INTRODUCTION

Aerodramus fuciphagus is the most commonly found swiftlet species in Malaysia, producing the premium grade white nest due to its composition: purely solidified salivary secretion with high concentrations of N-acetyleneuraminic acid (sialic acid) and epidermal growth factor (EGF) (Marcone, 2005; Wong et al., 2013; Looi et al., 2017). It is believed that EBN offers abundant of medicinal and health-promoting properties however there are not much scientific reports to prove this. Lipid droplets (LDs) are the major intracellular organelles specializing in storage of neutral lipids such as triglycerides and sterol esters. Excessive accumulation of lipid in LDs or disruption in energy homeostasis will result to various metabolic diseases such as obesity, diabetes, atherosclerosis and fatty liver disease (Ference et al., 2017; Krahmer et al., 2013). In this study, we determine the expression level of lipid signalling pathways genes such as Acetyl-CoA Acyltransferase (ACAT), Diacylglycerol O-acyltransferase 2 (DGAT2), Sterol regulatory element binding transcription factor 2 (SREBP2), 3-hydroxy-3-methylglutaryl-CoA reductase (HMGR), Low density lipoprotein receptor (LDLr), Proprotein Convertase Subtilisin/kexin type 9 (PCSK9) in HepG2 mammalian cells after supplemented with exogenous lipid and treated with or without Edible Bird Nest (EBN) extract.

METHODOLOGY

Step 1 – EBN Extraction

Raw EBN were cleaned with distilled water and feathers were removed manually before being dried in an oven at 60°C overnight. Dried EBN were finely grounded and mixed with Phosphate Buffer Saline (PBS) subsequently subjected to stewing in a water bath at 70°C for 5 hours. EBN supernatant were collected and subjected to acetone protein precipitation. EBN extract was filtered through 0.22 µm filter to get a pure EBN extract. HepG2 mammalian cells derived from liver tissue were used in this study. Cells were cultured in completed medium supplemented exogenous lipids and cholesterol with or without EBN extract. Simvastatin was used as positive control. RNA was extracted from cells according to suppliers manual and were subject to RT-PCR.

Step 2 – Cell culture incubation

Step 3 – RT-PCR

RESULTS AND DISCUSSION

Figure 1. Gene expression of lipid signaling pathways upon incubation with different media with or without EBN (a) ACAT2 (b) DGAT2 (c) LDLR (NC = Base line control, NC = Negative control, PC = Positive control, TX1 = 0.5 mg/ml EBN, TX2 = 1.0 mg/ml EBN, TX3 = 1.5 mg/ml EBN)

Among the six genes related to lipid signalling pathways tested, EBN extract have been found to have significant effects on ACAT2 and LDLR genes. ACAT2 gene is responsible for the synthesis of sterol ester where it will be incorporated in lipid droplets for lipid storage whereas LDLR gene is the most important key player in internalization of LDL from the blood stream into the cells. Hence, upregulation of LDLR gene will increase the number of LDL receptors on the outer surface of the cells thus reducing the amount of circulating LDL (bad cholesterol) in the blood which is very beneficial so as to lower the risk of atherosclerosis or cholesterol deposition in the vessels. As for PCSK9 gene, result remains inconclusive for now. However, EBN extract supplementation may have a positive effect in reducing PCSK9 expression. Further research to look into significant of EBN extract towards lipid signaling pathways expression via quantitative method in the future will be conducted.

CONCLUSION

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REFERENCES