

## ABSTRACT

### BIOLOGICAL POTENCY OF PREGNANT G3-G4 CROSSBREED MARE SERUM DERIVED BIOACTIVE MATERIAL INSULIN-LIKE GROWTH FACTOR-I IN BOVINE IN VITRO FERTILIZATION

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**Background:** In order to meet the needs of the animal protein, one of the efforts is increasing cattle population using reproductive biotechnology. In vitro fertilization is a technique that is expected to provide superior livestock mass production, but the problem is that the materials needed still have to be imported at a high price as well. Optimization of in vitro fertilization technique can be implemented by supplementing materials which are cheap and easily available in the country. Indonesia has a national racehorse, the G3-G4 crossbreed. In pregnant mare serum there is insulin-like growth factor-I (IGF-I) which is expected to be utilized to improve the outcome of in vitro fertilization.

**Objective:** This study aimed to verify the effect of pregnant G3-G4 crossbreed mare serum derived IGF-I supplementation into in vitro fertilization media on the increase of oocyte maturation and embryo cleavage rates.

**Methods:** IGF-I was obtained from pregnant G3-G4 crossbreed mare serum after separation by means of sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE) and specificity confirmation by means of western blot using IGF-I antibody, rabbit polyclonal IgG IGF-I (G17) followed with elution. Oocyte maturation with the supplementation of IGF-I eluate were compared to those of the patent IGF-I, each with a concentration of 5, 10 and 20 ng/ml as well as to those of the negative control (oocyte maturation without supplementation) and the positive control (oocyte maturation supplemented with 15 IU pregnant mare serum gonadotropin, PMSG). Matured oocytes were then inseminated with frozen semen of elite bull. The observed variables were the percentage of matured oocytes and cleaved embryos at 48 hours after fertilization.

**Results:** SDS-PAGE and western blot visualized the presence of IGF-I protein band at the molecular weight of 7.65 kDa. Elution of IGF-I protein band yielded a concentration of 250 ng/ml. Results of in vitro fertilization showed that the percentage of oocyte maturation and embryo cleavage were not significantly different ( $p>0.05$ ) between oocyte maturation group supplemented with IGF-I eluate, patent IGF-I and the positive control (PMSG), but were significantly different ( $p<0.05$ ) compared to the negative control.

**Conclusion:** From the results of this study, it could be concluded that pregnant G3-G4 crossbreed mare blood serum IGF-I concentration varied during various gestation ages, and IGF-I eluate and IGF-I patent there were no significant difference ( $p>0.05$ ) to increased the percentage of bovine oocyte maturation and embryo cleavage.

**Keywords:** Insulin-like growth factor-I, crossbreed mare serum, maturation, cleavage, cow oocytes