



**UNIVERSITI PUTRA MALAYSIA**

***ANTIMICROBIAL PROPERTIES OF SERUM FROM CAPTIVE  
ESTUARINE CROCODILE (*Crocodylus porosus*) AND FALSE  
GHARIAL (*Tomistomaschlegelii*)***

**ADILAH BINTI ISHAK**

**FPV 2018 3**

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(*Tomistomaschlegelii*)**

**ADILAH BINTI ISHAK**

A project paper submitted to the

Faculty of Veterinary Medicine, Universiti Putra Malaysia

In partial fulfillment of the requirement for the

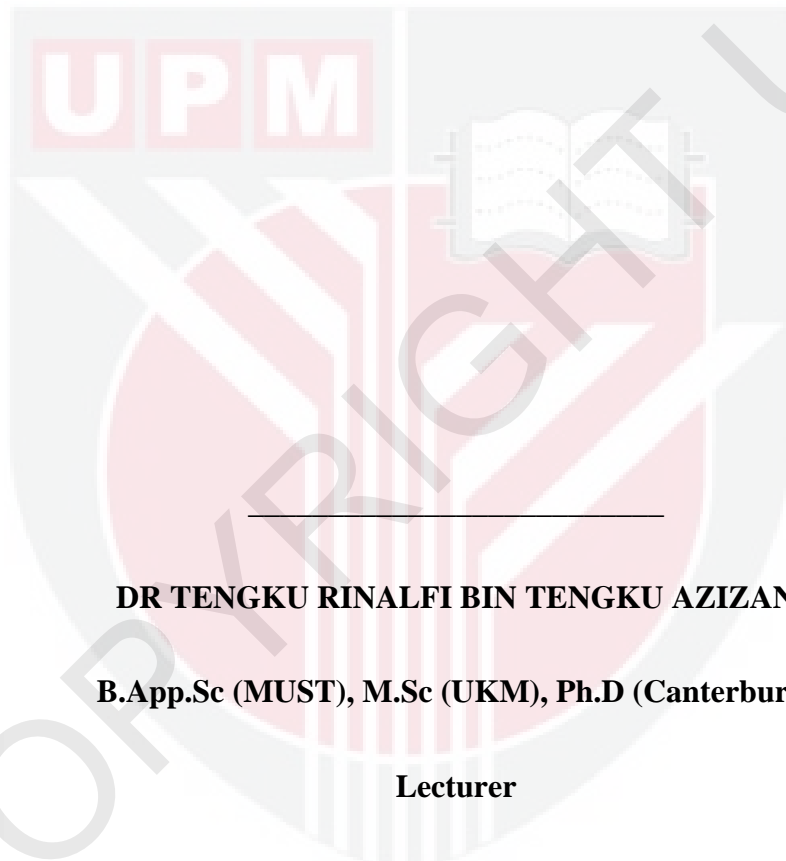
**DEGREE OF DOCTOR OF VETERINARY MEDICINE**

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It is hereby certified that we have read this project paper entitled “Antimicrobial Properties of Serum from Captive Estuarine Crocodile (*Crocodylus porosus*) and False Gharial (*Tomistomaschlegelii*)”, by AdilahBintiIshak and in our opinion it is satisfactory in terms of scope, quality, and presentation as partial fulfilment of the requirement for the course VPD 4999 - Project.



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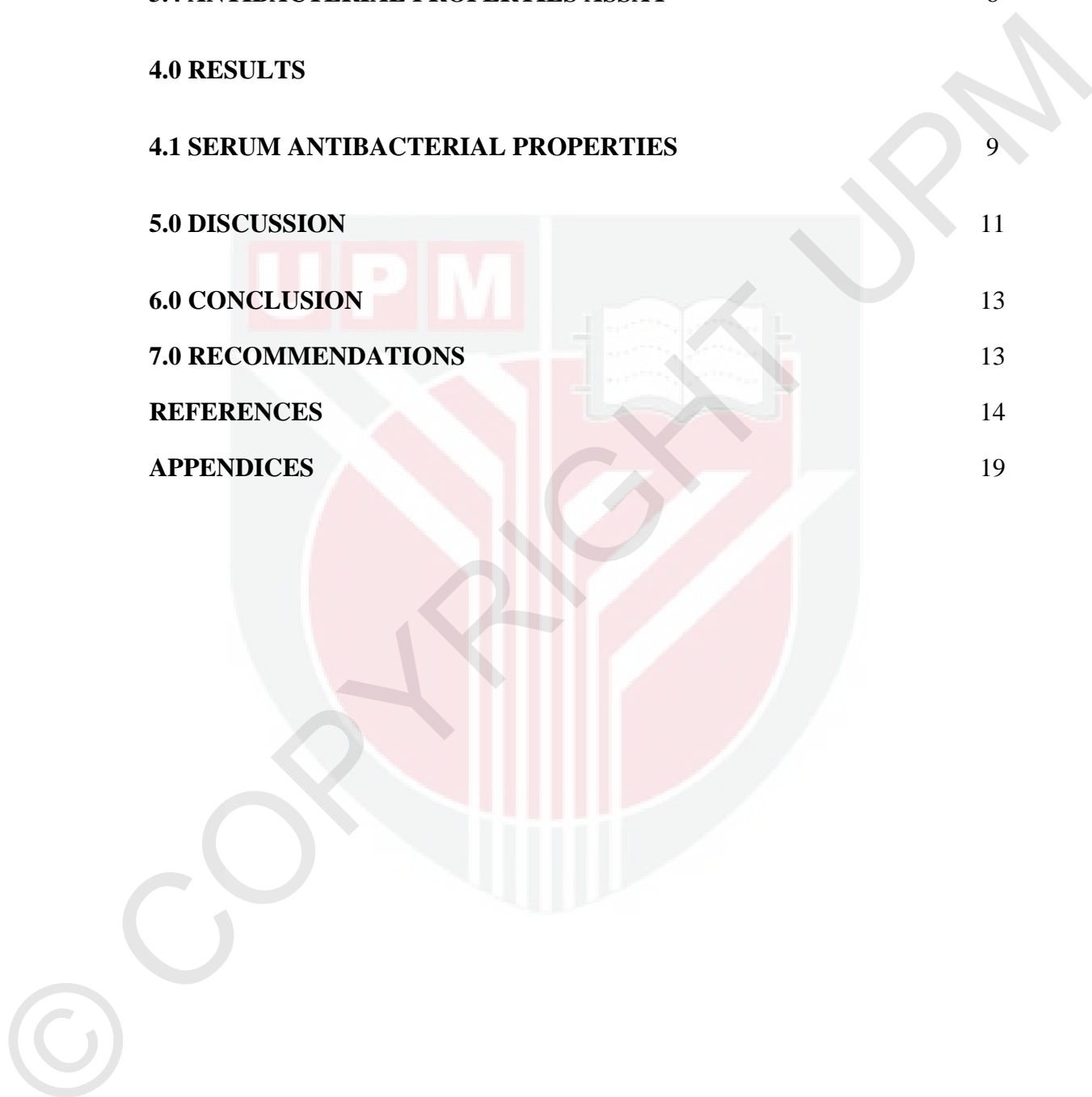
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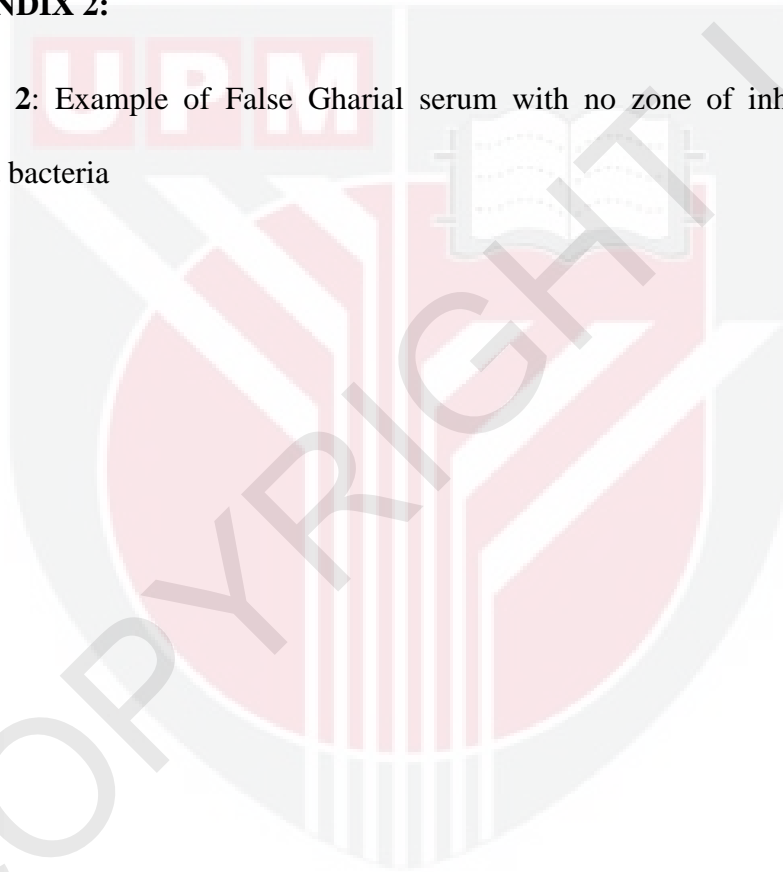
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## ABSTRAK

Abstrak kertas projek yang dikemukakan kepada Fakulti Perubatan Veterinar, Universiti Putra Malaysia untuk memenuhi sebahagian daripada keperluan kursus VPD 4999 – Projek.

### **CIRI ANTIMIKROBIAL DALAM SERUM KURUNGAN BUAYA TEMBAGA**

**(*Crocodylusporosus*) DAN BUAYA JEJULUNG (*Tomistomaschlegelii*)**

Oleh

AdilahBintiIshak

Mac 2018

Penyelia: Dr Tengku Rinalfi Putra Tengku Azizan

Serum buaya tembaga (*Crocodylusporosus*) dan buaya jejulung (*Tomistomaschlegelii*) diketahui mempunyai cirian timikrobial. Ini membolehkan buaya hidup di paya dan di kawasan yang boleh menyebabkan penyakit tanpa ancaman yang boleh membawa maut. Satu kajian mengenai serum dari kurungan buaya tembaga dan buaya jejulung telah dijalankan untuk mengkaji cirian tim ikrobial. Sampel darah dari 2 buaya tembaga dan 2 buaya jejulung diambil daripada urat ekor dorsal dengan menggunakan jarum 5 inci 18G 10ml jarum suntik. Darah dibiarkan beku dan emparan. Sampel serum buaya tembaga dan buaya jejulung diambil untuk menentukan cirian timikrobial terhadap 6 bakteria patogen dengan melakukan kaedah peresapan tunggal dan pemerhatian zon perencatan pada Mueller Hinton agar. Zon perencatan diperiksa, diukur, direkodkan dan dianalisis selepas inkubasi 24 jam di 37oC. Hasilnya, tiada ciri antimikrobial terhadap *Escherichia coli*, *Salmonella sp*, *Staphylococcus*

*aureus*, *Klebsiella pneumoniae*, *Enterobacter cloacae* dan *Pseudomonas aeruginosa*. Sebagai kesimpulan, tidak ada cirian timikrobial dalam serum dari kurungan buaya tembaga dan buaya jejulung di dalam kajian ini.

*Kata kunci:* buaya tembaga, buaya jejulung, cirian timikrobial



## **ABSTRACT**

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

### **ANTIMICROBIAL PROPERTIES OF SERUM FROM CAPTIVE ESTUARINE CROCODILE (*Crocodylus porosus*) AND FALSE GHARIAL (*Tomistoma schlegelii*)**

By

AdilahBintiIshak

Mac 2018

Supervisor: Dr Tengku Rinalfi Putra Tengku Azizan

The serum of Estuarine Crocodile (*Crocodylus porosus*) and False Gharial (*Tomistoma schlegelii*) were known to have antimicrobial properties. This allows crocodiles to live in harsh and highly pathogenic environment without the threat of being fatally infected. A study on serum from captive Estuarine Crocodile and False Gharial was conducted to examine the antimicrobial properties. Blood samples from 2 Estuarine Crocodiles and 2 False Gharials were collected from the dorsal tail vein by using a 5 inch 18 G needle of 10 ml syringe. The blood was left to clot and

centrifuged. The serum samples of Estuarine Crocodile and False Gharial were collected to determine the antimicrobial properties against 6 pathogenic bacteria by performing disc diffusion method and observation of inhibitory zone on Mueller Hinton agar. The zone of inhibition was examined, measured, recorded and analysed after 24 hours of agar incubation at 37°C. The results showed no antimicrobial properties against *Escherichia coli*, *Salmonella sp*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Enterobacter cloacae* and *Pseudomonas aeruginosa*. In conclusion, there are no antimicrobial properties in serum from captive Estuarine Crocodile and False Gharial in this particular study.

**Keywords:** Estuarine Crocodile, False Gharial, antimicrobial properties

## 1.0 INTRODUCTION

Archosaurs or the ruling reptiles is a remarkable group that comprised of Crocodylians which also include the defunct thecodonts, fossil of reptiles with four legs or two legs in the Triassic period with teeth set at the sockets's jaw, its earliest and most primordial associates, the pterosaurs or flying reptiles, the dinosaurs, and the ancestors of birds. The class of Reptilia conventionally has a subclass of Archosauria, yet in the meantime the categorization of reptiles is at the state of inconstancy and the taxonomic status of a few major groups may have to be reconsidered (Bellairs A. [d'A.], 1987; Benton, 1982; Green *et. al.*, 2014; Oxford Online, n.d.)

Each and every crocodylian at this time belongs to the Eusuchia. The Crocodylidae is a sole family that comprises of some 27 species and subspecies which can be grouped accordingly. This family is categorised into 3 subfamilies which are the Alligatorinae such as Alligator, Caiman, *Melanosuchus*, *Paleosuchus*, Crocodylinae such as genera *Osteolaemus* and *Crocodylus*, and lastly Gavialinae such as *Gavialis* and *Tomistoma* or false gharial that formerly has been considered as associating to the Crocodylinae (Bellairs A. [d'A.], 1987; Taplin, 1984; Oaks, 2007).

Animals have a prominent distinction in behaviour, morphology, and immune system as to survive and to fit in the environment. Crocodile is a powerful animal that enables it to survive in an extreme environment that harbours pathogenic disease to human or other animals.

Territorial behaviour usually ends up in aggression that results in flesh wounds. Serious injuries usually involve the loss of the limbs in these disputes. Nevertheless,

the injuries tend to recover frequently without infection in spite of the high concentration of potentially pathogenic microorganisms environment (Merchant *et al.*, 2006).

As reported by Adam Britton, a biologist in North Australia, he has discovered crocodylins in the crocodiles' blood which is almost identical to the antimicrobial proteins. The provision of innate immune system is due to the existence of antimicrobial peptides in alligators and crocodiles that give automatic defense from a particular disease (Amitabh, 2008).

### **1.1 OBJECTIVE**

To determine the antimicrobial properties of serum from captive Estuarine Crocodile (*Crocodylus porosus*) and False Gharial (*Tomistomaschlegelii*).

### **1.2 HYPOTHESIS**

$H_0$ = No antimicrobial properties in serum from captive Estuarine Crocodile (*Crocodylus porosus*) and False Gharial (*Tomistomaschlegelii*).

$H_1$ = There are antimicrobial properties in serum from captive Estuarine Crocodile (*Crocodylus porosus*) and False Gharial (*Tomistomaschlegelii*).

### **1.3 JUSTIFICATION**

The antimicrobial compound in the crocodylins to kill bacteria has a potential in human therapeutic use.

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