

Edible Bird's Nest: A Potential Product Breakthrough

Lee T.H. and Kamini N.

Institute of Bioproduct Development

Universiti Teknologi Malaysia

81310 UTM Skudai, Johor,

Malaysia

E-mail: lee@ibd.utm.my

ABSTRACT

EBN (known in Chinese as Yan Wo, Indonesia as Sarang Walet, and Japanese as Enso) is the dried glutinous secretion of the salivary glands from Southern Asia swiftlets. Edible Bird's Nest (EBN) was a significant item in the cuisine and pharmacy of the Emperors of China during the 16th century (Lau and Melville, 1994). EBN has been known considered to be one of the most precious food items by the Chinese for thousands of years (Ou *et al.*, 2001). The EBN industry is a multimillion dollar enterprise as EBN is valued at USD 1600/kg and is one of the industries that are not affected by the global recession (Yeap, 2002).

In general, EBN can be divided into cave nest (harvested from natural caves) and house nest (made in attic of the countryside house/cultivated in buildings). Dried and cleaned EBN is double-boiled with sugar to become bird's nest soup for consumption. The advancement in technology enabled a large variety of EBN-related products emerged in the market. These products are readily serves in canned or precooked form. In Traditional Chinese Medicine (TCM), EBN is believed to offer good effects for treating consumptive disease, curing tuberculosis, dry coughs, alleviating asthma, stomach ulcer, relieving gastric troubles and general

weakness of bronchial ailments. Consuming EBN regularly can give a person exuberant physical and mental strength as well as to restore one's youthfulness. The tonic powers of the EBN are believed to improve skin complexion and to slow the aging effect.

To date, there is less scientific evidence enclosed to support all the claims made by the traditional practitioners. Ng *et al.* (1986) reported on the immune-enhancing response by aiding immune cell division. Kong *et al.* (1987) discovered epidermal growth factor (EGF) like activity in 3T3 fibroblast that plays role in cellular process that supports the theory of anti-aging effects by EBN. Sialic acid a major carbohydrate compound that mediating the gaglioside distribution and structure in brain suggested by Chan (2006). Further investigation by Guo *et al.* (2006) provided valid evidence on EBN preventing influenza viruses. The latest discovery by Nakagawa *et al.* (2007) shows that Collocalia glycoproteins isolated from EBN are rich in proteoglycan (PG) containing non-sulphated chondroitin glycosaminoglycan (GAGs).

These evidences branched several other studies to be carried out to further understand the medicinal properties contained in EBN. Our establishment conducted two main projects: effects of EBN extract on the chondrocytes and fibroblast cells in vitro. The study on mRNA expression level in fibroblast cells using Real Time RT-PCR of matrix components such as elastin and collagen and the growth factors such as fibroblast growth factor (FGF), Transforming Growth Factor Beta 1 (TGF- β 1), and Epidemic Growth Factor (EGF) demonstrated increased in the EBN supplemented cells compare to the control cells. The study on mRNA expression level in chondrocytes of matrix components such as collagen and aggrecan core protein (ACP) showed increased expression in EBN supplemented cells.

The mRNA encoding matrix degrading enzymes such as Matrix Metalloproteinase 1 (MMP1), Matrix Metalloproteinase 3(MMP3) and Matrix Metalloproteinase 13 (MMP13) and the interleukins such as Interleukin 1 (IL-1), Interleukin 6 (IL-6) and Interleukin 8 (IL-8) showed decreased expression EBN supplemented cells.

The results obtained from the studies done indicated EBN as a good supplement and nourishment to the skin with some anti-aging properties by increasing the elasticity and maintaining the youthful skin with collagen. Furthermore, chondrocytes phenotype maintenance associates with the joint degrading diseases such as osteoarthritis which usually occurs in the ageing individual.

Reference

- Chan, S. W. (2006). Review of Scientific Research on Edible Bird's Nest. Department of Applied Biology and Chemical Technology. *The Hong Kong Polytechnic University*.
- Guo, C. T., Takahashi, T., Bukawa, W., Takahashi, N., Yagi, H., Kato, K., Hidari, K. I. P. J., Miyamoto, D., Suzuki, T. and Suzuki, Y. (2006). Edible Bird's Nest Extract Inhibits Influenza Virus Infection. *Antiviral Research*. 70: 140-146.
- Kong, Y. C., Keung, W. M., Yip, T. T., Ko, K. M., Tsao, S. W. and Ng, M. H. (1987). Evidence that Epidermal Growth Factor is Present in Swiftlets (Collocalia) Nest. *Comparative Biochemistry and Physiology Part B: Biochemistry and Molecular Biology*. 87(2):221-226.
- Lau, A. S. M. and Melville, D. S. (1994). International Trade in Swiftlet Nests With Special Reference to Hong Kong. Cambridge (UK): *Traffic International*.

- Nakagawa, H., Hama, Y., Sumi, T., Li, S. C., Maskos, K., Kalayanamitra, K., Mizumoto, S., Sugahara, K. and Li, Y. T. (2007). Occurrence of a nonsulfated chondroitin proteoglycan in the dried saliva of Collocalia swiftlets (edible bird's-nest). *Glycobiology*. 17(2):157–164.
- Ng, M. H. Chan, K. H. and Kong, Y.C. (1986). Potentiation of Mitogenic Response by Extracts of the Swiftlet (Collocalia) Nest. *Biochemistry International*. 3(3): 521-531
- Ou, K., Seow, T. K., Liang, R. C. M. Y., Lee, B. W., Goh, D. L. M, Chua, K. Y., Chung, M. C. C. (2001). Identification of Serine Protease Homologue in Bird's Nest by an Integrated Proteomics Approach. *Electrophoresis*. 22(16): 3589-3595.
- Yeap, T. E. (2002). Edible Bird's Nest Industry in Malaysia. Malaysia: *EBN Resource*.