A PREGNANCY RATE COMPARISON USING ASIC'S Ab∑UI™HYDRAULIC INJECTION INSEMINATION SYSTEM

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Introduction

During the last decade, Intra-Uterine Insemination (IUI) has been developed and used both for research and practice on farm. The benefits of using IUI technique are not only to reduce the number of spermatozoa (1-2 x 10^9/dose) used at insemination (getting more sows to be inseminated) but also to diminish semen back flow and sperm losses after insemination. In pigs, it has been shown that the optimal insemination time in order to achieve a good fertilisation rate is within 24 h before ovulation. The ability of a pig oocyte to be fertilised has been considered to be as short as 8-12 h after ovulation. Subsequently, **insemination after ovulation results in impaired farrowing rate and litter size**. **In addition, it is well documented that the sows with a longer weaning-to-oestrus interval (WOI) had a shorter duration of oestrus, consequently had a shorter ovulation time (i.e. a shorter time from standing oestrus to ovulation)**. In other words, sows with a shorter weaning-to-oestrus had a longer duration of oestrus, and consequently had a longer ovulation time. **For that reason, the timing of AI should be adjusted by using the WOI. Nonetheless, this is the first study to be published on the relationship of WOI and timing of AI by using ASIC's Ab∑UI™ Hydraulic Injection Insemination System.** ASIC catheters contain a membrane (see picture) inside a foam tip which enables their catheter to easily go through the cervix by pressurizing a container of semen; **without damaging the cervix**. Therefore, the aim of the present study was to investigate the efficacy of using ASIC's Ab∑UI™ Hydraulic Injection Insemination System on the pregnancy rate after adjusted timing of AI with WOI.

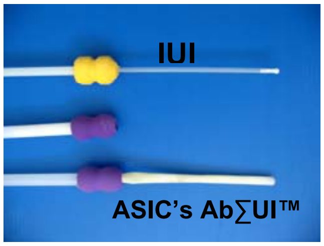
Materials and Methods

Forty crossbred (Landrace x Yorkshire) multiparous sows from a commercial herd with an average parity number of 3.6 ± 1.2 (mean ± S.D.) were used in this study. Prior to this study, the sows had shown a normal reproductive performance. The sows were kept in individual crates and boars were housed in the same stable throughout the experimental period. The sows were fed twice a day. Water was available ad libitum. *Oestrous detection* was performed by inspection of the vulva for reddening and swelling (prooestrus) as well as by control of the standing reflex (oestrus) in the presence of a boar. The oestrous detection was carried out twice daily. *Insemination*, sows were inseminated according to their WOI: 3-4 days, inseminated at 24 h and 36 h after standing oestrus; 5-6 days, inseminated at 12 h and 24 h after standing oestrus; ≥ 7days, inseminated at 0 h and 12 h after standing oestrus. Semen from boars of proven fertility were used during the experimental period. BTS extender was used for semen processing. Forty sows were divided into four groups: Group-A (10 sows): inseminated by using a foam tip (3 x 10^9 Spermatozoa/80ml); Group-B (10 sows): inseminated by using a foam tip (1.5 x 10^9 Spermatozoa/80ml); Group-C (10 sows): inseminated by using Ab∑UI™ catheter (3 x 10^9 Spermatozoa/80ml), Group-D (10 sows): inseminated by using Ab∑UI™ catheter (1.5 x 10^9 Spermatozoa/80ml). The insemination for a foam tip was carried out in the presence of a boar. However, when using Ab∑UI™ catheter, insemination was performed by absent of a boar. All sows were subjected to pregnancy diagnosis on days 20-22 after insemination by using real time ultrasound (50STringa, sector probe with 5 MHz, ESAOTE Pie Medical, The Netherlands).

Results

The average weaning to oestrous interval was 4.3 ± 0.9 (means ± S.D.) days, with a range of 3-9 days. The pregnancy rates were present in Table 1.

Groups	Pregnancy diagnosis (sows)	Pregnancy diagnosis (%)
A (n=10, 3 x 10^9 sperm/dose) **Foam**	**9/10**	**90%**
B (n=10, 1.5 x 10^9 sperm/dose) **Foam**	**8/10**	**80%**
C (n=10, 3 x 10^9 sperm/dose) **Ab∑UI™**	**10/10**	**100%**
D (n=10, 1.5 x 10^9 sperm/dose) **Ab∑UI™**	**10/10**	**100%**
Overall significance	NA	P< 0.05



Discussion and Conclusion

The present results confirm the previous studies in that a lower dose insemination (1.5 x 10^9 sperm) with Ab∑UI™- catheter does not negatively affect pregnancy rates. **Comparing ASIC's Ab∑UI™ catheters to foam tip catheters, a higher pregnancy rate was found with Ab∑UI™catheters.** This might be due to semen backflow being diminished when using Ab∑UI™catheters. However, further investigation is needed, in order to compare the farrowing rate and litter size. In conclusion, based on this result, the ASIC's Ab∑UI™ catheter can be an alternative IUI catheter for swine industry & also fixed time insemination using WOI as a tool resulted in a satisfy pregnancy rate.

Acknowledgement

Absolute Swine Insemination Co., LLL **(ASIC)** USA, is thanked for providing **ASIC Ab∑UI™** catheters for the experiment.

Experiment I (sperm distribution and fertilisation rate)

Table 1. Distribution of the sows, and numbers (means ± SD) of large follicles, corpora lutea (CL) in the different experimental groups

Groups	Catheter	Number of follicles or CL	Time of surgery
I (n=4)	Ab∑UI™-1.5	21.7 ± 0.6*	5-6 h after AI
II (n=5)	Ab∑UI™-3.0	19.2 ± 4.7*	5-6 h after AI
III (n=5)	Foam tip-1.5	20.0 ± 3.5*	5-6 h after AI
IV (n=3)	Foam tip-3.0	20.5 ± 2.4*	5-6 h after AI
V (n=5)	Ab∑UI™-1.5	21.2 ± 1.1	48-72 h**
VI (n=5)	Ab∑UI™-3.0	16.3 ± 3.1	48-72 h**
VII (n=4)	Foam tip-1.5	20.3 ± 1.5	48-72 h**
VIII (n=4)	Foam tip-3.0	20.5 ± 3.9	48-72 h**

*Numbers of follicles
** First day of standing oestrus = day 0

Table 2. Numbers of sows with oviductal segments containing spermatozoa at 5-6 h after AI

Groups	UTJ	Isthmus-P	Isthmus-M	Isthmus-D
Ab∑UI™-1.5 (n=4)	1/4	-	-	-
Ab∑UI™-3.0 (n=5)	3/5	1/5	-	-
Foam tip-1.5 (n=5)	2/5	1/5	1/5	1/5
Foam tip-3.0 (n=3)	2/3	-	-	-
Significance	NS	NA	NA	NA

NS = not significant; NA= not analysis

Table 3. Numbers of oocytes and cleaved oocytes at 48-72 h after ovulation

Groups	1 cell	2 cell	4 cell	6 cell	8 cell	Total	Oocytes with spermatozoa in the ZP	Fertilised	%
Ab∑UI™--1.5	57	24	8	-	-	89	44/89	89/89	100%
Ab∑UI™--3.0	34*	7	24	2	-	67	2/67	66/67	98.51%
Foam-1.5 (n=4)	27**	9	29	4	-	69	3/69	42/63	66.67%
Foam-3.0 (n=4)	41	16	-	-	-	57	8/57	30/57	52.64%
Significance	NA	NA	NA	NA	NA	NA	NA	P < 0.01	

* = 1 degenerated ; **=7 dgenerated
Test for fertlisation rate is significant at P<0.01 (GLM, Univariate analysis of variance, SPSS programme)
Test for both catheter (Ab∑UI™- vs Foam tip) is significant at P < 0.01 (Independent T test, SPSS programme)

Experiment II (%PR, %FR, NTB and NBA)

Table 4. (data from Banglan farm) Percentage of Pregnancy rate (PR), percentage of Farrowing rate (FR), number of total born (NTB) and number of born alive (NBA)

Groups	%PR	%FR	NTB	NBA
Ab∑UI™-1.5 (n=10)	100	80	11.4 + 2.7	9.9 + 2.6
Ab∑UI™--3.0 (n=10)	100	80	13.0 + 2.0	11.5 +1.9
Foam tip-1.5 (n=10)	80	50	12.8 + 4.4	12.2 + 3.6
Foam tip-3.0 (n=10)	90	70	11.3 + 4.5	11.9 + 2.6
Significance	NS (P=0.1)	NS (P=0.3)	NS (P=0.3)	NS (P=0.1)

For all the parameters, no extreme significance was found; however, a tendency to improve %PR and %FR "was found" and this is a good thing.
Profits and overall farm efficiencies resulting from increased conception and farrowing rates can be very significant!

Non-parametic test, Cochran test, and SPSS programme was used to compare %PR and %FR.
GLM, Univariate analysis of variance, Duncan's test, and SPSS programme was used to compare NTB and NBA

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