Asian Journal of Advances in Medical Science

Volume 6, Issue 1, Page 84-88, 2024; Article no.AJOAIMS.3731

Enhancing Health and Immunity through Natural Nutritional Supplements

Rouba Jihad Aldarf [a++*] and Ali Sultaneh [b#]

[a] Ministry of Agriculture and Agricultural Reform, Latakia, Syria.
[b] Faculty of Agricultural Engineering, Tishreen University, Latakia, Syria.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://prh.mbimph.com/review-history/3731

Original Research Article

Received: 02/05/2024
Accepted: 06/07/2024
Published: 09/07/2024

ABSTRACT

This study highlights the significance of understanding dietary habits and their implications on health amidst contemporary lifestyle changes. It specifically investigates bee pollen as a promising nutritional supplement owing to its diverse nutrient composition. The research involved collecting pollen samples and subjecting them to hot air drying to reduce moisture content and prolong shelf life. Analysis revealed substantial levels of protein and vitamin C in bee pollen, thereby enhancing its nutritional and health-promoting properties. Optimal drying conditions were determined at 40 degrees Celsius. In conclusion, bee pollen emerges as a valuable source of protein and vitamin C, advocating its inclusion in diets for enhanced health benefits and immune support.

[++] PhD;
[#] Assistant Professor;
**Corresponding author: Email: rubaaldarf86@gmail.com;*

Cite as: *Aldarf, Rouba Jihad, and Ali Sultaneh. 2024. "Enhancing Health and Immunity through Natural Nutritional Supplements". Asian Journal of Advances in Medical Science 6 (1):84-88. https://journalmedicals.com/index.php/AJOAIMS/article/view/145.*

Keywords: Bee pollen; healthy nutrition; dietary supplements; Vitamin C.

1. INTRODUCTION

In today's world, we witness continuous developments in lifestyle patterns and dietary cultures followed by individuals. These developments result from changes in social, economic, and technological structures that affect eating habits and nutrition. With increasing awareness of the importance of food in human health, understanding the health impacts of these changes becomes a crucial focus of scientific research. Popkin et al.,[1].

Health and nutrition are among the foremost issues occupying the minds of many individuals and communities in the present era. The health status of an individual is greatly influenced by the quality of the food they consume and the dietary patterns they follow. Multiple scientific studies highlight the comprehensive impact of dietary patterns on health, underscoring the importance of understanding changes in eating habits and analyzing their effects on public health. Mozaffarian et al [2].

These consumption changes in dietary patterns vary between changes in the quality of consumed food, the quantities of food intake, meal composition, preparation methods, and other factors that can affect nutrition and health levels. By understanding these changes and analyzing their effects, researchers and experts in public health and nutrition can direct efforts towards developing effective strategies to improve public health and reduce chronic diseases associated with lifestyle and nutrition. Malik et al.,[3].

This research will explore one of the most important dietary supplements that can be incorporated into the diet due to its high nutritional value, which is bee pollen.

Bee pollen granules consist of pellets collected during the foraging trips of worker bees, which are then packed into pollen baskets located on the hind legs of the bee Almeida-Muradian et al., [4].

When bee pollen is not properly stored, it loses much of its nutritional value due to the growth of fungi and bacteria resulting from high moisture levels. Therefore, drying bee pollen is necessary to prolong its shelf life. In some places, solar drying is used for bee pollen, which is undesirable due to the time it takes and the possibility of microbial damage during the drying process [5].

Therefore, the aim of the research is to utilize hot air drying, which is a suitable process widely used on a commercial scale. It is a process that does not require a long time and offers the possibility of controlling drying conditions such as temperature [6]. The dryer consists of a chamber containing trays stacked on top of each other where the food materials are placed. Heat is transferred through the air to the food material. These dryers are prevalent in the food industry due to their versatility and effective control over drying conditions [7].

2. MATERIALS AND METHODS

2.1 Bee Pollen Samples

Samples of bee pollen were collected from dedicated cells during the months of April and May in the year 2020 from the hive designated for the study.

One kilogram of bee pollen was collected and placed in a tightly sealed glass container. The collected bee pollen was cleaned to remove impurities such as parts of bees, leaves, and others.

The sample was divided into four sections, each containing 250 grams, to undergo drying processes at three different temperature levels [35–40–45°C], while the fourth section was analyzed without undergoing any heat treatment. These temperature levels fall within the range suggested by beekeeping scientists [35–45°C] in order to reduce moisture content to less than 12%. Sokhansanj and Jayas [8].

2.2 Chemical Analysis

- The estimation of lipid, protein, ash, and moisture content relies on official methods according to the Association of Official Analytical Chemists (AOAC) for the year 1997.
- Weight loss for the sample during the drying process is calculated by determining the moisture content using the weight method.
- The determination of vitamin C content involves extracting vitamin C from bee pollen using ascorbic acid (0.15% w/v)

according to Bernal's study in 1998. The content is then determined using the standardization method with 2,6-dichloroindophenol dye.

- Statistical analysis is conducted using the Genstat-12 software.

2.3 Aime of Study

The importance of this research lies in obtaining dried bee pollen with low moisture content, which allows the product to be stored at room temperature, making its marketing more convenient. While fresh bee pollen can be preserved, it requires refrigeration at temperatures ranging from (5 – 10°C). Therefore, resorting to drying bee pollen and reducing its moisture content to a level below which microbial spoilage is minimized facilitates the storage process.

3. RESULTS AND DISCUSSION

3.1 The Effect of Heat Treatment on the Chemical Composition of bee Pollen

The protein content in bee pollen without heat treatment was 20.30%, which is consistent with the study conducted by Rogala and Symas [9], where the protein content of bee pollen ranged between 20.5% and 24%.

- As for the effect of heat treatment, the protein content increased after heat treatment. This increase was more pronounced with higher drying temperatures. However, this increase was not statistically significant.

The lipid content in bee pollen was 7.79%, which is consistent with the lipid values for bee pollen from the southern region of Brazil, reaching 7% [4].

However, the lipid content in bee pollen collected from multiple flowers in Poland, South Korea, and China was 8.67%, 5.47%, and 6.19%, respectively [9].

As for the effect of drying temperature, the lipid content increased with heat treatment. However, this increase was not statistically significant.

The ash content in the samples was 2.1%, which is consistent with the specified values of 2.2% to 2.7% [4]. The ash content increased after the drying process in all treatments compared to fresh grains. However, the drying temperature did not significantly affect the ash content [10,11].

The vitamin C content in bee pollen was estimated before the drying process to study the effect of drying on the vitamin C content. Vitamin C is water-soluble and stable in the dried product, but vitamin C solutions can easily oxidize. A decrease in the amount of vitamin C was observed with an increase in drying temperature. Drying temperature had a highly significant effect on the vitamin C content [12].

Although the heat treatment at 35°C had the least effect on the vitamin C content, it required a longer period (18-24 h) to reduce the moisture content to the desired level, leading to undesirable color changes in bee pollen. Therefore, the heat treatment at 40°C is considered the best option because it requires less time (8-10) than the previous treatment to reduce the moisture content in bee pollen and is better than the heat treatment at 45°C in terms of its effect on the vitamin C content.

Previous images show that the heat treatment at 35°C resulted in significant and undesirable color changes. This is because it required a longer period to reach the desired moisture level. On the other hand, the color changes were less pronounced with the treatment at 45°C, but it led to significant changes in the chemical composition. Therefore, the treatment at 40°C is considered the best option [13-15].

Table 1. The following table illustrates the chemical composition of bee pollen for each heat treatment

Heat Treatment	Protein Content	Lipids	Ash	Vitamin C
No heat treatment	20.30 [a]	7.79 [a]	2.83 [a]	45.37 [a]
Treatment at 35°C	21.51 [a]	8.08 [ab]	2.80 [a]	42.10 [b]
Treatment at 40°C	21.52 [a]	8.26 [ab]	2.56 [a]	38.73 [c]
Treatment at 45°C	21.78 [a]	8.77 [a]	2.10 [b]	32.57 [d]
	LSD =1.5$^{N.D}$	**LSD=0.885$^{N.D}$**	**LSD=0.30 ***	**LSD=2.468 *****
	C.V = 3.9%	**C.V=5.7%**	**C.V = 6.3%**	**C.V = 3.3%**

35 40 45

Fig. 1. Effect of heat treatments on the physicochemical properties (color) of bee pollen

4. CONCLUSIONS

- The results showed that bee pollen is a protein-rich food substance.
- The presence of vitamin C in bee pollen is significant due to the health benefits it provides. Vitamin C acts as an antioxidant, helping to combat damage from free radicals in the body. It is important for skin health and the immune system, aids in iron absorption, and promotes wound healing. Therefore, the presence of vitamin C in bee pollen adds nutritional value and additional health benefits.
- The optimal heat treatment has been identified to reduce the moisture content in bee pollen, which is at 40 degrees Celsius.

5. RECOMMENDATIONS

- Using bee pollen as a rich nutritional supplement and immune system booster.
- Incorporating bee pollen into a healthy lifestyle by adding it to foods such as honey, for example.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

CONSENT AND ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Popkin BM, Adair LS, Ng SW. Global nutrition transition and the pandemic of obesity in developing countries. Nutrition Reviews. 2012;70(1):3-21.
2. Mozaffarian D, Ludwig DS. Dietary guidelines in the 21st century—A time for food. JAMA. 2010;304(6):681-682.
3. Malik VS, Willett WC, Hu FB. Global obesity: Trends, risk factors and policy implications. Nature Reviews Endocrinology. 2013;9(1):13-27.
4. Almeida-Muradian LB, Pamplona LC, Coimbra S, Barth OM. Chemical composition and botanical evaluation of dried bee pollen pellets. J. Food Compost. Anal. 2005;18:105–111.
5. Barth Om, Luz Cfp. Melissopalynological data obtained from a mangrove area near to Rio de Janeiro, Brazil. J. Apic. Res. 1998;37(2):155–163.
6. Crapiste G, Rotstein E. Design and performance evaluation of dryers. In Handbook of Food Engineering Practice (K. Valentas, E. Rotstein and R.P. Singh, eds.) CRC Press, New York, NY. 1997;125–166,
7. Ramaswamy H, Marcotte M. Food Processing Principles and Applications, CRC Press, Taylor & Francis Group, Boca Raton, FL. 2006;233-277.
8. Sokhansanj S, Jayas DS. Drying of foodstuffs. In Handbook of Industrial Drying (A.S. Mujumdar, ed.) Marcel Dekker, New York, NY. 1995;589-626.
9. Rogala R, Symas B. Nutritional value for bees of pollen substitute enriched with synthetic amino acids. J. Apic. Sci. 2006; 48:19–27

10. Szczêsna T. Long-chain fatty acids composition of honeybee collected pollen. J. Apic. Sci. 2006b;50(2):65–79.
11. Bernal I. Análisis de Alimentos, Editorial Guadalupe, Bogotá, Colombia. 1998;71–105
12. MADR (Ministerio De Agricultura Y Desarrollo Rural). La cadena de abejas y apicultura en Colombia. In Documento de Trabajo Bogota, Colombia. 2006; 124:1-16.
13. Avit Maxwell, Beugré Grah, Niaba Koffi Pierre Valery, Combo Agnan Marie-Michel, Yao N'zué Binjamin, and Gnakri Dago. Nutritional Quality of Food Supplements for Children from 6 to 59 Months Proposed to the Dietary Service of Regional Hospital of Daloa (Ivory Coast). Asian Food Science Journal. 2019;9(4): 1-10. Available:https://doi.org/10.9734/afsj/2019/v9i430019.
14. Stratton RJ, Elia M. A review of reviews: A new look at the evidence for oral nutritional supplements in clinical practice. Clinical Nutrition Supplements. 2007;2(1): 5-23.
15. Li QQ, Wang K, Marcucci MC, Sawaya AC, Hu L, Xue XF, Wu LM, Hu FL. Nutrient-rich bee pollen: A treasure trove of active natural metabolites. Journal of Functional Foods. 2018;49:472-84.

Peer-review history:
The peer review history for this paper can be accessed here:
https://prh.mbimph.com/review-history/3731