AN OVERVIEW OF NITRITE LEVEL IN MALAYSIA SWIFLET'S NEST

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ABSTRACT
The Department of Veterinary Services Malaysia (DVS) is alerted with the issue regarding sodium nitrite content in swiftlet's nest or Edible Bird's Nest (EBN) exported to China since the year 2009. This has given the opportunity to Veterinary Public Health Laboratory to conduct nitrite analysis using readily available method. The analysis was done with some modification of the Malaysian Standard Method MS 954: Part 14:1988 to determine the nitrite content in swiftlet's nest using Ultraviolet visible spectrophotometer and expressed as miligrammes of sodium nitrite per kilogramme (wt/wt) or parts per million (ppm). This study showed that raw-unclean EBN analyzed had higher nitrite content in comparison to raw-clean EBN and EBN products. This may be due to the excess presence of guano in the cave and house where the birdnest was collected. Through proper processes, the level of nitrite in the EBN can be reduced. *Garis Panduan Pembangunan Industri Burung Walit* (1GP) has been launched by DVS as a guideline for EBN industry.
Keywords*:* Sodium nitrite; Swiflets; Edible Bird Nest; UV spectrophotometer

INTRODUCTION

Swiflets are under the family *Apodidae* and contain four genera *Aerodramus*, *Hydrochous*, *Schoutedenapus* and *Collocalia*. Special interest is paid on genus *Aerodramus* as it can intricately construct saliva nests which are edible and known as Edible Bird's Nest (EBN). This EBN can be sold at very high price and is considered as the most expensive animal product. Nowadays, it can be found in the caves and even ranched by farmers in houses in the cities and in rural areas.

Nitrite is a compound that contains a nitrogen atom joined to an oxygen atom. Nitrite is naturally present in the EBN and nitrite combines with sodium to form an inorganic salt used as an antimicrobial agent, preservative and color fixative. As a food additive (E250) which is approved by the European Union, it is used as a preservative in non-heat-treated, cured, dried meat products, canned meat products and *foie gras* with a maximum residual amount of 100 mg/kg (Part C of Annex III of Council Directive No 95/2/EC). The Joint WHO/FAO Expert Committee on Food Additives (JEFCA) has established an Acceptable Daily Intake (ADI) of 0-0.07 mg/kg body weight, expressed as nitrite ion. However, Malaysian Standard has limited the amount of nitrite in raw EBN at less than 30 ppm.

MATERIALS AND METHODS

Sample Collection.

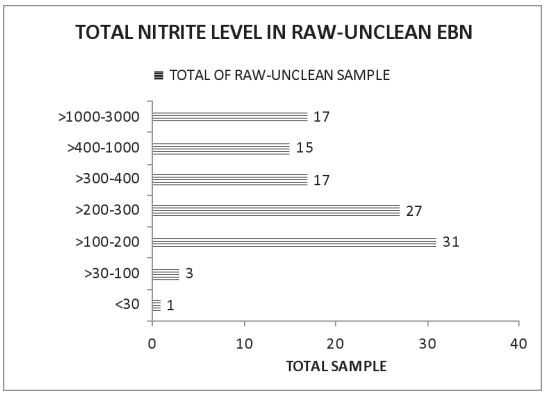
This study was carried out using the samples sent by private EBN processing plants, state DVS as well as self-collected by the customers to Veterinary Public Health Laboratory located at Bandar Baru Salak Tinggi, Sepang between midyear of 2010 to midyear 2012. The samples were either in the form of raw-unclean EBN, raw-clean EBN, value added EBN products or water samples.

All the samples were tested for nitrite content using the *Malaysian Standard 954: Part 14: 1988* method with modification of sample weight and working standard. The sample was reduced to 3 grams instead of 10 grams to counter the nature of the nest to absorb solution. The serial standard solutions reduced to 0.25 µg, 0.5 µg, 0.75 µg, 1.0 µg, 2.5 µg,

5.0 µg and 10.0 µg of sodium nitrite per milliliter for measurement of potentially low nitrite sample. First, the sample was ground and 5 ml of Borax Solution was added to the sample. The mixtures underwent digestion with hot water for 15 minutes, followed by adding 2 ml potassium ferrocyanide solution and 2 ml of zinc acetate solution. After allowing the solution to stand for 30 minutes, the supernatant was collected and filtered. Ten (10) ml of sulphanilamide solution and 6 ml of hydrochloric acid solution were added and left in the dark for 5 minutes. Next, 2 ml of N-1-naphthylethylenediamine dihydrochloride solution was added and left in the dark for 2 minutes. The photometric measurement was carried out at wavelength of 538 nm using *Shimadzu UV-1601PC* UV-Vis Spectrophotometer.

RESULTS AND DISCUSSION

A total of 305 samples were tested. One hundred and eleven (111) raw-unclean EBN samples were received from 11 states (W. P. Labuan, Perak, Selangor, Negeri Sembilan, Melaka, W. P. Kuala Lumpur, Johor, Pahang, Kelantan, Sabah and W. P. Putrajaya). Whereas, 164 raw-clean EBN samples were received from 12 states (Perak, Selangor, Negeri Sembilan, Melaka, W. P. Kuala Lumpur, Johor, Pahang, Terengganu, Kelantan, Sabah, Sarawak and W. P. Putrajaya). A total of 26 value added EBN products were received from 2 states only (Selangor and W. P. Putrajaya). The 4 water samples were received from EBN processing plant at Selangor state and 1 water sample was collected from the laboratory pipe water. The result of nitrite content is expressed as mg of sodium nitrite per kg (parts per million of nitrite content). Most raw-unclean EBN sample ranged from more than 100 to 200 mg/kg but raw-clean EBN sample fell in the range 1 to 30 mg/kg. Twelve (12) out of 26 EBN products had less than 1 mg/kg. There was one water sample which was tested to contain 50 mg/kg nitrite. The laboratory pipe water was tested negative for nitrite.



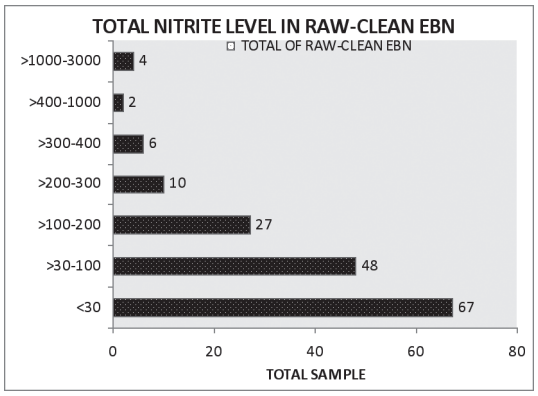
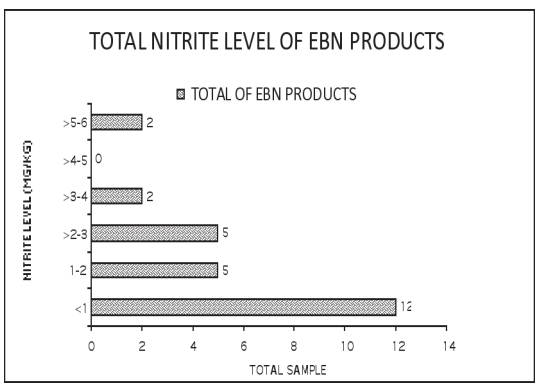


Figure 1 (Upper left): The distribution of nitrite level in the raw-unclean EBN samples
Figure 2 (Upper right): The distribution of nitrite level in the raw-clean EBN samples



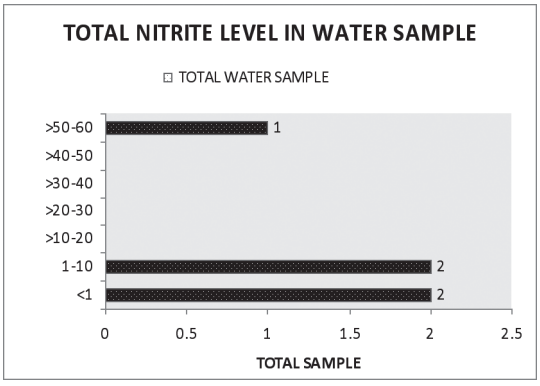


Figure 3 (Upper left): The distribution of nitrite level in the value added EBN products samples
Figure 4 (Upper right): The distribution of nitrite level in the water samples

The study showed that 99% (n=110) of raw-unclean EBN and 59% (n=97) of raw-clean EBN had more than 30 mg/kg nitrite content. This indicated that raw-unclean EBN had higher nitrite content compared to raw-clean EBN. This also meant that the soaking and cleaning process during processing of raw-clean EBN was able to reduce the nitrite content in EBN. Besides, about 36.9% (n=41) of the raw-unclean EBN originated from cave nests. Higher nitrite level may be due to accumulation of guano produced by swiftlets living in the cave. However, the water used to soak and clean the EBN should be checked for nitrite content to prevent contamination of nitrite to the EBN.

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