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Arabic summary

Summary

This study was carried out at International Livestock Management Training Center (ILMTC) Sakha, which belong to Animal Production Research Institute, Ministry of Agriculture in cooperation with Department of Animal Production, Faculty of Agriculture, Kafr El-Sheikh, Tanta University.

The present work aimed to study the effect of selenium and vitamin E supplementation and season on physical, bio-chemical semen characteristics and fertility of buffalo bulls semen. Nine sexually matured buffalo bulls had bad semen, 2-5 years age and average body weight 400-500 kg were used in this study. They were divided into equal three groups 3 animal each, the average age and body weight were nearly similar in all groups. Each group was allocated and received supplemented as follows:

Group1: bulls were injected with 10 mg selenium as sodium selenite/bull twice weekly.

Group2: bulls were received orally 100 I.U. of vitamin E as α tochoferol /bull twice weekly.

Group3: bulls were injected with 10mg selenium and supplemented with orally 100 I.U. of vitamin E /bull twice weekly.

Bulls in all groups were left without any supplementation for one month at the start and this pretreatment period which served as control for the subsequent treatments, the bull treated for three months (during treatment) and post-treatment period which lasted one month after stopping the treatments in summer and winter seasons.

Semen was collected twice weekly from all animals by artificial vagina during the period from May to September, 2002 and from November to March, 2003. All collected samples were tested for physical characters such as (ejaculate volume, sperm motility% , sperm concentration, abnormal sperm%, individual motility%, acrosome integrity%, sperm output and live sperm percentage of fresh semen and progressive sperm motility and live sperm percentage of post-thaw semen after one

day, 30 days and 90 days of storage in liquid nitrogen). Also, all samples were biochemical tested such as (fructose concentration, cholesterol concentration, total protein, GOT , GPT concentration and selenium concentration of seminal plasma). Blood samples were collected biweekly to determine testosterone level and selenium concentration of blood serum.

The results of the present study can be summarized as follows:

1- Reaction time significantly differed ($P<0.05$) among the treated groups, also among treatment period (pretreatment, in the treatment period and post-treatment) the shorter reaction time was observed during treatment. The difference between seasons was not significant, it was 60.8 and 56.6 seconds for summer and winter seasons, respectively.

2- The average of seminal volume in the bulls treated with vitamin E was significantly larger ($P<0.05$) (2.9 ml) when compared to selenium group (2.4 ml) or selenium plus vitamin E (2.75 ml). Differences among treatment periods (pretreatment, during treatment and post-treatment) were highly significant. The larger seminal volume was noticed in the treatment period. Season had a significant effect of seminal volume ($P<0.01$) and the highest volume was collect in winter season (2.9 ml) versus (2.5) ml in summer season.

3- The percentages of mass sperm motility were 57.0, 59.9 and 60.1% for selenium, vitamin E and selenium plus vitamin E groups, respectively. The differences among treated groups were not significant. Differences among treatment periods were highly significant. The highest motility was found in the treatment period. Season had no significant affect on mass sperm motility and the higher sperm motility percentage was recorded in winter season (59.5 %) and the lowest (58.4%) in the summer season.

4- The percentages of individual sperm motility of buffalo bulls did not differ significantly among the experimental groups, while the differences among treatment periods were highly significant. A higher sperm motility was obtained in the treatment period as compared to the pretreatment or the post-treatment periods.

Season had no significant affect on individual sperm motility percentage, and the higher progressive sperm motility was noticed during winter season (67.2%) versus (65%) during summer season.

5- Sperm cell concentration did not significantly differed among the experimental groups, but it was significantly among treatment periods, a higher sperm concentration was obtained in the treatment period. The differences between seasons did not significant.

6- Spermatogenic output did not significantly differed among the experimental groups, the highest sperm output was recorded in the group treated with vitamin E (3.58×10^9) followed by selenium plus vitamin E group (3.43×10^9) and selenium group (3.15×10^9). But it was significantly among treatment periods, a higher sperm output was found during the treatment period. Season had a significant ($P < 0.01$) effect on sperm output and the higher sperm output was observed during winter season (3.75×10^9) versus (3.02×10^9) during summer season.

7- Live sperm percentage among treated groups did not differ, the highest % of live sperm was in the bulls treated with selenium plus vitamin E (68.4%) followed by vitamin E and selenium groups (67.9% and 67.1%), respectively. Also the differences were significantly ($P < 0.01$) higher among treatment periods, a higher live sperm percentage was noticed in the treatment period. Season had no significant effect on live sperm percentage.

8- Percentage of abnormal sperm did not significantly differed among the experimental groups, but it differed significantly among the treatment periods ($P < 0.01$), and lowest abnormal sperm was found in the treatment periods. There were a higher significant ($P < 0.01$) differences between two seasons on sperm abnormalities. It was 12.3 and 11.8% for summer and winter seasons, respectively.

9- Acrosome integrity percentage did not significantly differed among the experimental groups, but the differences were highly significant ($P < 0.01$) among treatment periods, a highest acrosome integrity was observed during the treatment period. Season had a significant effect ($P < 0.01$) on acrosome integrity and higher

acrosome integrity was observed during winter season (92.9%) versus (90.4%) during summer season.

10- The overall means of glutamic oxaloacetic transaminase (GOT) concentration in seminal plasma were 68.6, 53.1 and 55.3 U/L for selenium, vitamin E and selenium plus vitamin E groups, respectively. Differences among treated groups were ($P<0.05$) significant. Also, the differences were highly significant ($P<0.01$) among the treatment periods, a lowest GOT concentration was noticed during treatment. Season had a significant effect ($P<0.01$) on GOT in seminal plasma, and higher GOT was observed during summer season (61.8 U/L) versus (56.2 U/L) during winter season.

11- The overall means of glutamic pyruvic transaminase (GPT) concentration in seminal plasma were 25.3, 25.4 and 24.3 U/L for selenium, vitamin E and selenium plus vitamin E groups, respectively. Differences among treated groups did not significant while the differences were highly ($P<0.01$) significant among treatment periods, the lowest GPT concentration was during treatment. Season had a significant effect ($P<0.01$) on GPT in seminal plasma, a higher GPT was observed during summer season (26.2 U/L) versus (23.8 U/L) during winter season.

12- The overall means of fructose concentrations (mg/100 ml) in seminal plasma were 331.9, 316.7 and 337.5 (mg/100ml) for selenium, vitamin E and selenium plus vitamin E groups, respectively. Differences among treated groups were significant ($P<0.05$) also, the differences were highly ($P<0.01$) significant among treatment periods, the highest value of fructose concentration was found during treatment. Season had a significant effect ($P<0.01$) on fructose concentration in seminal plasma, a higher value was observed during winter season (346.2 mg/100ml) versus (311.1 mg/100ml) during summer season.

13- The overall means of total protein in seminal plasma were 3.7, 3.3 and 3.4 (gm%) for selenium, vitamin E and selenium plus vitamin E groups, respectively. Differences among treated groups were significant ($P<0.05$). While, the differences were highly significant ($P<0.01$) among treatment periods, the highest value of total protein was observed during treatment. Season had no significant effect on total

protein in seminal plasma, a higher value was observed during winter season (3.5 gm%) versus (3.4 gm%) during summer season.

14- The overall means of cholesterol concentration in seminal plasma were 61.1, 54.2 and 59.3 (mg/dl) for selenium, vitamin E and selenium plus vitamin E groups, respectively. Differences among treated groups were not significant. While the differences were highly significant ($P<0.01$) among treatment periods, the highest value of cholesterol concentration was observed during treatment. Season had a significant effect ($P<0.01$) on cholesterol concentration in seminal plasma, a higher value was observed during winter season (64.9 mg/dl) versus (51.4 mg/dl) during summer season.

15- The overall means of testosterone concentration in blood serum of bulls were 0.63, 0.58 and 0.71 (ng/ml) for selenium, vitamin E and selenium plus vitamin E groups, respectively, differences among treated groups were not significant. While, the differences were highly significant ($P<0.01$) among treatment periods, the highest value of testosterone concentration was found during treatment. Season did not significant effect on testosterone concentration in blood serum, a higher value was observed during winter season (0.64 ng/ml) versus (0.62 ng/ml) during summer season.

16- The overall means of selenium concentration in blood serum of bulls were 0.39, 0.37 and 0.48 ($\mu\text{g/ml}$) for selenium, vitamin E and selenium plus vitamin E groups, respectively. Differences among treated groups were highly significant ($P<0.01$). Also, the differences were highly significant ($P<0.01$) among treatment periods, the highest value of selenium concentration was found during treatment. Season had a significant effect ($P<0.01$) on selenium concentration in blood serum, a higher value was observed during winter season (0.43 $\mu\text{g/ml}$) versus (0.39 $\mu\text{g/ml}$) during summer season.

17- The overall means of selenium concentration in seminal plasma of bulls were 12.3, 12.5 and 13.7 ($\mu\text{g/ml}$) for selenium, vitamin E and selenium plus vitamin E groups, respectively. Differences among treated groups were significant ($P<0.05$).

Also, the differences were highly significant ($P<0.01$) among treatment periods, the highest value of selenium concentration was observed during treatment. Season had a significant effect ($P<0.01$) on selenium concentration in seminal plasma, a higher value was observed during winter season (14.0 $\mu\text{g/ml}$) versus (11.7 $\mu\text{g/ml}$) during summer season.

18- The differences among treated groups were not significant in post-thaw sperm progressive percentage after storage in liquid nitrogen at -196 C^0 for one day, 30 days and 90 days. The highest value was found in bulls treated with selenium + vitamin E.

19- The overall means of post-thaw sperm progressive motility % after one day, 30 days and 90 days of storage in LN were 41.95, 39.7 and 38.4 %, respectively. Differences among three periods of storages were highly significant ($P<0.01$).

20- The differences among treated groups were not significant in post-thaw live sperm percentage after storage in liquid nitrogen at -196 C^0 for one day, 30 days and 90 days. The highest value was observed in bulls treated with selenium + vitamin E.

21- The overall means of post-thaw live sperm % after one day, 30 days and 90 days of storage in LN were 52.1, 49.9 and 45.5 %, respectively. Differences among three periods were highly significant ($P<0.01$).

22- The overall means of conception rate were 61.2, 60.4 and 62.5% for selenium, vitamin E and selenium plus vitamin E groups, respectively. Differences among treated groups were not significant. Also the differences among treatment periods were did not significant, the highest value of conception rate was found during treatment. Season did not significant effect on conception rate, the highest value was observed in winter season (61.6%) when compared to that summer season (61.0%).

The final conclusion, the previous results indicated that using selenium and /or vitamin E led to improve sexual desire and semen quality (larger ejaculate volume, high mass motility and higher sperm concentration), Consequently improved their fertility. So, we recommended treating buffalo bulls for A.I with selenium and /or vitamin E specially during summer and winter season under field condition.