ ) and WBC counts ( $p<0.05$ ). Hb concentration tended to increase as lactation period progressed then decreased at the last week of lactation, while WBC's revealed an opposite trend. The changes in the values of RBC's and PCV during lactation were negligible.
  - 16- Treatment with the high dose of CSFA significantly ( $p<0.05$ ) increased serum concentration of total protein, while other serum proteins were not significantly affected. Serum glucose concentration was insignificantly affected by CSFA, however it tended to increase due to the treatment in a dose-dependent manner. Serum total protein tended to increase ( $p<0.05$ ) as lactation advanced. The effect of weeks of lactation on blood serum concentration of glucose revealed that its concentration reached the highest values at week three (peak of lactation) then tended to decrease significantly ( $p<0.05$ ).
  - 17- Diet supplemented with low and high doses of CSFA resulted in significant increases in blood serum concentrations of triglycerides, cholesterol, HDL, VLDL ( $p<0.01$ ) and LDL ( $p<0.05$ ) compared to control. However, the two CSFA doses showed no significant differences in the effects on all these parameters. Serum concentration of LDL tended to increase significantly ( $p<0.05$ ) as lactation progressed, while other parameters were not significantly affected during lactation period.
  - 18- Serum concentrations of AST were significantly increased ( $p<0.01$ ) by CSFA treatment in a dose-dependent manner compared to control. Serum concentration of (ALT) was increased ( $p<0.05$ ) by (CSFA) treatment, but the effects of the two doses on ALT activity were not

statistically different. Serum concentration of (ALT) tended to decrease significantly towards the end of lactation, while (AST) was not affected.

- 19- Neither treatment nor weeks of lactation affected significantly serum concentration of calcium. However, the animals supplemented with CSFA had higher values of serum calcium.
- 20- Using diet supplemented with CSFA revealed pronounced improvement in the reproductive performance of Barki ewes during summer. This improvement was expressed as 46.7% and 33.3% reduction in number of services per conception using (50 and 75g/head/day of CSFA, respectively) compared to control. Furthermore, this improvement was reflected on the superior increment in conception rate, lambing rate and pregnancy rate for the group treated with CSFA (50g/head/day) which recorded four times increment in these parameters compared to both of control group and the (75g/head/day)- treated group. On the other hand prolificacy rate was not affected using (CSFA).