UNIVERSITI PUTRA MALAYSIA

SEMINAL CHARACTERISTICS OF GENETICALLY IMPROVED FARMED TILAPIA (GIFT) STRAIN INDUCED WITH DIFFERENT DOSES OF SPAWNING AGENT

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SEMINAL CHARACTERISTICS OF GENETICALLY IMPROVED FARMED TILAPIA (GIFT) STRAIN INDUCED WITH DIFFERENT DOSES OF SPAWNING AGENT

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CERTIFICATION

It is hereby certified that we have read this project paper entitled "Seminal Characteristics of Genetically Improved Farmed Tilapia (GIFT) Strain Induced with Different Doses of Spawning Agent", by Nur Syafiqah binti Abdul Aziz and in our opinion it is satisfactory in terms of scope, quality, and presentation as partial fulfillment of the requirement for the course VPD 4999 – Project

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DEDICATIONS

This project paper is dedicated to Allah S.W.T., who had created me and made all things possible,

To my family,

Father

Mother

Brothers & Sisters

And to all my lecturers who have committed themselves towards the noble cause of education.

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LIST OF ABBREVIATIONS

%	Percent
L	Liter
ml	Milliliter
µl	Microliter
µm	Micrometer
g	Gram
cm	Centimeter
mm	Millimeter
ml/kg	Milliliter per Kilogram
mOsm/kg	Milliosmoles per Kilogram
g/L	Gram per Liter
mg/L	Milligram per Liter
GIFT	Genetically Improved Farmed Tilapia
SGnRH	Salmon Gonadotropin-releasing hormone
GnRH	Gonadotropin-releasing hormone
PG	Pituitary Gland
hCG	Human Chorionic Gonadotropin
LRHa	Luteinizing Releasing Hormones Analogues

ABSTRAK

Abstrak daripada kertas projek yang dikemukakan kepada Fakulti Perubatan Veterinar untuk memenuhi sebahagian daripada keperluan kursus VPD 4999 - Projek

CIRI – CIRI SEMINAL DALAM STRAIN GENETICALLY IMPROVED FARM TILAPIA (GIFT) DIBAWAH PENGARUH AGEN PENELURAN DENGAN MENGGUNAKAN DOS BERBEZA

Oleh

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Strain Genetically Improved Farm Tilapia (GIFT) telah dihasilkan dari tilapia *Nile* melalui pembiakan selektif dan telah diternak secara meluas kerana mempunyai daya tahan yang tinggi terhadap pelbagai keadaan air. Hasil kajian ke atas kesan agen peneluran (untuk merangsang kematangan dan meninggikan pengeluaran sperma) terhadap ciri – ciri sperma yang dihasilkan oleh strain GIFT adalah sangat terhad. Kajian

ini dilaksanakan untuk mengetahui kesan dos berbeza bagi agen peneluran (Ovaprim®) ke atas ciri – ciri sperma strain GIFT serta untuk menentukan dos optimum bagi agen peneluran. Terdapat empat kumpulan rawatan yang terdiri daripada 0 (kawalan), 0.1, 0.3 dan 0.5 ml/kg dan berat badan adalah di antara 200 hingga 360 gram. Suntikan intraotot dilakukan terhadap ikan tersebut dan sperma diambil selepas 12 jam (tempoh pengeraman) melalui tekanan lembut pada abdomen. Hasil sperma perlu dicatit dan parameter sperma seperti tumpatan, pergerakan, kebolehhidupan dan morfometri sperma perlu dinilai. Terdapat perubahan ketara untuk pergerakan sperma tetapi tiada perubahan ketara untuk parameter lain. Kumpulan rawatan 0.5 ml/kg mempunyai purata yang tertinggi bagi tumpatan, pergerakan dan kebolehhidupan sperma, yang mana berupaya untuk menjadi dos optimum bagi Ovaprim®. Oleh yang demikian, semua parameter yang diuji perlu dinilai untuk mengenalpasti kuantiti dan kualiti sperma.

Kata kunci: *strain GIFT, agen peneluran, sperma, dos optimum*

ABSTRACT

An abstract of the project paper presented to the Faculty of Veterinary Medicine, UPM in partial requirement for the course of VPD 4999 – Project.

SEMINAL CHARACTERISTICS IN GENETICALLY IMPROVED FARM TILAPIA (GIFT) STRAIN INDUCED WITH DIFFERENT DOSES OF SPAWNING AGENT

By

Nur Syafiqah binti Abdul Aziz

2016

Supervisor: Assoc. Prof. Dr. Rosnina binti Hj. Yusoff

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Genetically Improved Farm Tilapia (GIFT) strain was developed through selective breeding of Nile tilapia and was cultured worldwide due to its ability to tolerate wide range of water conditions. There were limited studies on the effects of spawning agent (to induce maturation and increase milt production) on seminal characteristics of GIFT strain. This study was carried out to determine the effects of different doses of a spawning agent (Ovaprim®) on seminal characteristics of GIFT

strain as well as to determine the optimum dose of the spawning agent. There were four treatment groups which consisted of 0 (control), 0.1, 0.3 and 0.5ml/kg and the body weight was between the range of 200 to 360 grams. The fish was injected intramuscularly and the milt was collected after 12 hours (latency period) through gentle abdominal pressure. The volume of milt was recorded and sperm parameters such as sperm density, motility, viability and morphometry were evaluated. There was significant difference for sperm motility but other parameters were not significance. Treatment group 0.5 ml/kg has the highest mean for sperm density, motility and viability, which made it as the optimum dose for Ovaprim®. Thus, these parameters are usually being used to determine the sperm quantity and quality.

Keywords: *GIFT strain, spawning agent, milt, optimum dose*

1.0 INTRODUCTION

Tilapia is a freshwater species of the family, Cichlidae and is cultured worldwide for its hardiness as it is able to tolerate a wide range of temperature and salinity (Asian Development Bank, 2005). Nile tilapia was chosen for the breeding program of Genetically Improved Farmed Tilapia (GIFT) strain due to its short generation time of about six months (Asian Development Bank, 2005) compared with other tilapia species including Mozambique, red and black tilapia.

There are several hormonal agents that are commercially available for induction of spawning. These include pituitary gland (PG), human chorionic gonadotropin (hCG), and luteinizing releasing hormone analogues (LRHa). In two recent studies, African catfish has shown success in increasing its sperm quality and quantity when spawning is induced with the synthetic agent, Ovaprim® (Kasi *et al.*, 2015; Gbemisola and Adebayo, 2014). In addition, Ovaprim® was also effective in inducing final maturation, increasing milt production and improving the fecundity in African catfish (Kasi *et al.*, 2015; Achionye-Nzeh and Obaroh, 2012), fresh water Angelfish (Chatterjee *et al.*, 2013) and Rohu (Naeem *et al.*, 2013). However, from our literature search, Ovaprim® has not been used to induce spawning in GIFT strain. Therefore, due to the limited study on the effects of Ovaprim® on the seminal characteristics of GIFT strain, this project was conducted. GIFT strain was chosen due to its availability at the Department of Aquaculture, Faculty of Agriculture, UPM. It is hardy and has a faster growth rate (Asian Development Bank, 2005) compared with other tilapia strains or species.

This study was initiated with the objectives to compare the seminal characteristics of GIFT strain induced with different doses of Ovaprim® and to establish the optimum dose of Ovaprim® in GIFT strain in order to significantly increase tilapia production in meeting the demand for freshwater fish in Malaysia. The justifications for this study includes, to induce and synchronize spawning at any time convenient to the fish farmer as well as to increase freshwater aquaculture production due to decreasing marine fish production.

1.1. HYPOTHESIS

Null hypothesis (H_0) : Whole milt density and individual sperm morphometry, motility and viability are similar in GIFT strain tilapia induced with different doses of spawning agent.

Alternative hypothesis (H_A) : Whole milt density and individual sperm morphometry, motility and viability are different in GIFT strain tilapia induced with different doses of spawning agent.

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