IN VITRO SCREENING OF ANTIBACTERIAL ACTIVITY OF EDIBLE BIRDS’ NEST (EBN) AGAINST SELECTED PATHOGENIC BACTERIA

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Introduction

The edible bird’s nest (EBN) is mostly made up of saliva secreted by cave-nesting swiftlets and is well known as a traditional medicinal food in China dating back to the seventeenth century (Kong et al., 1987). These nests are constructed with glutinous strands of starch-like saliva produced by a pair of large salivary glands under the swiftlets tongue and thereafter they mate and breed their young in the nest (Goh et al., 2001). Grading of edible bird's nest is determined by dry mass and the time the swiftlets spend in building the nest (Sims, 1961). This salivary secretion is highly prized as the primary component of a culinary delicacy called birds' nest soup. These soups are usually prepared for consumption by cooking them in a double boiler with sugar and are highly claimed as a food tonic believed to have medicinal properties (Koon, 2000; Koon & Cranbrook, 2002). Until today, many research and scientific studies have been carried out to substantiate the claims of the health benefits associated with EBN despite its long history of medicinal use (Vimala et al., 2011). Unfortunately, much is still unknown about the bacterial and anti-bacterial activity of the EBN. Hence, this study has been carried out to screen the antibacterial properties of EBN against selected pathogens.

Materials and Methods

Two different standard agar based assays, disk diffusion and well diffusion assays were carried out in this research to preliminary screen the antibacterial activity of EBN extract. A total of fifteen pure edible birds’ nest extract comprising of extracts from fern nest, red nest, white nest, yellow nest and grass nest from different geographical locations were tested. These extracts were prepared using specific protocols kindly provided by Dr. Fadzilah Aini (DVS). The antibacterial activity was tested against five Gram-negative (Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Salmonella typhi and Pasteurella multocida) and four Gram-positive (Staphylococcus aureus, Enterococcus faecalis, Bacillus cereus and Rhodococcus equi) bacterial strains. For both assays, the general mechanism involved is that the EBN extracts diffuse out from the disc/well into the agar medium. As the sample diffuses out, the bacteria multiply creating a lawn of visible growth on the agar except in zones around the disc/well where diffused molecules possessed properties to inhibit bacterial growth (Kiska, 1998). The solvent without extracts served as negative control. Standard antibiotics units, Ampicillin (10µg), Ceftriaxone (30µg), Gentamicin (10µg), Erythromycin (15µg), Vancomycin (30µg), Chloramphenicol (30µg), Spectinomycin (100µg), Rifampicin (5µg) and Penicillin G (30µg) were used as positive controls. After 24 h of incubation, the diameter in mm of the inhibitory or clear zones around the disks and wells were recorded.

Results and Discussion

All fifteen different concentrated EBN extracts were found not to produce any zones of inhibition against the tested bacteria using both assay methods. This indicates that the extracts
do not possess any antibacterial activity against the tested organism in vitro. Results obtained from this study does not support the preliminary test from a previous study, which shows a positive inhibition of yellow nest against Pasteurella multocida using broth method (Suriya et al., 2004). Contradictory result may be due to the fact the extract was not freshly prepared in this study, which could possibly be explained by the bioactive component that is responsible for the antibacterial properties have been altered over time (Fadzilah, 2003). Other reasons could be because of the lack of standardization of the in vitro test used which led to the contradictory result. Major glyconutrients in EBN is sialic acid (9.0%) (Colombo et al., 2003; Kathan and Weeks, 1969) whereby sialic acid contributes to the flow resistance in mucus which in turn repels bacteria, viruses and other harmful microbes (Norhayati et al., 2010). It is obvious that only few researches have undertaken the antimicrobial properties of edible bird's nest, hence the lack of scientific evidence makes it difficult to state specifically its antimicrobial properties.

Conclusion
In conclusion, the present study demonstrates that the tested EBN extract contains no antibacterial properties against the selected pathogens. However, standardized reproducible method for evaluating the antimicrobial activity of EBN is required to confirm this.

Acknowledgements
The authors sincerely thank the Edible Birds Nest Centre of Excellence, Ministry of Agriculture (MOA) for the financial assistance (6371400) and staff of the Bacteriology Laboratory, Faculty of Veterinary Medicine for the technical support rendered.

References

