Identification of Sialic Acid Biosynthesis Gene in *Aerodranus fuciphagus* from Kelantan.

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Figure 1: The carcass of *Aerodramus fuciphagus.*

ABSTRACT

Aerodramus fuciphagus is an avian species from the swift family where they utilize their saliva secretion fully to build their nests. For the past few decades, the edible bird's nest (EBN) industry is on huge rise due to its high market value and low maintenance cost. EBN is widely used as traditional Chinese medicine and health supplement due to its high nutritional value. It was reported that the highest amount of glycoprotein present in EBN is sialic acid where it comprises approximate 9% of the nutrient composition. Sialic acid plays an important role for maintaining good health, including maintaining homeostasis balance in many living organisms, and superb moderator for the immune system where it aids for repelling of detrimental bacterias, viruses and microorganisms. There are two essential genes involve for the biosynthetic pathway of sialic acid which are MGAT and GNE genes. However, to our consciousness, the study of these genes in this species is lacking. In this study, newly designed primers of MGAT gene were tested in *A. fuciphagus* from Kelantan, Malaysia. A primer (Primer 1: XM_010006800.1A) was amplified between 200 – 300 bp *c.f.* 212 bp (the expected size range). Hence, suggests the presence of this gene. But, sequencing of the PCR product is needed to confirm the expected MGAT gene. It is important to identify sialic acid biosynthesis gene in *A. fuciphagus* because it is essential for understanding the genetics and mechanisms underlying its saliva secretion, in addition correlation with nest building behaviour of *A. fuciphagus* can also be understand. By knowing the sialic acid biosynthesis gene in *A. fuciphagus,* improvement on management and product quality for the sustainability of EBN industry in the near future can be done.

Keywords: *Aerodramus fuciphagus*; Edible bird's nest; MGAT gene; saliva; sialic acid.

INTRODUCTION

- The most popularly known species for its nest building ability is *A. fuciphagus*, where the nests are built almost entirely from its saliva secretion resulting it nest to be more costly than the other birds' nests (Shah & Aziz, 2014).
- The nests of *A. fuciphagus* contain high nutritional value and potential bioactive properties that arise from the various amounts of nutrient components that exist in the glycoproteins of the *A. fuciphagus* saliva, namely: sialic acid, galactosamine, glucosamine, galactose, as well as fucose (Kathan & Weeks, 1969).
- From those glycoproteins, sialic acid plays an important role for maintaining good health. It is important for maintaining:
  - Homeostasis balance in many living organisms (Tiralongo & Duncker, 2013).
  - Superb moderator for the immune system where it aids for repelling of detrimental bacterias, viruses and microorganisms by influencing the mucus's flow resistance (Hamzah et al., 2013).
- Thus, the present of high sialic acid in the EBN will positively increase the selling price of EBN (Marni et al., 2014).
- However, the knowledge about genes (e.g. MGAT and GNE) involving in the sialic acid biosynthesis mechanisms in this species is still lacking.

OBJECTIVES

1. To design primers from MGAT gene.
2. To screen MGAT gene in *A. fuciphagus* from Kelantan, Malaysia.

RESULTS AND DISCUSSION

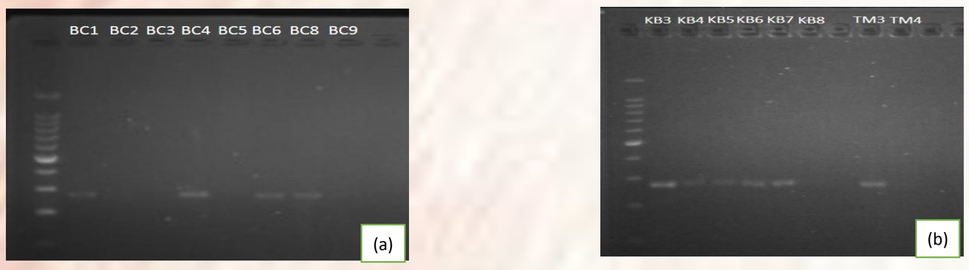

Figure 4: Primer screening for Kelantan individuals (a) Bachok (b) Kota Bahru and Tanah Merah.

- A primer designed for MGAT gene (Primer 1: XM_010006800.1A) was amplified between 200 – 300 bp *c.f.* 212 bp (the expected size range) (Figure 4).
- Hence, suggests the presence of this gene in *A. fuciphagus.* But, sequencing of the PCR product is needed to confirm the expected MGAT gene.

CONCLUSION

MGAT gene may plays a key role in the biosynthesis of sialic acid in *A. fuciphagus* from Kelantan.

ACKNOWLEDGEMENT

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MATERIALS AND METHODS

Sample Collection
- 25 blood samples of swiftlets from three different cities in Kelantan which are Bachok, Kota Bahru and Tanah Merah were collected (Figure 2).

DNA Extraction
- DNA were extracted using the Qiagen DNeasy Blood & Tissue kit according to the manufacture protocol.

DNA Verification
- The qualities of the obtained DNA were verified using 0.8% agarose gel electrophoresis (Figure 3).

Primer Design
- The sequences for the MGAT gene were determined from GenBank and aligned with closely related species to identify the conserved regions.
- Primers were designed using Primer3 input software.

Primer Screening
- Three pairs of MGAT gene primers were designed and used in the PCR screening step.
- The PCR products were manually scored on 2% agarose gel electrophoresis.

Data Analysis
- The representative of PCR products of amplified MGAT gene primers will be sent for sequencing, and obtained sequences will be compared to the available sequences in GenBank using blastn.

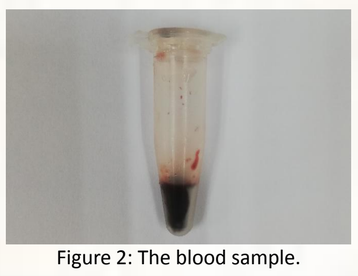

Figure 2: The blood sample.

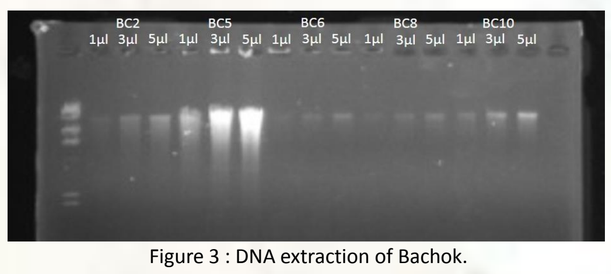

Figure 3 : DNA extraction of Bachok.

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