Production of female pigs by embryo sexing using the porcine amelogenin gene

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INTRODUCTION

Pre-determination of sex in livestock offspring is of critical importance for the efficient production of the world's food supply. Although several methods of sex identification exist, including cytogenetic analyses, H-Y antigen, measurement of X-linked enzymes and Y-chromosome-specific probes, polymerase chain reaction (PCR) amplification of sex specific DNA sequences is a relatively simple, rapid, inexpensive and highly accurate method. During the last years, molecular sexing was based on amplification of SRY gene. However, recent studies are focused on amplification of genes present in both males and females.

MATERIALS AND METHODS

In the present study, we designed a specific non degenerate primer pair for amplification of the porcine amelogenin (AMEL) gene. Amel gene is present in both X (AMELX) and Y (AMELY) porcine chromosomes and based on the differences in the introns of the two alleles, we aligned the sequences of AMELX and AMELY genes and designed a non degenerate primer pair for PCR amplification in a single reaction. DNA was extracted from 50 male and 50 female pigs, as well as from 20 porcine embryos produced *in vitro*.

RESULTS

PCR performed in DNA extracted from 50 male and 50 female pigs revealed the 100% accuracy of this method, by successfully confirming the sex of each DNA sample tested. (Figs 1 and 2).

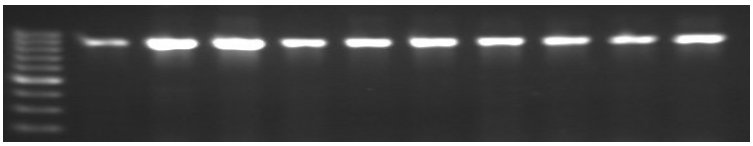

Figure 1. PCR amplification in porcine female DNA samples

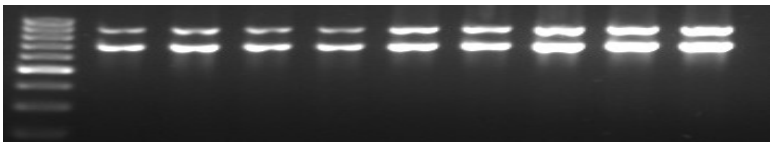

Figure 2. PCR amplification in porcine male DNA samples.

Furthermore, we successfully applied this PCR method for the sex determination of individual porcine embryos. As illustrated in Figure 3, we successfully applied this PCR method for the sex determination of individual porcine embryos.

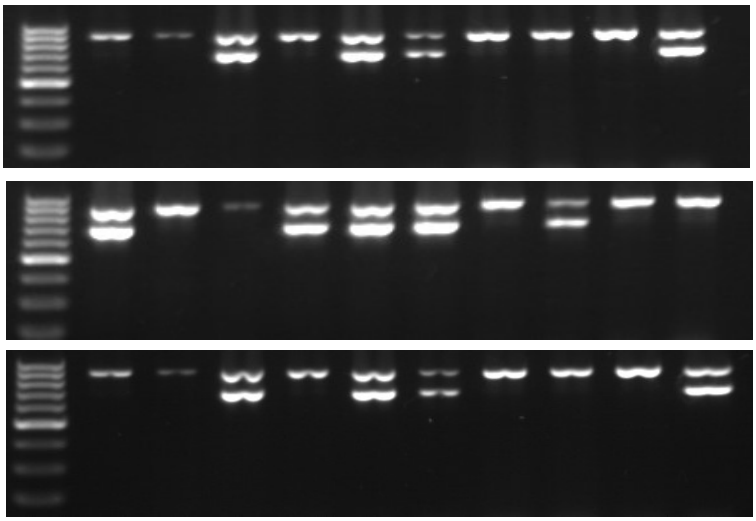

Figure 3. PCR amplification in porcine blastocysts DNA samples.

CONCLUSIONS

In conclusion, our findings show that the described PCR based assay on the *AMEL* gene is reliable for sex identification of porcine *in vitro* produced embryos. This study shows that the present method is a simple, cheap and highly precise method for porcine sex identification, which can be applied in breeding programs to facilitate manipulation of the sex ratio of offspring.

➢REFERENCES

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