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Conception rate of Bali cows inseminated with semen of the bull supplemented with Moringa Oleifera Leaf (MOL) powder block

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Abstract. Lower conception rate of cows in the tropics might be affected by low quality of semen collected from bulls consumed low quality food. This study was conducted to evaluate the conception rate of Bali cows inseminated with semen of the bulls supplemented with Moringa oleifera leaf (MOL) powder blocks. There were 26 Bali cows 3-4 years of age, non-pregnant and having corpus luteum, used in this study. All animals were injected with 2 ml of PGF2 α (juramate) to induce and to synchronize the estrous. They were divided into 2 groups, group 1 (G1, n=16) were inseminated with semen of bulls supplemented with MOL powder blocks. Group 2 (G0, n=10) were inseminated with commercially available semen. All cows were artificially inseminated 48 hours after the PGF injection. Pregnancy diagnosis were performed by rectal palpation 60 days after the insemination. The mean diffents between the two treatments were analyzed by chi-squared analysis. All animals in the two treatments came in oestrus after the PGF injection. Thirteen (13) out of 16 cows (81%) and 7 out of 10 cows (70%) detected in pregnant, respectively for G1 and G0. Although statistical analysis showed that there was not different between the two treatments ($P>0.05$), but economically, the treatment of G1 could increase 11 % of conception rate. It can be concluded that the supplementation of MOL powder block could increase the conception rate of Bali cows.

1. Introduction

Although Artificial insemination techniques has being applied in beef cattle for many years in the developing countries, the artificial efficiency, however, was still lower in compared to that in the developed countries [1]. It have reported that conception rate of cows bred with artificial insemination in South Sulawesi Province, Indonesia were only 22.8-38.3%. In Italia, pregnancy rate to first artificial insemination was 49.8 % [2]. [3] have reported conception rate of 55.5, 64.9 and 69 % in Netherland, Ireland and Canada, respectively.

Several factors were reported to affect the successful of artificial insemination such as semen quality, understanding and concern for breeders in detecting estrus, cow body condition score (BCS), livestock health, especially those related to reproductive organs, and skills and abilities of inseminators [4]. [5] has also showed that age, parity and breed significantly related to the conception rate in artificially inseminated cows.

After improving some factors related to artificial insemination techniques, the conception rate of artificially inseminated cows to 42 % in South Sulawesi [6], 59 % in East Java [4] and 64 % in North Halmahera [7].



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Semen quality is one of the main factor that affected the conception rate of artificially inseminated cows. This factor was affected by food quality and quantity of the bulls. [8] showed that malnutrition adversely effected the semen quality of the bulls. The process of spermatogenesis in producing good quality semen requires a complete nutritional intake of vitamins A, C, and E as well as minerals Zn and Se [8-10]. Moringa oleifera leaves is one of the plants that contain nutrients needed for the spermatogenesis.

Several studies have shown that the use of Moringa oleifera as a supplementary feed could increase the reproductive rate of the ruminants. Supplementation of Moringa oleifera leaf to the bulls significantly increased scrotal circumference of Bali cattle [11], increased libido and semen quality [12], increased sperm motility [13], and increased testosterone level [14]. It was not known wheather the high quality semen of bulls supplemented with moringa oleifera leaf will also show a high conception rate. Therefore, the purpose of this research was to evaluate the conception rate of Bali cows inseminated with semen of the bulls supplemented with Moringa oleifera leaf (MOL) powder blocks.

2. Materials and Methods

2.1. Semen collection

The semen was collected from bulls supplemented with Moringa oleifera leaf (MOL) powder block for 6-8 weeks 0.5 kg/head/day. Each MOL powder block consists of Moringa oleifera leaf powder 250 gr, Molasses 175 gr, salt 20 gr, urea 20 gr, mineral mix 20 and cement 15 gr.

Methods for evaluation semen collection, evaluation, delution and freezing followed the methods described by [15] and [16].

2.2. Methods of experiment

There were 26 Bali cows, 3-4 years of age, were selected based on the present of corpus luteum (luteal phase) for this study. They were kept under a ranch condition at the Maiw Breeding center (MBC) Enrekang (about 200 km north of Makassar). The animals were estrus synchronized by a single injection of 2 ml of prostaglandin (PGF2 α , Juramate). They were artificially inseminated 48 hours after the PGF2 α injection by one professional AI technician. They were divided randomly into 2 groups. Group 1 (n=16) were inseminated using the semen of bull supplemented with MOL powder block. Group 2 (n=10) were inseminated using commercially available Bali bulls semen. Rectal palpation was performed for pregnancy diagnosis 60 days after the insemination. Conception rate in the two groups were calculated.

2.3. Statistical analysis

The significant different of conception rate between the two groups was analyzed by Chi Square Analysis [17].

3. Results and Discussion

Conception rate (CR) of the two groups of cows inseminated with the semen of bulls with and without a supplementation of MOL powder block are shown in table 1.

Table 1. Conception rate of the two groups of cows inseminated with the semen of bulls with (Group 1) and without (Group 2) supplementation of MOL powder block.

Treatment Group	Number of cows (head)		CR (%)
	Inseminated	Pregnant	
Group 1	16	13	81
Group 2	10	7	70

Conception rate were not significantly different ($P>0.05$) between the two groups. However, the conception rate of cows inseminated with semen from the bull supplemented with MOL powder block (Group 1) tended to be higher in compared to that in the control group (81 vs 70%).

This study showed that the supplementation of MOL powder block could increase the quality of semen in Bali bull. The high quality of semen tended to increase conception rate of the artificially inseminated Bali cows. The increase of CR by 11% in cows inseminated with semen of the supplemented with MOL has an important meaning in economic aspects. The increase of CR for this group has also shown an interesting finding because the semen of bull supplemented with MOL powder block is comparable with the commercially semen.

The levels of conception rate in cow were classified into 3 categories: 1. High (>80%) level of CR (Pane [18] and Sudarmaji et al. [19]). 2. Medium (60–80%) level of CR (Toelihere [20] and Susulawati [4]). 3. Low (<60%) level of CR (Toleng et al. [1] and Darma [6]). The conception rate of cows inseminated with semen of bull supplemented with MOL powder block is clasfied in to a high level of CR (81%), while the control (commercial semen) remain at the medium level (70%).

The reasons for the increased conception rate in the cows inseminated with semen of bulls supplemented with MOL powder block are not yet well known. One possible reason is the improvement of sperm quality as a result of the high quality feed, especially related to micro minerals. [21] have proven that the injection of trace minerals in bulls (Cu, Mn, Se, and Zn) improves sperm quality (motility and marphology). This is in line with the report of [14] reported that, the supplementation of moringa leaf and organic Zn significantly improved the sperm quality of Bali bulls. The effects of Zn on semen quality have also reported by [22], [23], and [24]. Zn affects the work of sperm cell metabolism enzymes to produce energy [24].

Moringa leaves contains a high level of Vitamins A, C and E, and minerals Zinc, Calcium, Se. These vitamins and minerals have been also reported to affect individual semen motility, progression and concentration. [8] state that, selenium, as antioxidant, affects sperm quality by preventing oxidative damage. Se deficiency inhibits the process of spermatogenesis [25]. Vitamin A affects spermatogonia differentiation and spermatid adhesion regulation [26], vitamin protects sperm from oxidative stress [27] and Vitamin E improves the health of reproductive organs, preventing sperm cell membranes from fat peroxidation and maintain sperm from oxidative reactions [28].

The quality of semen may corelated with conception rate. High quality bulls based on a high Breeding Soundness Examination (BSE) resulted a high pregnancy rate of cows [29]. [30] showed that the pregnancy rate of cows' artificially inseminated using low quality semen. It can be concluded that conception rate of Bali cows artificially inseminated with the semen of bulls supplemented with MOL powder block.

4. Conclusion

The supplementation of Moringa oleifera leaf (MOL) powder block could increase the conception rate of Bali cows

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