EFFECT OF SPROUTS (*PHASEOLUS AUREUS*) ADDITION IN RATION ON THE QUALITY OF FRIESIAN BULL SEMEN

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Abstract

A research on effect of bean sprouts (Phaseolus aureus) addition in ration of Friesian bull has been conducted in term to learn its effect towards motility and abnormality of their sperm. This research was conducted at Artificial Insemination Center in Lembang District, West Java, using 16 head of Friesian bulls of 3 – 3.5 years old and 800 – 900 kg of body weight. Treatment of ration were T0: basal ration without bean sprout ; T0.5 : T0 + 0.5% bean sprout; T1.0 : T0 + 1.0% bean sprout; T1.5 : T0 + 1.5% bean sprout. Feeding treatment was applied in two months and semen collection was conducted weekly for four times started from the end of feeding treatment. The study uses Completely Random Design. Each treatment was replicated 4 times. Data of this research was analyzed by ANOVA. Conclusion of the research is that addition of 0.5% bean sprout on bull ration is the optimum proportion to improve sperm motility and decrease sperm abnormality; however, addition of bean sprout has no effect on the other variables of Friesian bull semen qualities – either macroscopically or microscopically. And so, on the post thaw semen qualities that measured via post thaw motility and conception rate.

Key words: Friesian Bull, Bean sprout, sperm quality

INTRODUCTION

The successful application of reproductive biotechnology in the form of artificial insemination with frozen semen is influenced by several factors, both biological factors and technical factors. Semen quality is one factor that plays a role in the success of artificial insemination technology. Good quality of semen is produced by healthy males and appropriate fed by good quality of nutrition. Good nutrition is nutrition balanced protein and calories. To obtain the protein-calorie nutrition it needs to make various efforts such as by preparing rations of any material alternative that contains carbohydrates, fats, proteins, vitamins, and minerals. Ration of males can be improving semen quality in addition to meeting the needs of those living males.

Complete feed ingredients containing vitamins, minerals and materials are believed to improve the quality of semen. Previous studies said Soya bean sprout *(Phaseolus aureus)*, which contains vitamin A, C, and E, as well as the minerals sodium, magnesium, zinc, calium, and ferrum, which supposedly can increase the fertility of males (Surahman and Darmajana, 2004). If the composition of the nutrient content is added to the ration, it can supplement rations. Vitamin C, vitamin E, amino acids, zinc and copper which are contained in the sprouts affect the durability of the oxygen reaction and protect sperm from the sperm membrane from peroxide free radicals. Thus allowing the addition of bean sprouts in the ration increased sperm quality, which is characterized by increased motility, sperm concentration, decreased sperm abnormalities (Oliveira, et al, 2004; Yazama, et al., 2006; Cayurt, and Achan, 2008; Alonzo et al., 2009). This research was aimed to find out the effect of giving sprouts in the ration of FRESIEN bovine male semen quality.

MATERIAL AND METHOD

This research was conducted at Artificial Insemination Center in Lembang District, West Java, using 16 head of Friesian bull of 3

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– 3.5 years old and 800 – 900 kg of body weight. Commencing the research, the bulls were given basal ration for 14 days for adaptation. Feed was given twice daily, at 7 am and 2 pm. Treatment of ration were T0: basal ration without bean sprout; T0.5:T0+0.5% bean sprout; T1.0:T0+1.0% bean sprout; T1.5:T0+1.5% bean sprout. Research was conducted for 90 days. Collecting semen was done once a week. It started at day 59, then followed at day 73, 80 and 87 and these were as replications to value the response of treatments.

Data analysis was Completely Random Design, consists of four ration treatments to the 16 bulls, as replication was four semen collecting periods (day 59, 73, 80 and 87). Parameters were semen volume, pH, sperm concentration, sperm abnormality of fresh semen and the quality after frozen.

RESULTS AND DISCUSSIONS

Effect of treatments on fresh semen is shown at Table 1. Table 1 contains the characteristic of Friesian bull fresh semen of four treatments (T0; T0.5; T1.0; T1.5). Table 1 shows that the addition of bean sprout in ration increase the number of progressively motile sperm and decrease abnormalities ($P<0.01$). The highest motility sperm percentage is come from bull with 0.5% soy bean sprout addition, i.e. 72.86 ± 2.47 Another treatments show sperm motility value higher than sperm motility of no addition in ration.

Table 1 Characteristic of Friesian Bull Fresh Semen of some treatments

Parameter	Treatments			
	T0	T0.5	T1.0	T1.5
Volume (ml)	7.51 ± 0.47 [a)]	6.32 ± 0.71[a)]	7.70 ± 0.90[a)]	7.25 ± 0.35 [a)]
Color		white milk, crème		
pH	6.28 ± 0.32[a)]	6.26 ± 0.22[a)]	6.16 ± 0.13[a)]	6.20 ± 0.30 [a)]
Motility (%)	51.39 ± 8.33[a)]	72.86 ± 2.47[b)]	69.75 ± 3.69[b)]	68.75 ± 1,98[b)]
Abnormality (%)	5.36 ± 0,24[a)]	2.20 ± 0.27[b)]	3.06 ± 0.32[c)]	3.63 ± 0.23[d)]
Concentration (Million/ml)	1276.76±240.65[a)]	444.29±228.65[a)]	1410.00±223.75[a)]	209.00±225.40[a)]

Remarks: T0 : basal ration without bean sprout ;T0.5:T0+0.5% bean sprout; T1.0:T0+1.0% bean sprout; T1.5:T0+1.5% bean sprout
The same letter in the same row indicates no difference.
Different letters in the same row indicate significant differences

Motile sperm either on treated ration bull semen or non treated one of this research show similar or normal value. Sperm abnormality from treated ration bull semen was significantly ($P<0.05$) lower than semen from non treated ration bull semen. Addition of 0.5 % bean sprout yielded the lowest sperm abnormality; even the range of the sperm abnormality either on treated or non treated ration bull semen was on normal value.

Decreasing of sperm abnormality means the increasing of life sperm but not on sperm motility. This is can be understood because not all living sperm are motile progressively (Campbell, et al, 2003). Table 1 shows addition bean sprout on the ration was not increase the normal semen volume neither affects to the semen color, semen pH, sperm density.

The higher percentage of living sperm, motile sperm and low sperm abnormality, are the consequence of contribution of vitamin E, B, Zn, Ca that contained in bean sprout. Vitamin E is an antioxidant which has a role to protect sperm membrane from ROS (Reactive Oxygen Species) (Oliveira et al, 2004: Yazama, et al, 2006: Canjurt and Akhan, 2008: Alonzo, et al, 2009: Gliozzi, et al, 2009). Similarly, vitamin B 12 on the bean sprout also has a role to support vitamin E. Nevertheless the addition of bean sprout in the ration of FRESIEN bull was not affect to post thaw sperm qualities as shown on Table 2.

Table 2 Friesian Bull Frozen Sperm Motility after Thawing on Several Treatments

Treatment	Motility (%)	R value (%)
No bean sprout addition	43.33± 3.89[a)]	46.67 [a)]
Ration with addition of 0.5% bean sprout (T0.5)	44.17± 2.74[a)]	61.11 [a)]
Ration with addition of 0.1% bean sprout (T1.0)	44.12± 1.12[a)]	53.85 [a)]
Ration with addition of 1.5% bean sprout (T1.5)	43.50± 3.71[a)]	72.73 [a)]

The same letter in the same column indicates no significant difference

The average of post thaw sperm motility on all treated ration bull semen is around 40%. And it was not affected by addition of bean sprout. As well as on sperm fertility measured by their conception rate (CR) which are around 46.67 – 72.73%.

CONCLUSIONS

Based on research result, could be concluded that addition of 0.5% bean sprout on bull ration, is the optimum proportion to improve sperm motility and decrease sperm abnormality. On the other hand, fertility of frozen semen which measured by conception rate was no affected by addition of bean sprout in the ration.

REFERENCES

[1] Aghaci, A., S. Tababaci, and M. Nazari. 2010. The Correlation Between Mineral Concentration Of Seminal Plasma and Spermatozoa Motility in Rooster. *Journal of Animal and Veterinary Advences.* 9 (10). 1476 – 1478

[2] Alonzo, S.E., R.S. Ricalde, F.C. Castro, R.A. Lopez, M.A. Gamboa, and J.R. Buenfil. 2009 Effect of Dietary Selenium and Vitamin E on Semen Quality and Sperm Morphology of Young Boars During Warm and Fresh Semen. *J.of Animal and Veterinary Advance.* 8 (11) :2311 – 2317.

[3] Arfiantini, I, T.L. Yusuf and N. Graha 2005. Longivitas dan Recovery Rate Pasca Thawing Semen Beku Sapi Fresien Holstein menggunakan Bahan Pengencer yang Berbeda. Buletin *Peternakan.* 29 (2) : 53-61.

[4] Arfiantini, I., dan T.L. Yusuf. 2006. Keberhasilan Penggunaan Tiga Pengencer dalam Dua Jenis Kemasan ada Proses Proses Pembekuan Semen Sapi Frisien Holstein. *Majalah Ilmiah Peternakan.* 9 (3) : 25-35.

[5] Ball, P.J.H. and A.R. Peters. 2004. Reproduction in Cattle. 3rd Ed. Backwell Publishing.

[6] Cai, J.G., S.Q. Sun., L.G.Wang, H.J. Gu. 2004. *The Effect Of Adding Vitamin B12 in Sperm Diluter on Quality of Bull's Straw Frozen Sperm.* J. Liaoning Agricult. Coll. 6 : 10-11.

[7] Campbell, J.L., K.l.Cambbell, and M.D. Kenealy. 2003. *Artificial Insemination.* In. Anim. Sci. 4th Ed. Mc. Grow Hill. New Fork.

[8] Eghbali, M., S.M.A. Shoushtari, S.A. Rezaei, and M.H.K. Ansari. 2010. *Caalcium, Magnesium, and Total Antioxidant Capacity (TAC) in Seminal Plasma of Water Buffalo(Bubalus Bubalis) Bull and their Relationship with Semen Characteristics.* Veterinary Research Research Forum. 1 : 12-20.

[9] Garner, D.L, and E.S.E. Hafez. 2000. *Spermatozoa and Seminal plasma. In*

[10].E.S.E. Hafez and B.Hafez (7Ed.). Reproduction in Farm Animals. Lippincot Williams and Wilkins. Philadelphia. pp. 96-105.

[11] Gliozzi, T.M.. L. Zaniboni, A.Maldjian, F. Luzi, L. Maertens, and S. Cerolini. 2009. *Quality And Lipid Composition of Spermatozoa in Rappids Fed DHA and Vitamin E Rich Diets. Theriogenology. 71 : 910-919.*

[12] Hayashi,Y. and N.isobe. 2005. *Effect of of Thaw Temperature on Holstein Frozen Semen* .Journal of International Development and Cooperation. 12 (1). 107-110.

[13] Hong, J.H.U., Q.W. Li., Y.I. Chen., Z.J. Jiang., Y.H.Jia., L. Q. Wang, and B. Ou. 2009. *Effect Of Addition of Vitamin B12 to the Extender on Post Thaw Motility, Acrosome Morphology, And Plasma Membrane Integrity in Bull Semen.* Turk. J. Vet. Anim Sci. 33 (5) : 379-384.

[14] Hurley, W.L. and R.M. Doane. 1989. *Recent Development in The Roles of vitamin and Mineral In Reproduction.* J. Dairy Sci. 72 : 784-804.

[15] Kaya, A., M. Askoy, and Tekely. 2002. *Influence of Ejaculation Frequency on Sperm Characteristic, Ionic Composition and Enzymatic Activity of Seminal Plasma in Rams.* Smal Ruminan Resc, 44 : 153-158.

[16] Millar, M.J., M.I. Fischor, P.V. Elcoate, and C. A. Maswon. 1958. *The Effect of Dietary Zinc Deficiency on Reproduction System.* Journal Biochem. Physiol. 36 : 557-569.

[17] Oliveira, C.E.A., C.A. Badu, W.M. Ferreira, E.B. Kamwa, and A.M.Q. Lana. 2004. *Effect of Dietary Zink Supplementation on Spermatik Characteristics of Rabbit Breeders.* Proceeding 8th World Rabbit Congres. Mexico.

[18] Smith, O.B. and O.O. Akinbamijo. 2000. *Micronutrients and Reproduction in Farm Animals'* Animal Reproduction Sci. 60 : 599-590.

[19] Sorenson, Jr. A.M. 1979. *Laboratory Manual for Animal Reproduction 4th*. American Press. Boston. USA.

[20] Surahman, D.N. dan D.A. Darmajana. 2004. *Kajian Analisa Kandungan Vitamin dan Mineral.* Seminar Nasional Rekayasa dan Proses. 1411-1416.

[21] Yazama, F., K. Furuta, M. Fujimoto, T. Sonodo, H. Shigetomi, T. Horiuchi. M. Yamada, N. Nagao, and N. Maeda. 2006. *Abnormal Spermatogenesis in Mice Unable to Synthesize As Corbic Acid.* Anatomi Science International. 81: 115-125.