Research Article

Effect of Magnetic Water Drinking on Testis Dimension, Scrotal Circumference and Blood Parameters of Holstein Bulls Born in Iraq

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Abstract | This study was undertaken to investigate the influence of magnetic water treatment on testis dimensions, scrotal circumference and levels of blood parameters for Holstein bulls born in Iraq. Sixteen Holstein bulls born in Iraq were selected on basis of age 17-19 months (8 bulls) and 29-32months (8 bulls). Bulls of both age groups were divided randomly into two groups equally (control and treated group with magnetic water). Results showed a significant rise ($p<0.05$) in testis dimensions and scrotal circumferences in treated group as compared with control bulls for age at 17-18 month. Furthermore, the results showed significant ($p<0.05$) differences in red blood cells (RBC), Packed cell volume (PCV) and Hemoglobin (Hb) of treated bulls for age 17-18 and 29-32 month compared with control. Also, significant ($p<0.05$) differences were found in white blood cells (WBC) for treated bulls age 29-32 month compare with control. It is concluded that magnetic water can be used for the development of artificial insemination program in Iraq which can effect reproductive efficiency of bulls.

Keywords | Magnetic water, Testis dimension, Blood parameter, Bull, Iraq

Editor | Kuldeep Dhama, Indian Veterinary Research Institute, Uttar Pradesh, India.
Received | May 03, 2015; **Revised** | June 02, 2015; **Accepted** | June 04, 2015; **Published** | June 21, 2015
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Citation | Al-Nuemi SH, Al-Badry KI, Atteyh AJ, Al-Sabeea WS, Ibrahim FF, Rajab BA (2015). Effect of magnetic water drinking on testis dimension, scrotal circumference and blood parameters of holstein bulls born in Iraq. Adv. Anim. Vet. Sci. 3(7): 413-417.
DOI | http://dx.doi.org/10.14737/journal.aavs/2015/3.7.413.417
ISSN (Online) | 2307-8316; **ISSN (Print)** | 2309-3331

INTRODUCTION

Water and life are closely linked; water is the blood of life. It is needed to transport compounds via the blood, maintain cellular structural integrity, regulate temperature etc. (Reuter, 2004), many researches studied the negative changes in natural water after sterilization and called this water (dead water), so magnetic water transfer water from dead to live (Batmanghelidj, 2005). Magnetic water means passing water from magnetic tubes, by putting magnet in water so properties of water turn into very fertile and active causing high oxygen ratio, velocity of dissolution salts and amino acids in water (Batmanghelidj, 2005). Increased penetration and flexibility of water (Davis, 2004) and absorption of water from the body can decrease superficial tying in water (Szkatula et al., 2002). These characteristics of water can increase the following:

- circumlocution of blood and oxygen
- transport of food in blood (Morgan, 1988)
- transport of calcium ions which expedite cure of nerve tissue and bones (Korpan and Saradeth, 1995)
- ability of body for Production general hormones (Al-Sabbeea, 2008)
- activity of enzymes (Al-Sabbeea, 2008)
- getting rid of internal poisons produced from metabolism
- increase internal poisons absorption (Cho, 2005)
- improved semen characteristics, fertility rate (Alfonso, 2006)
- sexual hormones (Al-Sabbeea, 2008)
- blood picture (Stanis et al., 2001)

Numerous studies about this technique were used in sheep and goat in Iraq and gave positive results especially about testis dimensions, scrotal circumference and blood parameters. Although, not any study is performed about artificial insemination in bulls in Iraq. For the reason, the present study was designed to know how this technique can be used for development of artificial insemination program

in. Another aim of the study was to judge how the technique effect the bulls of different age.

MATERIAL AND METHOD

Animals

This study was carried out at Artificial Insemination Center, Abou Ghareeb. Sixteen Holstein bulls born in Iraq were selected on the basis of age 17-19 months (8 bulls) and 29-32 months (8 bulls). From each age group, bulls were divided randomly into two groups equally (control and treated group). In control bulls, tap water wass used for drinking. In contrast, treated bulls were drinking magnetic water through using the system of magnetic water with dipolar or bipolar. Magenetic water was manufactured in the laboratory of technology office of water treatment of Ministry of Science and Technology in a power of 2000 gauss. The water was served at morning and evening prior to consumption of concentrated food to ensure drinking of a large amount of water .

Testis Dimensions and Scrotal Circumference

The length and width of testis and the scrotum circumferences were then measured at each month by using tape (Coulter, 1991).

Blood Samples

Five ml of blood was collected from jugular vein from all animals (treatment and control) at the beginning to the end of the experiment once in each month. Of the collected bool, 2.5 ml centrifugated at 3000 rpm for 20 minutes to obtain serum for measuring total protein by using Tossoh System. The other 2.5 ml of blood was stored in a test tube containing anticoagulant (EDTA). For measurement of hemoglobin ((Hb), packed cell volume (PCV), total number of white blood cells (WBC) and red blood cells (RBC), Diogon system was applied.

Statistical Analysis

Statistical analysis was performed using SAS (Statistical Analysis System-version 9.1) (SAS, 2010). Lease significant differences (LSD) test was used to assess significant difference between means. $p<0.05$ was considered statistically significant.

RESULTS AND DISCUSSION

Testis Dimensions and Scrotal Circumference

Results in Table 1 show that the length of right and left testis of treated group age 17-18 month increased significantly ($p<0.05$) compared with control, also the width of the right and left testis of treated group of same age increased significantly ($p<0.05$) as compared to control. Moreover,Table 1 revealed that scrotal circumference for the treated group also increases significantly ($p<0.05$) as compared with control. These results of the present study about testis dimensions and scrotal circumferences are in agreement with Atteyh (2008) who found significant increase in testis dimension for treated buck and Yassen and Al-Dori (2011) found the similar results for lambs. This benefit of magnetic water on testis dimension and scrotal circumferences may be this magnetic water enhance the digestion absorption of growth functions cell and circulating system (Lebeau, 2001; Hussen, 2002), and increase the feed conversion efficiency by reducing the surface tension and increase the permeability of the cells, and this allows the expansion of the gut to take advantage of food and therefore, an improvement in the dimensions of the body. On the other hand, increase in the dimensions of the body is the inevitable result of an increase in the dimensions of the testis. It is one of the body parts and there is significant correlation between the dimensions of the body and testis dimensions and between scrotal circumferences with testis dimensions (Sarder, 2005). Moreover, many authors (Adedeji et al., 2005; Casas et al., 2007; Perry and Patterson, 2011) discovered that scrotal traits in bulls were closely related to body size and weight. But results in Table 1 revealed that there was no significant difference in testis dimensions and scrotal circumferences of treated group for age 29-32 month compared with control group of bulls aged from 17-19 months. Coulter (1991) reported that scrotal circumferences increased rapidly in young bulls, gradually rise in mature bulls and decline in old bulls due to senile atrophy. Addass (2011) revealed that testis dimensions increased lineary with increasing age of bulls until two years where at 13 month of age, bulls reached a scrotal circumference of 33 cm (Casas et al., 2007) and 32-33 cm (Ahmed et al., 2005), whereas Sosa et al. (2002) showed a scrotal circumference of only 30 cm at similar age.

Blood Parameters

Results in Table 2 revealed that a significant increase ($p<0.05$) in RBC, PCV and Hb of treated group as compared with control bulls whether age 17-18 and 29-32 month, furthermore, the same table show that WBC of treated group for age 29-32 month increase significant ($p<0.05$) as compared to control. A significant increase in PCV and Hb is also found by Atteyh (2008) for buck and Mahdi (2012) and Shamsaldin and Al-Rawee (2012) found in ram. There are other studies showing a significant increase ($p<0.05$) in Hb for lambs (Al-Sabaa, 2008), ewes (Kamil, 2011) and in fish (Khalid et al., 2012). The benefit of magnetic water on PCV and Hb may be attributed to increase in production of these cells from bone marrow, circulatory system under effect of hormonal factors (Mbasa and Poulsen, 1991) or magnetic may water improves the immune system of animal (Jonsen et al., 2001; Salem et al., 2006) or may be magnetic water decreases viscosity of blood and increase movement of blood in vessels which caused high movement of Hb (Mile-Wski, 2004).

Table 1: Effect of magnetic water on testis dimension and scrotal circumference for Holstein bulls born in Iraq (Means±SE)

Parameters	Age 17-18 month		LSD value	Age 29-32 month		LSD value
	Treatment	Control		Treatment	Control	
Testis left width (cm)	5.22 ± 0.08	4.20 ± 0.07	0.217 *	6.25 ± 0.34	6.78 ± 0.23	0.845 NS
Testis right width (cm)	5.91 ± 0.13	4.54 ± 0.10	0.324 *	7.88 ± 0.22	7.21 ± 0.22	0.646 NS
Testis left length (cm)	17.07 ± 0.35	15.51 ± 0.19	0.769 *	21.71 ± 1.16	20.06 ± 0.61	2.739 NS
Testis right length (cm)	18.35 ± 0.31	16.75 ± 0.26	0.821 *	22.18 ± 1.22	21.93 ± 0.86	3.098 NS
Scrotal circumference (cm)	35.42 ± 0.34	33.94 ± 0.26	0.853 *	40.87 ± 0.65	39.73 ± 0.90	2.254 NS

* (P<0.05); **NS:** Non-significant

Table 2: Effect of magnetic water on blood parameters for Holstein bulls born in Iraq (Means± SE)

Parameters	Age 17-18 month		LSD value	Age 29-32 month		LSD value
	Treatment	Control		Treatment	Control	
RBC (x 10/L)	7.43 ± 0.06	6.57 ± 0.08	0.212 *	7.77 ± 0.21	6.54 ± 0.24	0.675 *
PCV (%)	30.18 ± 0.25	28.19 ± 0.35	0.915 *	34.74 ± 0.73	32.03 ± 1.03	2.623 *
HB (g/dl)	12.55 ± 0.13	10.92 ± 0.13	0.383 *	12.47 ± 0.29	11.19 ± 0.38	0.999 *
WBC (×10/L)	18.62 ± 2.61	14.53 ± 1.08	5.265 NS	9.16 ± 0.35	7.05 ± 0.88	1.965 *
Total protein (g/dl)	6.92 ± 0.14	6.80 ± 0.16	0.458 NS	6.46 ± 0.26	6.00 ± 0.52	1.216 NS

* (P<0.05); **NS:** Non-significan; **RBC**= Red Blood Cells, **PCV** = Packed cell volume, **HB**= Hemoglobin, **WBC** = White Blood Cells

In addition, the present study show that a significant increase (p<0.05) in RBC (in agreement to Shamsaldin and Al-Rawee (2012)) could be attributed to magnetic water causing increased production and transferred large amount of RBC (Laycock, 2007) and to elaborate blood vessel and increase in movement of RBC to changes of nutrition and transferred of oxygen to cells (Kulish, 2004), or may be magnetic field causes increase in attract iron from the blood and then connect the blood in large quantities and thus increase number of RBC and Hb (Rokicki, 2006). This is consistent with the findings of the (Michael and Yoshitaka, 2002) who pointed to the possibility of water treatment magnetically to expel toxins and get rid of the cells which when compared to the results of the values of hemoglobin concentration between weeks, presence of a positive effect of the water treatment was noticed.

Magnetically by maintaining hemoglobin levels compared with the control groups, and this is due to the possibility of magnetically treated water to increase the solubility of metal salts and nutrients, especially iron, which have been more willing to penetrate the membrane of cells and blood cells, and this is identical to what reached (Skeldon, 1990), who pointed out the importance of treated water magnetically to increase and improve the absorption of nutrients, minerals and water in the body, as are gatherings treated water magnetically smaller, more energetic and able to transit easily through the walls of the cells to transport nutrients and remove waste, as noted (Salem et al., 2006) to the high proportion of hemoglobin up to 10% in experimental animals after treatment with magnetic fields. As a result of the impact of the treated water magnetically in the blood to make it a high potential in the processing of the body's cells and tissues of different nutrition appropriate to perform its best of its biological, leading to the lifting capacity of organs and tissues hematopoietic like liver, kidney and spleen, to produce blood, which is similar to the findings of Verheyen (2003) and MTC (2006) also due to the positive impact of water treatment magnetically increase in metabolic reactions in the tissues (Santwani, 2000). Al- Hassani (2000) and Mustafa (2007) confirmed that high blood viscosity in chicks that dealt with water processors magnetically due to increased numbers of RBC in addition to the increase blood vessels compared to a set of control which had a role in accelerating the process of blood clotting, which could be due to contain small amounts of thromboplastin. Improvements in the PCV due to the effect of the magnetic water on thyroid gland by increasing the activity of the pituitary gland in the liberation stimulating hormone (Thyrotrophic stimulation hormone), and this is consistent with Santwani (2000) who pointed out that the importance of the magnetic field in raising hormone which works to increase the production of RBC and thus increases PCV. A significant impact for magnetic field in the functions of the organism, especially components and characteristics of blood (Goodman and Blank, 2002). Another blood parameter which evaluated in this is study total protein. Results revealed that total protein for treatment group did not different significant as compared with control for both two ages of bulls. Khalisa and Ali (2012) revealed that drinking magnetic water had beneficial effect on some physiological aspects manifested by a significant elevation in total serum proteins of male rabbits, but Atteyh (2008) show increase in total protein

of bucks after drinking magnetic water. From the above researchers means that the effect of magnetic water on total protein of blood may be differed from species to another and increase significantly in some components of blood without increase in others such as total protein. Sargolzehi et al. (2009) claimed that an increase in milk yield of dairy cattle consuming magnetic water without change in milk protein.

CONCLUSION

The study conclude that magnetic water increases testis dimensions, scrotal circumferences, RBC and PCV only for age 17- 18 month, whereas, it has positive effect in Hb and WBC only for bulls of 29-32 month.

ACKNOWLEDGEMENTS

This study was carried out in the Artificial Insemination Center, Iraq (AI Center). The authors would like to thank every member in the AI Center, especially to the Dr. Kamel Fayath and Mr. Hatham Taha for their unlimited help.

AUTHOR'S CONTRIBUTION

All authors contributed equally in all the efforts for this article.

CONFLICT OF INTEREST

Authors declare that there is no conflict of interest.

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