IMPACT OF DIFFERENT LASER LEVELS ON IN-VITRO FERTILIZATION (IVF) AND BLASTOCYST HATCHING IN DROMEDARY CAMELS

By

MAIADA WAGDY AHMED ALLAM

B.Sc. Agric. Sc. (Animal Production), Ain Shams University, 2005
M. Sc. Thesis, Agric. Sc. (Animal Physiology), Ain Shams Univ., Egypt, 2011

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ABSTRACT

Maiada Wagdy Ahmed Allam. Impact of Different Laser Levels on In-Vitro Fertilization (IVF) and Blastocyst Hatching in Dromedary Camels. Unpublished Ph.D. Thesis, Department of Animal Production, Faculty of Agriculture, Ain Shams University, 2019.

Two experiments were carried out. The first experiment aimed to define the impact of different laser irradiation levels on *in-vitro* maturation *(IVM)* during breeding season. Oocytes were categorized as Germinal vesicle (GV), Germinal vesicle breakdown (GVBD), Metaphase I (M I), Metaphase II (M II) and Degenerated oocytes (DO) stages. The second experiment aimed to define the effect of oocytes treated with laser irradiation on *in- vitro* Fertilization *(IVF)* such as Penetration rate (PR), Fertilization rate (FR), Second polar body (2^{nd}PB) and Abnormal fertilization rate (AFR) stages during breeding season.

The present study aimed to evaluate the impact of high sensitive and low costly technique of laser irradiation of oocytes at certain wavelength for improvement of dromedary she-camel oocytes maturation with study the laser impact at nuclear maturation and fertilization. Three different laser irradiation levels (Blue, Green and Red laser light) at 488 nm, 532 nm and 632 nm wavelength, respectively were used. Continuous wave (CW) from a diode laser light with a total output power at 3 mW have been used to irradiate oocytes for different durations intervals.

Five oocyte groups were carried out. The first group was unexposed to laser light irradiation and kept as control group (0, un-irradiated). The other four groups were exposed to laser light irradiation for 2, 3, 4 and 5 minutes to define the effect of laser irradiation on *in-vitro* maturation *(IVM)* and fertilization *(IVF)* of the dromedary she-camel oocytes. A total number of 177 clinically healthy dromedary she-camels was used in this study. The age of these camels varied from 5 to 10 years or more and their body weights (BW) were approximately 500-600 kg.

Ovaries were collected from slaughtered animals, oocytes were collected by aspiration technique and matured in TCM-199 medium in CO_2 incubator (5% CO_2) at 38.5°C and high humidity for 42 h.

In the first experiment, after maturation the obtained results showed that the highest ($P<0.05$) value of the GV, GVBD, M I and DO was recorded at exposed to laser irradiation for 5, 4, 3 and 5 min at 488 nm, 4, 5, 0 and 3 min at 532 nm and 2, 4, 0 and 3 min at 632 nm wavelength, respectively. Meanwhile, the M II was recorded at exposure to laser irradiation at control, 4 and 2 min at 488 nm, 532 nm and 632 nm wavelengths, respectively.

In the second experiment, the obtained results revealed that the highest ($P<0.05$) value of the PR and AFR was recorded at exposure to laser irradiation to 4 min at 488 nm and 532 nm and 4 and 5 min at 632 nm, respectively. Whereas the FR and 2^{nd}PB expulsion was represented at control, 4 and 2 min at 532 nm and 4 min at 632 nm and control, respectively.

In conclusion, the exposure of laser irradiation for 2, 4 and 2 min at 488 nm, 532 nm and 632 nm wavelength, respectively improved *in-vitro* nuclear maturation of immature oocytes in dromedary she-camels and exposure to 4 min at 532 nm and 632 nm wavelength increased penetration, fertilization rate and 2^{nd} polar body expulsion.

Key words: She-camels, Oocytes, Laser irradiation, *In-vitro* Maturation, *In-vitro* Fertilization

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