

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

By

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

**A Thesis Submitted in Partial Fulfillment
Of
The Requirements for the Degree of**

**DOCTOR OF PHILOSOPHY
in
Agricultural Sciences
(Animal Physiology)**

**Department of Animal Production
Faculty of Agriculture
Ain Shams University**

2019

Approval Sheet

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Date of Examination: 11 / 4 / 2019

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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 Unpublished Ph.D. Thesis, Department of Animal Production, Faculty of Agriculture, Ain Shams University, 2019.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 (2ndPB) 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 CO₂ incubator (5% CO₂) 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 2ndPB 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 2nd polar body expulsion.

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

ACKNOWLEDGEMENT

In actual fact the prayerful thanks are due to our **MERCIFUL ALLAH** who gave me the ability and patience to finish this work.

Special acknowledgement and sincere appreciation to **Dr. Essmat Bakry Abdalla**, Professor Emeritus of Animal Physiology, Department of Animal Production, Faculty of Agriculture, Ain Shams University, for his sharing in suggesting the subject of this study, close supervision, constructive criticism, valuable advices and great help in preparation of the manuscript.

Special acknowledgement and sincere appreciation to **Dr. Farouk Abdalla El-Sayed Khalil**, Professor Emeritus of Animal Physiology, Department of Animal Production, Faculty of Agriculture, Ain Shams University, for his helping in revision the manuscript, valuable advices.

Special thanks and deep gratitude are due to **Dr. Alaa El-Sayed Bellasy Zeidan**, Head of Research of Physiology of Reproduction and Artificial Insemination (AI), Animal Production Research Institute (APRI), Agricultural Research Center (ARC), for his direct and excellent supervision, appreciable help, great interest, sharing in suggesting the problem, revision the manuscript, valuable guidance and encouragement throughout the different phases of this work and help during the writing of this manuscript.

Hearty thanks and special gratitude extended to **Dr. Zienab Abdel-Fattah Mohammed Abdel-Salam**, Assistant Professor of Laser Applications in measurements, photochemistry and agriculture Department (LAMPA), National Institute of Laser Enhanced Sciences (NILES), Cairo University, Giza, Egypt. for her kind help and good cooperation with me and to provide the necessary potential in conducting and implementing laboratory experiment in Laser Atomic Spectroscopy Laboratory and her participation in solving the proposed problem and her encouraging continually to finish the work to the fullest.

Special thanks and deep gratitude extended to **Dr. Magdy Ramadan Badr**, Head of Research of Artificial insemination (AI) and Embryo transfer (ET) Department, Animal Reproduction Research Institute (ARRI), Haram, Giza, Egypt, for his kind help and good cooperation with me and to provide the necessary potential in conducting and implementing laboratory experiment in Embryo transfer Laboratory and sharing in suggesting the problem.

Special thanks and deep gratitude extended to **Staff Members** at a local Automated El-Bassatein Abattoir, Cairo, for their kind help in the experimental work.

Special thanks and deep gratitude extended to **Staff Members** of the Department of Animal Production, Faculty of Agriculture, Ain Shams University, for their help during this work.

Last but not least, hearty thanks and gratitude for **my lovely Mother** and **the spirit of my beloved Father, my lovely Sister (Yara)** and **my dear Brothers (Ahmed, Amr and Loui)** for their encouragement throughout the different periods of this work.

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