

EDIBLE BIRD'S NEST AND TREATMENT METHOD THEREOF

FIELD OF INVENTION

- 5 This invention relates to edible bird's nest (EBN). More particularly, the present invention relates to a method of pretreating raw edible bird's nest and a clean, cooked, and dried edible bird's nest prepared therefrom, wherein the dried edible bird's nest has increased mobilised glycoprotein, sialic acid and water absorbing capacity.

10 BACKGROUND OF INVENTION

- Edible bird's nest (EBN) is derived from bird's nest of Swiftlet, particularly *Aerodramus Fuciphagus*, during its breeding season whereby upon activation by its reproductive hormone the Swiftlet secretes nest cement from its pair of sublingual glands to construct the bird's nest. EBN
15 is known to be nutritious and it contains active ingredients which may have functions of anti-cancer, anti-aging, and immunity enhancing. Hence, EBN is considered a precious food particularly among the Chinese culture due to its nutritional value as well as its rarity.

- A bird's nest usually has the shape of a shallow cup and is composed of interwoven strands of
20 nest cement secretion. The raw bird's nest can be harvested from a cave or a Swiftlet house. However, the Swiftlet house is more preferable as it promotes sustainability Swiftlet habitat as well as the supply of bird's nest. Raw bird's nest usually contains a significant amount of solid impurities, microbial contamination, and nitrite and nitrate content. Therefore, it is a common practice in the industry to pretreat the raw bird's nest before selling to the consumer.

- 25 Commercially available treated raw bird's nest is dried and clean with reduced microbial and other contaminations. However, such bird's nest is commonly treated with bleaching agent and other chemicals to clean and give a pleasant outlook for the bird's nest. The chemical treatment changes the property of the bird's nest and reduces its nutritional value and natural aroma.
30 Nevertheless, cooking the raw bird's nest, either in clean or unclean form, requires long hours of soaking and boiling in order to dissolve the glycoprotein or to release its active compound –

sialic acid. It is also difficult to control the time of cooking the bird's nest which may result in loss of nutritional value due to overcooked of bird's nest or glycoprotein not being digested and absorbed by human's body due to undissolved protein.

- 5 To solve the inconvenience of cooking raw bird's nest, instant bird's nest is developed which refers to ready-to-consume bird's nest in a bottle. Edible additives may be added to enhance the taste experience of the consumer. Instant bird's nest is prepared by mixing cleaned bird's nest, water, and additives in a glass container followed by heating to sterile and cook the product. Adding preservatives is unavoidable so as to increase the lifespan of the product. Handling is an
10 issue as the product is in liquid form within the glass container. Consumer also could not customise the flavour of the instant bird's nest according to his preference.

- Another type of instant bird's nest is invented, in which the bird's nest is in dried form and can be served within 10-30 minutes after mixing with boiling water, and it is known as instant brew
15 bird's nest. Of interest in respect to a method of preparing the instant brew bird's nest is disclosed in Chinese Patent No. 102715507. The method comprises the steps of soaking clean raw bird's nest in water to allow it for softening and expansion; double-boiling the expanded bird's nest; moulding the boiled bird's nest upon cooling; and freeze-drying the moulded bird's nest. Despite its fast serving time, bird's nest of such product is in crushed form so as to increase
20 its surface area for water absorbing. The bird's nest has lower nutritional value as double boiling already renders most nutrition being degraded or leached into water.

- To overcome the drawbacks, it is desirable to develop an improved method of treating raw bird's nest and to provide an edible bird's nest having a higher readily dissolvable glycoprotein content,
25 with retained natural bird's nest aroma, customisable flavour, and can be served in a shorter period of time. This invention provides a solution to the problems.

SUMMARY OF INVENTION

One of the objects of the invention is to provide an improved method of pretreating raw edible bird's nest for preparing a cooked and dried edible bird's nest which can be consumed immediately as a snack or softened in water and consumed in a short period of time.

- 5 Another object of the invention is to prepare a dried edible bird's nest having increased number of mobilised glycoproteins and/or sialic acid as well as other nutrition and therefore, can be easily absorbed by one's digestive system after consuming the bird's nest.

- Still another object of the invention is to improve water absorbing ability of a dried edible bird's nest whereby the bird's nest can be softened in water within a shorter period of time.

Yet another object of the invention is to retain natural aroma of an edible bird's nest even after cleaning and treating the bird's nest.

- 15 Again another object of the invention is to provide a dried edible bird's nest which can be moulded into various shapes and sizes.

Also another object of the invention is to provide a dried edible bird's nest with customisable flavour through addition of edible additives.

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- At least one of the preceding aspects is met, in whole or in part, by the present invention, in which the embodiment of the present invention describes a method of treating edible bird's nest for use in preparing bird's nest soup comprising the steps of removing solid impurities from a bird's nest matrix; mobilising glycoprotein within the bird's nest matrix; removing microbial contamination in the bird's nest; and freeze-drying the bird's nest to remove moisture while retaining pores within the bird's nest.

- In a preferred embodiment of the invention, the solid impurities are removed simultaneously when the bird's nest is soaked in water. Preferably, the bird's nest is soaked in water for 3-24 hours to expand the bird's nest matrix to 5-20 times its original size. Preferably, the bird's nest is soaked at 1-20°C.

In another preferred embodiment of the invention, the glycoprotein is mobilised by heating and freezing the bird's nest for a number of cycles.

- 5 Still in another preferred embodiment of the invention, the microbial contamination is removed by autoclaving/steaming the bird's nest.

Preferably, one or more edible additives are incorporated into the bird's nest matrix. The additive can be selected from the group consisting of extracts of red date, agarwood, longan, cordyceps,
10 lemongrass, ginseng, collagen, and tissues.

A further embodiment of the invention is a dried edible bird's nest prepared from a method as depicted in any of the preceding description.

- 15 The preferred embodiment of the invention consists of novel features and a combination of parts hereinafter fully described and illustrated in the accompanying drawings and particularly pointed out in the appended claims; it being understood that various changes in the details may be effected by those skilled in the arts but without departing from the scope of the invention or sacrificing any of the advantages of the present invention.

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DETAILED DESCRIPTION OF THE INVENTION

This invention relates to edible bird's nest (EBN). More particularly, the present invention relates to a method of pretreating raw edible bird's nest and a clean, cooked, and dried edible
25 bird's nest prepared therefrom, wherein the dried edible bird's nest has increased mobilised glycoprotein, sialic acid and water absorbing capacity.

Hereinafter, the invention shall be described according to the preferred embodiments of the present invention and by referring to the accompanying description and drawings. However, it is
30 to be understood that limiting the description to the preferred embodiments of the invention and to the drawings is merely to facilitate discussion of the present invention and it is envisioned that

those skilled in the art may devise various modifications without departing from the scope of the appended claim.

5 The invention discloses a method of treating edible bird's nest for use in preparing bird's nest soup comprising the steps of removing solid impurities from a bird's nest matrix; mobilising glycoprotein within the bird's nest matrix; removing microbial contamination in the bird's nest; and freeze-drying the bird's nest to remove moisture while retaining pores within the bird's nest.

10 As used herein, the term "edible bird's nest" or "bird's nest" refers to bird's nest of Swiftlet, particularly *Aerodramus Fuciphagus*, regardless of whether it is raw or cooked, clean or unclean, and dried or moist. As used herein, the term "raw bird's nest" refers to crude and untreated bird's nest harvested from a cave, a Swiftlet house, or any possible place where bird's nest can be harvested. Preferably, raw bird's nest is harvested from a Swiftlet house as contaminations are lower and more controllable as compared to from a cave. In one embodiment of the invention,
15 whole raw bird's nest is treated. Yet in a preferred embodiment of the invention, only strand area of the raw bird's nest is used and treated in order to render the treated bird's nest uniform and homogeneous outlook and texture. It is also advantageous to use the strand area only as the area usually contains minimal contamination.

20 According to the preferred embodiment of the invention, solid impurities are removed from the bird's nest matrix, whereby the raw bird's nest is first soaked and expanded. The raw bird's nest is immersed in excessive water for softening and expansion in size of the raw bird's nest. Preferably, the raw bird's nest is immersed at a temperature of 1°C-20°C and more preferably at 2°C-4°C. Soaking at lower temperature can inactivate microbial activity and thus, minimise
25 multiplication of microbes and prevent further microbial contamination on the bird's nest. The bird's nest can be soaked for 3-72 hours and 12 hours are preferred. Typically, soaked bird's nest can expand to 5-20 times its original size. Typically but may not always be, 10 times size expansion can be achieved for 12 hours soaking time. Long soaking time is not preferred as it may render the bird's nest too soft for handling, cooking and moulding, as well as may affect the
30 quality of the bird's nest.

In another preferred embodiment of the invention, the method further comprises a step of incorporating edible additive into the soaked bird's nest. The additive can be selected from the group, but without limiting to, consisting of extracts of plant and animal such as red date, agarwood, longan, ginseng, cordyceps, ginger, lemongrass, collagen, and animal tissues, or a combination thereof. Other additives which improve the flavour and colouring of the bird's nest can also be used. Additive is added into the water when soaking. Particles of the additive are incorporated within the matrix of the bird's nest due to expansion of bird's nest as a result of water being absorbed. The amount of additive incorporated within the bird's nest matrix is depicted by the concentration of the additive in the soaking water.

As depicted by the preferred embodiment of the invention, the soaking water can be replaced for a number of times throughout the soaking period. Nitrite/nitrate particles are leached to the soaking water by diffusion and thus, the nitrite/nitrate content of the bird's nest is reduced or removed. It is preferable to replace the soaking water for at least 2 times so that the nitrite/nitrate content can be reduced to a safe level. In the case when additive is added to the soaking water, the additive may only be added in the last replaced soaking water as the diffusion of the nitrite/nitrate particles may be affected by the incorporation of the additive and also to minimise wastage of the additive.

Subsequently after soaking, expanded bird's nest is removed from the soaking water and solid impurities are removed thereafter. Preferably, the solid impurities are removed by hand-picking method in which no chemical is used and possible physicochemical property change of the bird's nest can be eliminated. It shall be noted that other method of removing solid impurities from bird's nest such as ultrasonic treatment can also be employed. However, method of removing solid impurities which involves further immersing of the bird's nest in a liquid chemical is not preferred as the previously incorporated additives may be leached and physicochemical property of the bird's nest may be altered.

As described by the preferred embodiment of the invention, the cleaned bird's nest is subjected to heating-freezing treatment for a plurality of cycles. The cleaned bird's nest is first heated with steam for 10-120 minutes and subsequently freezing at -5°C to -80°C, more preferably at -10°C

to -30°C for 12 hours. The heating and freezing are performed for a number of cycles in order to release and loosen glycoprotein and/or sialic acid as well as other nutrition within the bird's nest. Glycoprotein and/or sialic acid are mobilised in-situ and dissolved in water held by the bird's nest without leaching out from the matrix of the bird's nest. Hence, it is not preferred to heat the bird's nest by boiling or any heat treatment method which requires the bird's nest to be immersed in water, to prevent leaching of the glycoprotein and/or sialic acid as well as the additives. Overheating shall also be prevented to avoid degradation of the glycoprotein and/or sialic acid. The heating-freezing cycle is carefully controlled to prevent loss of mobilised glycoprotein and/or sialic acid.

It is crucial to mobilise the glycoprotein and/or sialic acid in the bird's nest. These two components are commonly regarded as the functional or active compounds which are nutritional. Usually the two components are bond to the bird's nest matrix and not readily dissolvable in water despite a minute amount of them is naturally appeared as mobilised form. By mobilising the two as well as other active components, they become readily dissolvable in water therefore easily digestible by consumer.

Still in another preferred embodiment of the invention, the incorporation of edible additives can be also done during the heating-freezing treatment. Solution of additives is added to the bird's nest and subsequently heating to concentrate the amount of additives. It shall be noted that the incorporation of edible additives can be done in the step of soaking and/or heating-freezing treatment.

After the heating-freezing treatment, the bird's nest may be considered as a cooked bird's nest. A substantial amount of water is held within the matrix of the cooked bird's nest, despite possible existence of microbial contamination. The held water contains dissolved glycoprotein, sialic acid, and additives. The cooked bird's nest is subjected to autoclave treatment to remove the microbial contamination. Preferably, the cooked bird's nest is autoclaved at 95°C-110°C for 20-60 minutes.

In accordance with the preferred embodiment of the invention, the autoclaved bird's nest holding the substantial amount of water with dissolved glycoprotein and additive is freeze-dried to

remove the moisture while retaining pores within the bird's nest. Preferably, the bird's nest is freeze-dried on a mould. The mould can be in various shape and size, depending on the desired configuration of the product which is the freeze-dried bird's nest. However, it may not be necessary to use a mould as long as the shape of the bird's nest can sustain after freeze-drying.

- 5 The moulded autoclaved bird's nest is first frozen to fix the shape, size, and weight, followed by freeze-drying to remove the moisture content within the bird's nest. While the water is removed, the glycoprotein and additives are still remained within the matrix of the bird's nest. Particularly, the glycoprotein is in mobilised form and hence, it can be easily absorbed by human digestive system when the bird's nest is consumed. Freeze drying also render the dried bird's nest with
10 high porosity and hence, high water absorption capacity.

- In an exemplary embodiment of the invention, bird's nest soup can be prepared by merely softening the dried bird's nest, hereinafter referred as treated bird's nest, in sufficient water, particularly boiling water, for 5-30 minutes. The treated bird's nest is readily softened as it
15 contains high amount of pores and therefore, high water absorption capacity. Additional edible additives such as, but is not limiting to, sugar, salt, milk and honey can be added on top of the pre-incorporated additives. The degree of softness of the bird's nest can be controlled by controlling the soaking time in hot water thereby providing a different mouth-feel to a consumer. Alternatively, the bird's nest can also be consumed in its dried form as a snack. Treated bird's
20 nest produced by the aforementioned method can retain the natural aroma of a bird's nest, which is normally regarded as white egg smell.

- A further embodiment of the invention is a dried edible bird's nest prepared from a method as depicted in any of the preceding description. The dried bird's nest comprises high porosity which
25 renders the dried bird's nest with high water absorption capacity. Preferably, the pore size of the edible bird's nest is 10-300 μm . The dried bird's nest also comprises high amount of mobilised glycoprotein and sialic acid. Hence when consumed, the glycoprotein and other nutrients are readily absorbed by a natural body. The dried bird's nest can be in various shapes and sizes depending on the desired configuration of the product. The shape can be selected from, but is not
30 limiting to, a cup, sheet, heart, round, square, and word.

In another further embodiment of the invention, the dried bird's nest may contain particles of edible additives within the matrix of the bird's nest. The additives can be selected from the group, but is not limited to, consisting of extracts of plant and animal such as red date, agarwood, longan, ginseng, cordyceps, ginger, lemongrass, collagen, and animal tissues.

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Although the invention has been described and illustrated in detail, it is to be understood that the same is by the way of illustration and example, and is not to be taken by way of limitation. The spirit and scope of the present invention are to be limited only by the terms of the appended claims.

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EXAMPLEExample 1

- 5 The edible bird's nest produced by a method as depicted in any of the preceding description is tested for its porosity, nutritional content, and microbial contamination.

The bird's nest, on average, has a pore size of 10-300 μm , with irregular pore size and shape. The pore size of the bird's nest can be measured by way of microscopy or scanning electron
10 microscope.

To measure the amount of readily dissolvable (mobilised) glycoproteins and/or sialic acid, the bird's nest is soaked in hot water for 10 minutes. On average, the bird's nest contain 250-1250 mg of mobilised sialic acid and/or glycoproteins per kg of bird's nest, which constitutes about
15 15% of the bird's nest.

In terms of microbial contamination, pathogens count such as *E.coli*, *Salmonella sp.*, and *Staphylococcus aureus* are within the safe level as required in Malaysia Standard MS2334:2011, as shown in Table 1.

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Table 1

Category	Parameters	Tolerance level	Methods of tests
Microbiology	Total plate count	$\leq 2.5 \times 10^6$ cfu/gm	Microbiological Analysis in Food Product (Analisis ujian mikrobiologi dalam produk makanan, Makmal Kesihatan Awam Veterinar, Salak Tinggi, 2002)
	Coliforms	≤ 1100 MPN/gm	
	E. coli	≤ 100 MPN/gm	
	Salmonella sp.	Nil	
	Staphylococcus aureus	≤ 100 MPN/gm	
	Yeast and mold	≤ 10 cfu	

Table 2 shows the microbial and heavy metal content test result of the bird's nest.

Table 2

Test Parameter	Unit	Result
Lead (as Pb)	mg/kg	Not detected (<0.01)
Mercury (as Hg)	mg/kg	Not detected (<0.01)
Arsenic (as As)	mg/kg	Not detected (<0.05)
Cadmium (as Cd)	mg/kg	Not detected (<0.01)
Total plate count @ 37 °C for 48 hours	cfu/g	<10
Coliforms	MPN/g	Not detected
E. coli	MPN/g	Not detected
Yeast and mold	cfu/g	Not detected
Staphylococcus aureus (Count)	cfu/g	Not detected
Salmonella in 25 g	-	Absent

Table 3 shows the nutritional content of the bird's nest.

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Table 3

Test Parameter	Unit	Result
Energy	kcal/100g	14
Fat	g/100g	0.1
Carbohydrate	g/100g	1.5
Total Sugars	g/100g	Not detected (<0.3)
Protein	g/100g	1.8

Comparative Example

Commercially available dried bird's nest from Johor and Kelantan are obtained. The commercial
 10 dried bird's nest shows nearly negligible pores.

The mean mobilised sialic acid content of commercially available dried bird's nest is shown in Table 4. In general, the mobilised sialic acid content present in an amount of 68.92mg/kg – 165.57mg/kg which accounts for about 9% of the bird's nest.

Table 4

Kelantan		Johor	
District	Mean (mg/kg)	District	Mean (mg/kg)
Pasir Puteh	68.92	Batu Pahat	107.04
Pasir Mas	73.56	Kluang	116.25
Gua Musang	73.65	Muar	118.98
Tanah Merah	81.91	Segamat	122.04
Gong Manok	89.65	Kulai	124.00
Machang	93.86	Johor Bahru	142.00
Jeli	94.88	Tangkak	142.45
Kota Baru	118.00	Mersing	154.28
Bachok	132.00	Kota Tinggi	157.79
		Pontian	165.57
Average	95.55	Average	135.04

CLAIMS

1. A method of treating edible bird's nest for use in preparing bird's nest soup comprising the steps of
 - 5 removing solid impurities from a bird's nest matrix;
mobilising glycoprotein within the bird's nest matrix by subjecting the bird's nest to a heating-freezing treatment for 2 to 5 cycles;
removing microbial contamination in the bird's nest; and
freeze-drying the bird's nest to remove moisture while retaining pores within the
10 bird's nest,
characterized in that the heating in the treatment excludes boiling or any heat treatment method which requires the bird's nest to be immersed in water.
2. A method according to claim 1, wherein the solid impurities are removed simultaneously
15 when the bird's nest is soaked in water.
3. A method according to claim 2, wherein the bird's nest is soaked in water for 3-24 hours to expand the bird's nest matrix to 5-20 times its original size.
- 20 4. A method according to claim 2 or 3, wherein the bird's nest is soaked at 1-20°C.
5. A method according to any of the preceding claims, wherein the microbial contamination is removed by autoclaving the bird's nest.
- 25 6. A method according to any of the preceding claims, wherein one or more edible additives are incorporated into the bird's nest matrix.
7. A method according to claim 6, wherein the additive is extracts of red date, agarwood, longan, cordyceps, lemongrass, ginseng, collagen, and tissues.

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8. A method according to any of the preceding claims, wherein the autoclaved bird's nest is frozen on a mould.
- 5 9. A method according to any of the preceding claims, wherein the solid impurities are removed by hand picking.
- 10 10. A method according to any of the preceding claims, wherein strand area of the raw bird's nest is used.
- 10 11. A dried edible bird's nest prepared from a method as claimed in any of the preceding claims.
12. A dried edible bird's nest according to claim 11, wherein the bird's nest comprises 250-1250 mg of mobilised sialic acid and/or glycoproteins per kg of bird's nest.