

FIELD TEST OF THE EFFECTIVENESS OF RABBIT SEMEN EXTENDER MRA-bit[®] INCORPORATING GnRH ANALOGUE.

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ABSTRACT

The aim of this work was to evaluate the efficacy of MRA-bit[®] rabbit semen extender based on reproductive performance of high number of lactating rabbit does inseminated under farm conditions. 2307 commercial hybrid multiparous lactating does (Hyplus strain PS19) belonging to four industrial rabbit farms (farm 1: 574 does; farm 2: 624 does; farm 3: 519 does and farm 4: 590 does) located in Galicia, Spain, were used. All the does were treated hormonally to synchronise the oestrus. The hormonal treatment consisted of 25 IU eCG (Gonaser[®]) subcutaneously injected in a volume of 1 ml, 48 h before AI. The 2307 does were randomly divided in 2 equal groups in each farm. All the does were inseminated during 3 successive cycles, at 42 days intervals. At the moment of AI, the 2 groups inseminated with the same heterospermic pool between treatments in different farms, received different hormonal treatments for ovulation induction: 1) control group: 0.2 ml of Lecirelina (Dalmarelin[®]) were intramuscularly injected immediately after AI; 2) experimental group: 0.5 ml of semen diluted with MRAbit[®] was inseminated. Despite different results between farms, neither kindling rate nor prolificacy was influenced by the ovulation method. In conclusion, on multiparous lactating rabbit does prepared for AI (light stimulation + eCG injection), MRA-bit[®] allows eliminating GnRH injection without affecting reproductive performance.

Keywords: Rabbit, artificial insemination, ovulation induction.

INTRODUCTION

Rabbits are induced ovulators and, therefore, when using artificial insemination (AI), ovulation has to be induced by artificial methods. The ovulation inducing method most frequently used is an intramuscular injection of GnRH or its synthetic analogues (Theau-Clément *et al.*, 1990). GnRH can be used by intravaginal administration, adding the hormone to the seminal dose, with similar results as those obtained by intramuscular injection (Quintela *et al.*, 2004; Quintela *et al.*, 2009). Since March 2010, MRA-bit[®], a new rabbit semen extender that incorporates GnRH analogue is commercialized (Kubus, S.A, Madrid, Spain).

The aim of this work was to evaluate the effectiveness of MRA-bit[®] rabbit semen extender on reproductive performance of a high number of lactating rabbit does, inseminated under farms conditions.

MATERIALS AND METHODS

Animals

Two thousand three hundred and seven commercial hybrid multiparous does (Hyplus strain PS19, Grimaud Frères Sélection, France) belonging to four industrial rabbit farms (Farm 1: 574 does; Farm 2: 624 does; Farm 3: 519 does and Farm 4: 590 does) located in Galicia, Spain, were used during the

experimental period (January-April 2010). Rabbit does were under a 12L:12D lighting program. Six days before AI, a light stimulation was applied by a sudden change of the lighting program from 12L:12D to 16L:8D. During the 4 days following AI, light was reduced 1 h per day, to recover the 12L:12D photoperiod.

Pregnant or lactating does were fed *ad libitum* whereas non-lactating does were restricted to 150 g·day⁻¹ of commercial feed except from the 6 days before AI to the day of pregnancy diagnosis, during which they were fed *ad libitum*. Two types of commercial diets were used: from 21 days *post partum* to weaning (30–35 days), for practical reasons, all does, including non-lactating females, were fed with a kits-suitable commercial feed (Coren – Medicado N “A”[®]), and during all other periods a maternity diet was used (Coren – Conejas madres[®]).

Reproductive management

All does were hormonally treated to synchronise oestrus. The hormonal treatment consisted of 25 IU eCG (Gonaser[®], Laboratorios Ovejero, Leon, Spain), subcutaneously injected in a volume of 1 ml, 48 h before AI.

All does, were inseminated at a 42 days interval during 3 successive reproductive cycles with the same heterospermic pool each day in all farms. Litters were homogenised to 10 kits. Controlled suckling was applied to all does from 0 to 11 days *postpartum*. From day 12 *post partum* (1 day after AI) to weaning (30–35 days *postpartum*) free suckling was allowed by keeping the nest box opened.

Parturitions took place mainly on day 30 post AI and in the morning of day 31. When all does had completed parturition, the number of born alive and dead kits/litter was recorded. Then, the number of rabbits per litter was adjusted to 10 kits of equal body size.

Experimental design

The 2307 does were randomly divided in 2 equal groups in each farm. At the moment of AI, the 2 groups received different hormonal treatments for ovulation induction:

1. Control group: 0.2 ml of Dalmarelin[®] intramuscularly injected immediately after AI
2. Experimental group: 0.5 ml of semen diluted with MRAbit[®] was inseminated.

Statistical analysis

Data on kindling rates were analysed by the logistic regression. Data on prolificacy were analysed using the GLM (General Linear Model) procedure of SPSS 10.0 software (SPSS Inc., Chicago, Illinois, USA), considering the effects of the treatments. Differences were considered statistically significant at the $P < 0.05$ level.

RESULTS AND DISCUSSION

The obtained results (Table 1) demonstrates that MRA-bit[®] extender was able to dilute rabbit semen and induces ovulation in rabbit does submitted to AI. Indeed, since there were no differences of fertility (81.9% and 82.8% for treatment and control, respectively) between the inseminated does by the traditional method or by diluting semen with MRA-bit[®] extender. Prolificacy was even higher in MRA-bit[®] group (12.23 vs 11.61 total born for treatment and control respectively) between the inseminated does by the traditional method or by diluting semen with MRA-bit[®] extender. Consequently, the productivity (total number of born alive for 100 inseminated does) was not depressed when semen is diluted with MRA-bit[®] extender (930 vs 902 for the traditional method).

Previous studies had demonstrated the possibility of adding directly GnRH to the seminal dose (Quintela *et al.*, 2004; Quintela *et al.*, 2009; Viudes de Castro *et al.*, 2007) with variable results. MRA-bit[®] extender, that incorporates a GnRH analogue, leads to similar efficiency that intramuscular hormone administration.

Table 1: Influence of the method of ovulation induction on reproductive performance (average ± standard deviation)

	Number of observations	Kindling rate (%)	Total born	Born alive
MRA-bit [®]	1217	81,9	12.23 ± 6,51	11.36 ± 6,77
Control	1090	82,8	11.61 ± 3,426	10.89 ± 3,74
<i>Significance</i>	<i>NS</i>	<i>NS</i>	<i>NS</i>	<i>NS</i>

In most rabbit farms, the GnRH administration is usually done by the farmer himself, with some risks of misuse, and increasing the time needed for each AI. Using a semen extender directly incorporating GnRH in its composition, and moreover prepared in the AI Center, would be beneficial for the farmer.

CONCLUSION

On multiparous lactating rabbit does prepared for AI (light stimulation + eCG injection), this study demonstrates that semen diluted with MRA-bit[®] leads to the same level of productivity at birth, than an intramuscular GnRH injection at the moment of insemination.

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