

Comparative analysis of Embryo development According to Goat oocyte grade, Fertilization time, *In Vitro* Culture Method

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Abstract

Owing to the growing interest in the consumption of health food, public interest in goats has been increasing. An embryonic *in vitro* culture technique capable of embryo transfer is required to ensure prolific goat genetic resources. Here, we analyzed the effects of goat oocyte grade, fertilization time, and *in vitro* culture method on *in vitro* goat oocyte maturation and embryo culturing. The oocyte grade was evaluated according to cytoplasm and cumulus cells using fertilization times of 6, 12, and 18 h. *In vitro* culture methods were divided into steps and the development rate was analyzed. *In vitro* maturation rates differed depending on oocyte grade, along with differences in embryo development rates. When analyzed by fertilization time, there was no difference in the cleavage rate between 6 h (87.38%), 12 h (84.85%), and 18 h (88.79%). Furthermore, embryo development rate remained unchanged between 6 h (31.07%) and 18 h (32.71%). However, the blastocyst rate was low at 12h (25.25%). Embryo development rates did not significantly differ between steps; 26.32% and 23.81% in the first and second steps, respectively. Our study findings indicate that it is essential to use high-grade oocytes for successful embryo development, whereas fertilization time and *in vitro* culture steps do not have significant effect. In future studies, additional research on *in vitro* goat embryo culturing will be necessary. Conclusively, the establishment of a dependable *in vitro* fertilized goat embryo system will contribute to successful goat husbandry.

Keywords : Goat, Embryo, Oocyte grade, *In vitro* fertilization