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PLASMA BOVINE GROWTH HORMONE (bGH) IN BUFFALOES AND ITS ASSOCIATIONS WITH SELECTED PHENOTYPES

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PLASMA BOVINE GROWTH HORMONE (bGH) IN BUFFALOES AND ITS ASSOCIATIONS WITH SELECTED PHENOTYPES

BY

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It is hereby certified that we have read this project paper entitled "Plasma Bovine Growth Hormone (bGH) in Buffaloes and Its Associations with Selected Phenotypes" by Nur Husna Atika binti Azhar and in my opinion; it is satisfactory in terms of scope, quality and presentation as partial fulfillment of the requirement for the course VPD 4901 – Project

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In the name of Allah, The Most Graceful and The Most Merciful

To

Beloved parents

Azhar Ahmad & Halimahtun Sa`diah Jap

Siblings

Muhammad Azfar Halimy Azhar

Nur Husni Athirah Azhar

Muhammad Afiq Hafizi Azhar

Families & friends

Lecturers and staff

Lovable little furry and scaly friends

&

All animals alive in this small yet cruel world

Thank you very much

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In the name of Allah, The Most Graceful and The Most Merciful

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LIST OF ABBREVIATIONS

bGH	bovine Growth Hormone
ELISA	Enzyme-linked Immunosorbent Assay
FPV	Faculty of Veterinary Medicine
GH	Growth Hormone
ITIS	Integrated Taxonomy Information System
SE	Standard Error
UPM	Universiti Putra Malaysia

ABSTRAK

Abstrak daripada kertas projek yang dikemukakan kepada Fakulti Perubatan Veterinar untuk memenuhi sebahagian daripada keperluan kursus VPD 4999 – Projek Ilmiah Tahun Akhir

PLASMA HORMON PERTUMBUHAN LEMBU (bGH) DALAM KERBAU DAN KAITANNYA DENGAN FENOTIP TERPILIH

Oleh

Nur Husna Atika Binti Azhar

2016

Supervisor: Dr. Mohd Shahrom bin Salisi

Co-supervisor: Dr. Mark Hiew Wen Han

Empat puluh kerbau dengan fenotip yang berbeza telah digunakan di dalam kajian ini. Fenotip yang dikaji adalah baka, jantina, berat badan semasa, umur, berat lahir dan umur matang. Sampel darah diperolehi dari urat coccygeal ke dalam tiub ethylenediamine tetraacetic asid (EDTA). Plasma diperolehi selepas pengemparan pada 3000 rpm selama 15 minit. Kepekatan plasma hormon pertumbuhan lembu telah dinilai menggunakan kit komersial

dari Novateinbio Bovine Growth Hormone ELISA Kit yang menggunakan prinsip kuantitatif ELISA sandwich. Data-data pada fenotip terpilih dikumpulkan daripada rekod ladang daripada tahun 2006 hingga 2015 secara retrospektif. Dari segi baka, tiada perbezaan yang signifikan ($p>0.05$) antara Swamp dan Murrah Cross untuk kepekatan plasma hormon pertumbuhan lembu. Tiada juga perbezaan yang signifikan ($p>0.05$) antara kerbau betina dan jantan untuk kepekatan plasma hormon pertumbuhan lembu. Dalam kumpulan umur, tiada perbezaan yang signifikan ($p>0.05$) di antara kumpulan kerbau muda, dewasa dan tua untuk kepekatan plasma bGH. Pekalikorelasi (r) di antara kepekatan plasma hormon pertumbuhan lembu, berat badan, umur, berat lahir dan umur matang telah diuji di mana kepekatan plasma hormon pertumbuhan lembu telah dikaitkan secara negative dengan berat badan ($r = -0,069$), umur ($r = -0,111$), berat lahir ($r = -0,141$) dan umur matang ($r = -0,062$). Kesimpulannya, dalam kajian ini, kepekatan plasma hormon pertumbuhan lembu tidak menunjukkan sebarang kaitan dengan fenotip yang dipilih.

Kata Kunci: Kerbau, hormon pembesaran, fenotip, ELISA

ABSTRACT

Abstract of the project paper presented to the Faculty of Veterinary Medicine in partial fulfillment of the requirement for VPD 4999 – Final Year Project

BOVINE GROWTH HORMONE (bGH) IN BUFFALOES AND ITS ASSOCIATION WITH SELECTED PHENOTYPES

By

Nur Husna Atika Binti Azhar

2016

Supervisor: Dr. Mohd Shahrom bin Salisi

Co-supervisor: Dr. Mark Hiew Wen Han

Forty buffaloes with different phenotypes were used in the study. The phenotypes were the breed, sex, current body weight, age, birth weight and age at puberty. Blood samples were collected from the coccygeal vein into ethylenediamine tetraacetic acid (EDTA) tubes. Plasma was harvested after centrifugation at 3000 rpm for 15 minutes. Concentrations of plasma bovine growth hormone (bGH) were determined by quantitative sandwich ELISA using commercial kits from Novateinbio Bovine Growth Hormone ELISA Kit.

The data on selected phenotypes were collected from the farm records retrospectively between 2006 and 2015. Breeds wise, there was no significant difference ($p>0.05$) among Swamp and Murrah Cross in plasma bGH concentration. There was also no significant difference ($p>0.05$) among female and male buffaloes in plasma bGH concentration. In age groups, there was no significant difference ($p>0.05$) among young, adult and old buffaloes in plasma bGH concentration. The correlation coefficient between (r) between plasma bGH concentration, body weight, age, birth weight and age at puberty were tested which plasma bGH concentration was negatively correlated with body weight ($r = -0.069$), age ($r = -0.111$), birth weight($r = -0.141$) and age at puberty ($r = -0.062$). Thus, in this study, plasma bGH concentration did not showed any association with selected phenotypes.

Key Words: Buffaloes, growth hormone, phenotypes, ELISA

1.0 INTRODUCTION

Integrated Taxonomy Information System (ITIS) documented that buffaloes belong to the mammalian class of the family of Bovidae. Buffalo can be classified into two main species of buffalo which are the Asiatic buffalo (*Bubalus bubalis*) and the African buffalo (*Syncerus caffer*) (Iannuzzi & Meo, 2009). The domestic water buffalo (Bubalus bubalis) has two subspecies which are the river buffalo and the swamp buffalo. The river or dairy type had different breeds for example Murrah and Nilli Ravi. According to a journal on the current status and challenges in buffalo production in Malaysia, in year 2004, the total population of buffaloes in Malaysia is 138 098 heads and 95% of this population was swamp buffaloes (Mazni *et al*., 2006).

Visceral and skeletal growth, protein, lipid and carbohydrate metabolism of an animal was controlled by hormonal secretion. One of the hormones that responsible for these mechanisms is growth hormone (GH). It was the hormone that stimulates growth, especially the polypeptide hormone that is secreted by the anterior pituitary gland (Studdert *et al*., 2011). Level of GH was found to have association with growth performance. Animals with high level of GH showed enhanced growth performance. Hence, endogenous GH level is suited to be a tool to select animals as high level of endogenous GH

helps to explore superior growth traits of the animal (Wickramaratne *et al*., 2010).

For quantifying the concentration of GH in blood, hormone assays involves many methods and the most frequently used method is Radioimmunoassay (RIA). Other non-radioactive method which is the enzyme immunoassay method (EIA) or enzyme-linked immunosorbent assay (ELISA) which can be considered beneficial in terms of analytical, operational, and clinical outcomes (Sachidhanandam *et al*., 2010). ELISA was claimed to have short duration of time needed for result interpretation which can be done in less than 24 hours (Mishra *et al*., 2007). The study of the association between the concentration of bGH and the selected phenotypes in buffaloes will provide information on the profile of the bGH in buffaloes. The profile of plasma bGH concentration can be use as an aid in selection of buffaloes as animals with high level of GH concentration exhibited enhanced growth performance. On the other hand, there is limited study done on the association of certain phenotypes with bGH in buffaloes.

The study of the association between the concentration of bGH and the selected phenotypes in buffaloes will provide information on the profile of the bGH in buffaloes. The profile of plasma bGH concentration can be use as an aid in selection of buffaloes as animals with high level of GH concentration

exhibited enhanced growth performance. On the other hand, there is limited study done on the association of certain phenotypes with bGH in buffaloes.

The objective of this study is to determine the concentration of bovine GH (bGH) in buffaloes and to investigate the association between the concentration of bGH and the selected phenotypes in buffaloes.

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