

THE APPLICATION OF ECONOMIC AND SIMPLE METHODES FOR IMPROVING OOESTRUS ONSET AND REPRODUCTIVE PERFORMANCE OF GOAT IN SMALL HOLDER FARM

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Abstract

A research to develop to synchronize oestrus onset of animal utilizing Iodium (*biocide*®) using intra uterine injection has been done at laboratory of Reproduction, Faculty of Animal Husbandry Brawijaya University as well as field trials in UPT Ternak /ATMROC- Taiwan in Singosari, Malang and also in the small holder farm. The laboratory experiment is concentration level of Biocide (1:500, 1:1000 and 1:2000) and the second factor is incubation time (0, 30, 60, 90, 120 minute). Variables observe were motility,% live-dead cell or viability of spermatozoa. Field Trial: utilizing (*biocide*®). The variable observed are response of animal utilizing visualization method of oestrus and hormonal (progesterone test) with RIA method. The result showed that the oestrus onset occurred in days 2 to days 8, meanwhile the peak as oestrus and standing heat, confirmed with progesterone level < 0.5 ng/ml, showed in days 6 with the level of success is 60 – 70% oestrus. For Sperm quality test with the Hoesch 33258-Propidium Iodide staining, showed that there is no effect of biocide residue on spermatozoa in vitro. Compared with synthetic hormone, utilization of biocide® is cheaper (500 rupiah vs 15.000 to 35.000 rupiah) and showed that there are no effect and risk on female goat in early pregnancy. So, this method can be adopted and feasible as an alternative method for oestrus synchronization in small-scale farms.

Key words: Hormonal manipulation, Goat, Oestrus synchronization, Biocide

Introduction

Ruminant production in rural area especially in the smallholder farm still faces low performance of reproduction. This condition is expressed in low fertility, litter size, long open days and especially on poor oestrus onset condition. The hormonal manipulation as well as improving nutritional condition could solve this problem. Hormonal manipulation utilizing synthetic hormone for oestrus synchronization is relatively very expensive for smallholder farm. So, it must be looking for other

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alternative method that is cheaper and more suitable in this condition. A simple method need to be developed to synchronizes animal utilizing a simple and economic materials of Iodium (biocid ®) through intra uterine injection.

Synchronization of goat female is generally done by hormonal manipulation using prostaglandin or progestagen and biologically with teaser effect in specific treatment. The popular hormone for oestrus synchronization is PGF₂α (Atmadihardja, 1982; McMahon et al, 1979, Lindsay at al, 1982) Flugeston Acetat (FGA) and PMSG (Sianturi at al, 1997; Figueiredo Freitas at al, 1993) or other using a combination method both biology and hormonal using progestagen (Adiati at al, 1997).

Utilization of Iodium for improving the reproduction performance of cattle in Malang regency showed that 32 female that 81.3% of them was inseminated, resulted in 64.3% pregnancy rate (Tanaka, 2001). Meanwhile, preliminary research in fields trials using Iodium to improve the oestrus onset in goat resulted in about 70% oestrus (Mudawamah and Ciptadi, 2000). There are many Iodium have been utilized like Lugol® (Tjondronegoro, at al, 1995), Iodine® (Tanaka, 2001).

The residue of Iodium in uterus mucous may have effect on sperm quality, but so far still in range of artificial insemination application (Tjondronegoro at al., 1995). However, sperm quality test in vitro should be done to know the effect of Iodium utilization.

Materials and Methods

The research has been done at the both level of laboratory experiment and field trials in smallholder farm in Malang regency, east Java. The variables observed are response of animals (oestrus onset and pregnant rate) utilizing visualization test and hormonal (progesterone test) using Radio Immuno Assay. (RIA).

Sperm quality test in vitro:

The experiment was done in Lab. of Animal Reproduction, Brawijaya University and Lab. of Sperm Quality of Artificial Insemination Center, Singosari Malang. Goat Semen obtained from selected Goat with at least 70% of quality. Variables observed is % live dead, and % motility of sperm. Sperm viability test was also done with Hoesch 33258- Propidium Iodine (H22258-PI, Sigma) (Ciptadi, 2001).

The treatments are level of biocide concentration (P1, 1:500; P2, 1: 1000, P3 1: 2000) and incubation time of sperm (0, 0.5, 1.0, 1.5 and 2.0 hours) using factorial 3 x 5 with 5 replication each.

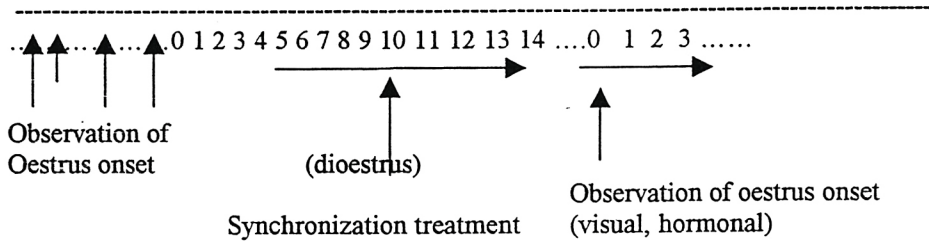
Field trials of oestrus synchronization treatment:

The 30 female goat have been selected for their normal reproductivity performance of oestrus cycles, parity 1 – 2 , non pregnant with the age of 3 – 4 years.

The Iodium was injected intra uterine (IU) in day- 5 to day-14 of cycles, using

sprit 10 ml that was modified, cervix expander, insemination gun for goat with plastic sheet (Minitab, German).

The schedule of oestrus treatment and observation of result describe in figure 1.:
Day:



Result and Discussions

Sperm quality *In Vitro*

The result of *in vitro* test showed that there are significant different of the treatments on sperm motility of different level Biocide concentration (table 1.) The 1: 500 concentrations resulted in the lowest of motility, but the motility of 1: 1000 and 1: 2000 treatments is higher than control. In this case, may be it's because of Kalium antiseptic in Iodium that have important role in motility of sperm. Bearden and Fuquay mentioned that Kalium is needed for maintenance the metabolism and motility of sperm with maintain to osmotic pressure for suitable environment of spermatozoa. Meanwhile, sperm motility tend to decrease in longer time of incubation.

Table 1. Sperm Motility of different level of Iodium and time of incubation

No.	Conc.Level of Biocide	Motility (%) (X ± SD)	Incubation (minute)	Motility (%) (X ± SD)
1.	Control	53.67 ± 10.56 abc	0	62.50 ± 9.46 c
2.	1: 500	47.00 ± 9.9 a.	30	58.33 ± 10.05 bc
3.	1: 1000	55.00 ± 14.14 ab.	60	53.33 ± 12.96 abc
4.	1: 2000	61.67 ± 12.06 b.	90	50.00 ± 12.91ab
5.			120	47.50 ± 12.50a

* Different subscript showed a significant different (P < 0.05)

There are no interaction between concentrations level of biocide and the time of incubation. It means that each treatment has independent effect on motility. Finally, the motility of sperm treated in biocide still accepted in the range as a normal for fresh insemination that needs at least 40% motility (Toelihere, 1980; Mudawamah and Ciptadi, 1999).

Sperm Viability test : H-33258-PI vs. Eosin Nigrosin.

Test of sperm viability have been done by conventional method Eosin Nigrosin staining compared with new method using H 33258_PI (table 2).

Table 2. The viability of goat sperm in both staining method Eosin-Nigrosin and H 33258-PI.

No.	Conc.Level of Biocide	Live-dead sperm (%) (X ± SD) in H-33258-PI	Live-dead sperm (%) (X ± SD) in Eosin-Nigrosin
1.	Control	71.40 ± 8.87 b	78.28 ± 4.48 a
2.	1: 500	58.28 ± 7.06.a	60.84 ± 21.53a
3.	1: 1000	69.12 ± 9.89.b	54.92 ± 16.34_a
4.	1: 2000	70.56 ± 7.96.b	67.16 ± 6.51_ab

* Different subscript showed a significant different (P < 0.05)

Base on the quality of staining, it can be observed clearly that new method of staining using H 33258-PI is more accurate than conventional method using Eosin-nigrosin. The repeatability of observation with H 33258-Pi is relatively higher than conventional staining. So, for a routine test quality of sperm commercially it was suggested to use this method that more objective and accurate.

Fields trials of oestrus synchronization

Visual observation on oestrus onset showed that all of the animals 100% are in oestrus. These signals of oestrus appear in day-2 and gradually increase day to day. Control animal, treated with Glandin N, oestrus onset occurred in day- 2 to day-3, meanwhile with biocide treatment oestrus showed longer in day-3 to day -8. According to Seguin (1980) using 2% of Lugol, cattle oestrus occurred in day-6 to day-10.

Progesterone assay confirmation on day - 0 to day 2-7 on oestrus onset occurred, showed that there is decrease from 0.84 ng/ml (2.67 n mol/L) and to be less then 1.0 ng/ml during oestrus onset occurred. (Akusu, 1990, Susilawati 1997).

Based on both sperm quality test and oestrus onset, it can be concluded that biocide concentration on 1: 1000 is the best. The rate success of oestrus synchronization using standing heat is about 60 – 70%. However, the more number of animals is needed to obtain more representative and more accurate data of synchronization rate in the different age or parity and physiology status of animals.

For the economic reason, this method of oestrus synchronization could be considered as a simple method possible to use in the smallholder farm. The cost of this method for one doses application is about Rp. 500, compared with the price of the same dose of synthetic hormone (imported) that needs more than Rp. 15.000, - per dose/animal. It seems that this simple method is suitable for mainly solving reproductive disorder of animal in small-scale farmer (Tanaka, 2001; Tjondronegoro, 1995).

Conclusion

The rate success of oestrus synchronization using biocide is about 60 – 70%, occurred in day-3 to day-8. Biocide is relatively having no effect on sperm quality in vitro. It was suggested to use new staining method H 33258-PI for commercial purposes on routine laboratory quality test. This method is acceptable for improving the reproductive performance of reproduction in smallholder farms.

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