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THE PRODUCTION OF PLASTIC PROGESTERONE IMPLANTS FOR ESTRUS SYNCHRONIZATION IN BIG TAIL SHEEP FROM SAPUDI ISLAND

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ABSTRACT

Short-term goal of this research was to find a method of determining the design model of plastic progesterone implants, while the long-term goal was to support programs for improving the genetic quality of sheep and increase productivity through estrus induction technology and treatment of infertility without waiting for the occurrence of natural estrus. Methods of investigation were carried out on experimental animals as many as 20 healthy, non pregnant, adult female of sheep in a state of lust. Experimental design used was completely randomized design which is divided into four treatment groups. Each group consisted of 5 sheep. Data were analyzed by Analysis of Variance and followed with the least significant difference test. The groups consisted of P0 as a control group receiving injections of 7 mg PGf2 α , P1 group received 50 mg progesterone, P2 60 mg, and P3 70 mg. Subsequent diagnosis of estrus was performed start from day 11. The results showed that the administration of PGf2 α and plastic implant had effect on time of estrus onset. The use PGf2 α results in slower estrus onset ($p < 0.05$) compared to the use of plastic progesterone implants. Estrus induction and synchronization with a dose of 50 mg MPA in the form of plastic progesterone implants has no significant difference with 60 mg or 70 mg and still effective to induce estrus. This dose, therefore, can be regarded as the most efficient one compared to treatment with other doses.

Keywords: progesterone implants, PGf2 α , time of estrus.

INTRODUCTION

Improving the quality of big tail sheep strain Sapudi island, Madura, East Java, is one of the main aspects in the development of original germ plasma farm in Indonesia. Cutting-edge technology that has been applied to improve the reproductive efficiency of livestock is the estrus induction, sterility management, artificial insemination, estrus synchronization, super ovulation and embryo transfer. In Indonesia, in addition to low population, the problems commonly found are livestock production, particularly big tail sheep, reproductive disorders and livestock management (Hardjopranjoto, 1984) such as the frequent occurrence of repeated mating followed by waiting for estrus in the next 21 days, the incidence of silent estrus calm and afterbirth infection, calving interval of more than 6 months, and low birth rate and pregnancy. We often encounter the

use of sires for natural mating. Artificial insemination is only done if there is a natural estrus. Estrus induction and synchronization technology have not done optimally. Fat tail sheep farming in East Java is still in early stages of development. Management of breeding, especially reproductive management with the proper approach between paramedics, engineers reproduction, inseminator and ranchers, still not optimal.

To improve the efficiency of reproduction and population increase, it is necessary to treat reproductive disorders, where estrus synchronization is combined with IB. The use of hormonal preparations, especially progesterone for the purpose of improvement of reproductive, is mostly done in the field. One of its use is for the induction of estrus. Estrus induction techniques or estrus synchronization performed simultaneously in a cattle

population to obtain estrus is by using PGf2 α hormone and progesterone (Malik, 2000 ; Evans and Max Well, 1987). Current progesterone preparations in the market is Progesterone Release Intravaginal Device (prid), Control Internal Drug Release (CIDR) and Implant Synchronate B (Tanaka et al., 2001).

PRID is the progesterone hormone in the form of a spiral tool derived from the French and CIDR of New Zealand. It is stored in the cattle's vagina containing 1.55 g progesterone contained on the silicon surface in a capsule containing 10 mg of estradiol benzoas. Real results will be seen in 12 days of storage in the vagina. PGf2 α currently is recommended for use after 7 days stored and removed from the vagina on day 7 to ensure synchronized estrus (Tanaka et al., 2001).

The use of hormone progesterone group by pasting into the sponge intra-vaginally for 10-14 days in sheep and goats produce lower conception rates when mated in the first appearance of estrus. However, when it is done in the next oestrus period a high conception rates will be obtained (Siegmund, 1979). Therefore, a study should be done on the induction of estrus with progesterone implants combined with artificial insemination in sheep as a substitute for imported progesterone drugs such as PIRD, CIDR and Synchronate B because, in addition to scarcity, imported hormone price is also quite expensive.

The general objective of this research was to produce porous implant implants applied under the skin inserted with an applicator (stainless introducer) containing Medroxy Progesterone Acetate (MPA) for estrus induction and synchronization material in big tail sheep strain Sapudi island of Madura. The result was expected as scientific information to assess the use of porous progesterone implants applied under the skin for therapeutic estrus induction and synchronization for the purpose of increasing livestock population. The study also searched to

determine a model of estrus induction treatment technology on big tail sheep strain Sapudi island of Madura, which has not been touched by reproductive technology.

Plastic Progesterone Implants Design

The required material specifications were 0.25 cm diameter plastic mold length of 2.5 cm made 2 mm pores; stainless introducer (as implant that pierce the sheep neck) 10 cm long with a pointed tip portion with a cavity of 0.25 cm for the implant can enter the cavity of steel introducer and at the upper end there is a booster to insert the implant under the skin of big tail sheep; Medroxy Progesterone Acetate (MPA) ; croda gelatin 1 kg ; 500 grams cyprofloxacin and 500 grams vaseline. The progesterone implant subcutaneously applied in big tail sheep had a diameter of 0.25 cm and a length of 10 cm.

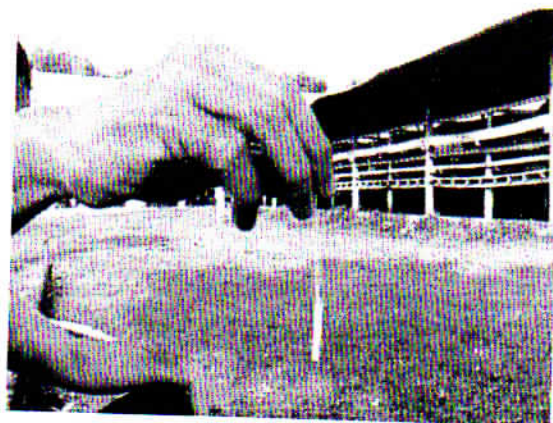


Figure 1. Plastic Progesterone Implant

On the implant design models in the required size, we made a hole of 2 mm with a pin to easily allow in subcutaneous absorption of progesterone. Charging of pure progesterone hormone made by Up John Company was weighed according to the need using analytical balance and added with croda gelatin.

Plastic Progesterone Implants Test on Big Tail Sheep

It required as many as 20 female big tail sheep who had produced offspring and aged more than 1 year, which were randomly divided into 4 groups with each treatment was subjected to 5 replications. After progesterone implants was removed on day 11, it was expected that estrus occurred on day. Before and after the removal, as much as 5 cc of blood was taken for examination of blood serum progesterone levels by RIA method. Control sheep were given with IM injection of 7 mg PGf2 α . In treatment P1, P2, and P3 the sheep were given with subcutaneous progesterone implant each 50 mg, 60 mg and 70 mg.

The Time of Estrus after Plastic Progesterone Implants Removal in Big Tail Sheep

In P0 5 female big tail sheep were given each with 7 mg PGf2 α IM. Then the P1, P2 and P3 were given with progesterone implants in doses of 50 mg, 60 mg and 70 mg MPA. Observation of the onset of estrus was started after the removal of Plastic Progesterone Implants on day 11. Estrus was expected to occur on day 13.

RESULTS

Decrease in progesterone levels until reaching the lowest levels in blood can stimulate the release of LH from the anterior pituitary. LH secretion from positive feedback of estrogen can cause ovulation (Hafez, 1993). Furthermore, it is suggested that when ovulation has occurred, LH levels will decline rapidly to the lowest levels in blood. LH will decrease followed by an increase in FSH production gradually and FSH is required to stimulate follicle growth. According to Mahaputra (1993) the

growing follicles enhances estrogen levels in the blood, and in the uterus prostaglandin is produced if fertilization does not occur. Furthermore, prostaglandin will cause regression of the corpus luteum and progesterone production decline sharply. Predominant estrogen in reproductive organs cause estrus for reproduction.

MPA absorption by vaginal mucosa will run slowly because of the presence of Croda Gelatin, so that on day 7 the hormone progesterone will be in the blood in high levels. According to Evans and Maxwell (1987) high progesterone causes silent uterus quiet, so if Plastic T Sponge MPA is removed, there will be a drastic decrease in progesterone which will be followed by uterine contractions caused by prostaglandin production.

Estrus due to the injection of PGf2 α is caused by PGf2 α vasoconstriction ability to luteolyzing the corpus luteum through hypoxia. As a result, the production of progesterone decreases sharply and eventually dominated by the hormone estrogen in the reproductive organs so that estrus finally appears (Ismudiono, 1996). Artificial insemination can be done after cows showing symptoms of estrus. Statistical analysis of the time of onset of estrus symptoms (hours) after the removal of Plastic Progesterone implants can be seen in Table 1.

Based on the results of the statistical analysis, the entire group of cows experienced estrus, but in control group (P0) where symptoms of estrus was delayed compared to cows with MPA implants treatment (P1, P2, P3). Whereas, between treatments receiving various doses of MPA (P1, P2, P3) there was no real difference, so that the use of MPA in smallest dose (50 mg) at P1 still produces symptoms of estrus.

Table 1. Mean and Standard Deviation of Estrus in Hours After Plastic Progesterone Implants Removal in Big Tail Sheep

Treatment	Mean Time of Estrus Onset \pm SD (Hours)
P0 (PGf2 α 7 mg)	53.20 ^a \pm 0.8367
P1 (MPA 50 mg)	48.40 ^b \pm 1.1402
P2 (MPA 60 mg)	48.60 ^b \pm 0.8944
P3 (MPA 70 mg)	48.60 ^b \pm 1.3416

Description : Different superscript in the same column indicates significant differences at the level of trust between the control and treatment groups ($P < 0.05$).

CONCLUSION AND RECOMMENDATIONS

This study has not drawn any conclusion because it is still in the process of conducting research that has been running for 75%. It is recommended that the disbursement of research funds should not be too long. Disbursement should be done by mid-year, so that in the future it could be disbursed earlier. It facilitates researchers to quickly conduct research and to carry out research in a more comfortable condition because they would not be pressed for time for reporting their accountability.

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