

SAFETY PROFILE AND NUTRITIONAL CONTENT OF RAW CLEANED EDIBLE BIRD'S NEST

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Introduction

The Edible Bird's Nest (EBN) is a nest produce from swiftlet's saliva from the species *Aerodromus fuciphagus*. It is acclaimed to be a prestigious health food which contains high nutritional values and it is also believed to possess various medicinal properties. Despite the rapid demand for EBN worldwide, scientific research on the medicinal and nutritional properties of EBN is still very much lacking. This research is challenging given the fact that the quality of EBN appear to vary with the season of the harvest and the location of the ranches. The objective of this paper is to investigate and compare the safety profile and nutritional content of EBN from different regions in Malaysia. We also assess the effect of haze on the quality of EBN.

Materials and Methods

Material

A total of 7 raw cleaned EBN samples were sourced directly from processing factories from 6 different regions in Malaysia: Central region (Jerantut), West coast region (Klang and Kuala Selangor), Northern region (Alor Setar), East coast region (Kuala Rompin), Southern region (Johor Bharu) and East Malaysia (Sibu). All of nests were harvested from the ranches in which the location corresponds to the locality of the respective processing factories. They were authenticated by a single experienced team member before collection. The samples were cleaned and dried by the respective factories as according to the guidelines provided by the government

Methods

The EBNs were carefully labelled and put inside clean containers and sent to a food lab which is accredited with Skim Akreditasi Makmal Malaysia (SAMM) ISO 17025. The safety profile was determined according to the heavy metals and nitrate content by using In House Method based on Association of Official Analytical Chemist (AOAC), American Public Health Association, Standard Method for Examination of Water and Wastewater (APHA), and International Food Research Journal (CAW 012). The microbiological analysis was determined by Australian Standard, official AOAC methods and Bacteriological Analytical Manual (BAM). The EBN was collected during heavy haze period (API 100-200 for a month) from Port Klang and compared with EBN collected from healthy API level area in Jerantut.

Results

The proximate analysis revealed that the protein content of all of the EBN examined in this study are consistent and ranges from 50%-53%. The total carbohydrate content ranges from 33.9%-36.8%. The crude fat level in all of the EBN samples is 0.1%. The moisture content of all collected EBN samples are within the industry accepted level, ranging from 8.6% to 13.5% (<15%). The ash content in the study ranges from 2.1%-2.9%

The safety profile showed that heavy metals content like arsenic, mercury, lead or cadmium were not detected in all collected EBN samples. The nitrate content in all EBN samples is within tolerance level (<30mg/kg), ranging from lowest 9.8 mg/kg (EBN from Alor Setar) to highest 20.5 mg/kg (EBN from Kuala Selangor).

There are no significant growth of *Escherichia coli*, Coliform, *Staphylococcus aureus* and *Samonella* spp. in all samples. Mould is significantly present in all samples except from EBN sample from Alor Setar. Significant growth of yeast was only found in EBN sample from Sibul, Sarawak. There was no significant growth of total plate count from all collected EBN samples from different regions of Malaysia.

In this study, we had collected EBN sample from Port Klang and Jerantut during the heavy haze period (March 2014) with API 100-200. However, there were no significant differences in term of microbiology, safety and nutritional profile of these haze contaminated samples.

Discussion

The order of composition (from highest to lowest) is protein, carbohydrate, ash and lipids. In our study, the protein content ranges from the various regions ranges from 50% to 53%. Other studies had shown a much variable protein content whereby Norhayati (2010) found protein content in raw cleaned EBN from different parts of Malaysia were 56% -61.5%. Other studies by Lu (1995), Marcone (2005), and Wang (1921) revealed a wider range at 42% - 63%. However, a lower protein contents were quoted by a by Nurul Huda (2008) where samples obtained from several locations in Penang were in the range of 24% - 49%. While a good feeding environment had an impact on the diversity of food supply for swiftlets and quality of EBN, the differences in the protein levels quoted in different studies may be partly explained by the different methods used in different researchers in raw cleaned edible bird nest. In our study, there is consistency in term of protein content from different regions in Malaysia. It is now a known fact that the composition of protein comprise of glycoprotein, amino acids and various peptide; functions which need to be studied further in details.

The total carbohydrate content in this study ranged from 33.9% - 36.8% which is higher compared with the total carbohydrate content in a study done by Lu (1995), Marcone (2005) and Wang (1921), ranging 10.63% - 27.26%. The total carbohydrate values in a study done by Nurul Huda (2008), ranging from 28 - 58%. It is now known that the carbohydrate moiety of the EBN compose of sialic acid, glucosamine and acetyl neuraminic acid, biomolecules that could potentially exhibit medicinal properties.

The crude fat level in all our samples is consistent at 0.1%, which is lower in comparison to the analysis of fat content done by Lu (1995), Marcone (2005) and Wang (1921) was ranging 0.14% -1.28%. The crude fat content in study done by Nurul Huda (2008) has even high content which ranged from 0.47 – 1.99%.

The moisture content of all collected EBN samples are within tolerance level, ranging from 8.6% to 13.5% (<15% recommended) suggesting that the factories did not adulterate the weight of EBN by adding moisture. Lastly, the ash content in our study ranges from 2.1% - 2.9%, relatively low compared to the proximate analysis of ash content done by Lu (1995), Marcone (2005) and Wang (1921), which was 2.1% - 7.3%. While the other local study done by Nurul Huda (2008), the ash content ranged from 2.75% - 7.5%.

Conclusion

Our study demonstrated that raw cleaned EBNs from different regions in Malaysia have good consistency in their proximate analysis, even during hazy periods. They contained high proteins and carbohydrate with low fat and ash content, which is a proof that the product is not adulterated with other common adulterant substances like egg white, sea weeds, karaya

gum and *Tremella* fungus as Marcone (2005) compare protein contents and found that adulterated substances have low crude protein. EBN are also extremely safe to be consumed as heavy metals are not detected, within acceptable microbiology profile and the nitrate level within standards set by the government. Our study has verified that the raw cleaned EBN from various parts of the country is of good and consistent quality. All EBN also met the stringent export criteria set by the Department of Veterinary Services Malaysia.

References

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