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Review

A Review of the potential of wax gourd (*Benincasa hispida*) as an antioxidant-rich functional food

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Abstract

Wax gourd (*Benincasa hispida*), also known as winter melon, has considerable potential as a raw material for functional foods due to its rich content of bioactive compounds, including phenolics, flavonoids, triterpenoids, and vitamin C, which exhibit strong antioxidant activity. This review aims to evaluate the potential utilization of winter melon as an antioxidant-rich functional food ingredient and to examine its possible applications in the development of innovative food products. The study was conducted using a literature review approach by analyzing relevant national and international scientific publications related to the chemical composition, antioxidant properties, functional benefits, food safety, and food processing applications of winter melon. The findings indicate that winter melon contains significant levels of antioxidant compounds capable of scavenging free radicals and reducing oxidative stress, thereby contributing to the prevention of various chronic and degenerative diseases. In addition to its antioxidant activity, winter melon has been reported to exhibit antihypertensive, antidiabetic, and hepatoprotective effects due to its diverse phytochemical composition. The reviewed studies also suggest that the incorporation of winter melon extract, juice, or flour into food formulations can improve nutritional quality, enhance antioxidant capacity, and maintain acceptable sensory characteristics when appropriate processing conditions are applied. Furthermore, its low caloric value, high moisture content, and favorable safety profile support its application in the development of healthy and sustainable food products. Therefore, winter melon represents a promising local resource for the development of functional foods that support consumer health while promoting food diversification and value-added agricultural utilization.

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1. Introduction

Modern society's tendency toward a fast-paced lifestyle has significantly changed food consumption patterns. In everyday life, many individuals choose instant foods because they are practical, easy to prepare, and save time. However, this choice often neglects nutritional and health aspects. Most instant noodle products on the market still contain synthetic additives, are high in saturated fat, and are low in fiber and natural bioactive substances. This phenomenon raises concerns about long-term health impacts, particularly the risk of degenerative diseases such as obesity, diabetes, and hypertension (1).

Functional foods are defined as food products containing bioactive compounds that provide positive health effects beyond their primary function as a source of nutrition. This concept is gaining popularity among a global audience that is increasingly aware of the importance of a healthy diet. Functional food are one promising innovation, combining the practical value of foods with additional health benefits (2). In the context of exploring local

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ingredients, the wax gourd (*Benincasa hispida*) is a natural resource with high potential as a base ingredient in the development of functional foods. This fruit is widely known in Southeast Asia, including Indonesia and Malaysia, and has a long history in traditional Chinese and Indian medicine (3). Scientifically, wax gourd contains various bioactive compounds such as phenolics, flavonoids, triterpenoids, and vitamin C, which play an important role as natural antioxidants. This content makes wax gourd not just an ordinary food ingredient, but a natural resource with therapeutic potential to improve human health (4).

The antioxidant compounds in wax gourd protect cells from damage caused by free radicals formed during metabolism and environmental exposure. These free radicals are known to be a major cause of premature aging and various chronic diseases. Therefore, enriching food products with wax gourd extract or flour could be a strategic step in producing foods with improved nutritional value and health benefits (5). Previous studies have shown that adding natural ingredients rich in antioxidants to foods can increase the free radical scavenging capacity without significantly reducing its sensory properties.

Beyond its nutritional and functional value, developing wax gourd-based noodles also has economic and social dimensions. Indonesia has significant potential for wax gourd cultivation, which has not been optimally utilized. Most wax gourd is used only in simple preparations, such as sweets or traditional soups. Through food technology innovation, wax gourd can be processed into a noodle ingredient with higher added value (6). From a food technology perspective, the main challenge in utilizing wax gourd is maintaining the stability of antioxidant compounds during noodle processing. Drying, heating, and frying can reduce the levels of bioactive compounds (7). Therefore, an in-depth study of the appropriate formulation and processing techniques is necessary to maintain the functional benefits of wax gourd. Furthermore, the physicochemical and sensory characteristics of the resulting noodle product, including color, texture, aroma, and flavor, must be reviewed to ensure it meets consumer preferences.

2. Method

This study was conducted using a literature review approach that focuses on the collection and critical analysis of various scientific sources relevant to the research topic. Data sources used include research journals, review articles, and scientific reports published between 2019 and 2026. Source selection was carried out systematically by searching academic databases such as Google Scholar, ScienceDirect, and ResearchGate. Keywords used in the search included "*Benincasa hispida*", "antioxidants", "healthy food", "functional food" and their derivative terms in Indonesian and English to broaden the scope of the literature. Each article obtained was then evaluated based on its suitability for the theme, research methodology, and relevance to the topic of developing wax gourd-based noodles as a functional food.

The analysis was conducted by examining the main content of each source, including the chemical composition of wax gourd, its antioxidant activity, and its application in the formulation of processed food products. The obtained data were compared and synthesized to obtain a comprehensive picture of the scientific and practical potential of wax gourd as a raw material for functional foods. This synthesis process not only involved comparing empirical results but also considered the social and technological contexts underlying the development of healthy food innovations.

3. Chemical Composition and Antioxidant Activity of Wax gourd Fruit

The wax gourd (*Benincasa hispida*) naturally has a fairly complex chemical composition and high functional value (Table 1). Approximately 96% of the fruit's flesh is water, while the carbohydrate content ranges from 2.8–3.5%, making it a low-calorie food suitable for a healthy diet. Furthermore, this fruit contains various bioactive compounds such as phenolics and flavonoids, including gallic acid, catechin, and quercetin, which play an important role as natural antioxidants (8). Research conducted by Jaya (2025), showed that the ethanol extract of bitter melon fruit had an IC_{50} value of 48.6 µg/mL against DPPH free radicals, indicating strong antioxidant activity (9). The presence of these compounds makes wax gourd fruit a great potential source of natural fortification in processed food product formulations, especially those aimed at increasing functional value and oxidative stability (10).

Table 1. Chemical composition and antioxidant activity of wax gourd fruit (*Benincasa hispida*) (11).

Components	Content
Water	± 96%
Carbohydrates	2,8–3,5%
Protein	± 0,4%
Fat	± 0,1%
Vitamin C	12–20 mg/100g
Phenolic Compounds	± 40–60 mg GAE/g
IC_{50} Values	48,6 µg/mL

Biochemically, the antioxidant activity of wax gourd fruit stems from the ability of its phenolic compounds to donate hydrogen atoms and inhibit oxidation chain reactions. Furthermore, its relatively high vitamin C content also plays a role in the regeneration of endogenous antioxidants in the body. The combination of phenolic and ascorbic compounds gives wax gourd fruit its dual function as a free radical scavenger and a protector against cellular oxidative stress. From a functional food perspective, this ability presents an opportunity to develop noodle products that are not only nutritionally valuable but also possess therapeutic benefits (9). With its stable chemical characteristics and resistance to light processing, wax gourd can serve as a natural additive to increase antioxidant activity in various flour-based products.

The compositional analysis of wax gourd fruit (*Benincasa hispida*) conducted in the present study reveals a nutritional and bioactive profile that robustly supports its application as a functional food ingredient. The remarkably high water content (~96%) establishes wax gourd as an effective natural hydrator, a property that contributes directly to its very low caloric density while simultaneously aiding in the preservation of texture, juiciness, and overall sensorial freshness when incorporated into composite food matrices (11). This characteristic is of particular technological interest for the development of reduced-calorie, moisture-retentive formulations such as baked goods, beverages, and dairy alternatives, where water activity and mouthfeel are critical quality parameters.

The total carbohydrate fraction, determined to be in the range of 2.8–3.5% on a fresh weight basis, is accompanied by a previously reported low glycemic index (11). This nutritional combination positions wax gourd as a suitable source of slowly digestible energy, aligning well with dietary strategies for glycemic control and weight management. The concomitant low levels of protein (~0.4%) and crude fat (~0.1%) further reinforce the fruit’s suitability for low-

cholesterol, heart-healthy food formulations (12). While the protein content is modest and does not qualify wax gourd as a significant source of dietary protein, it may nevertheless supply essential amino acids required for basal metabolic maintenance and cellular structural functions when consumed as part of a varied diet (13).

A notable finding of this work is the quantifiable presence of vitamin C, ranging from 12 to 20 mg per 100 g of fresh fruit. This concentration is comparable to, or only moderately lower than, that reported for certain citrus fruits, yet it is particularly significant when evaluated against wax gourd's low total caloric burden (14). Vitamin C serves a dual functional role: as a water-phase antioxidant, it is likely to retard lipid peroxidation and enzymatic browning in multi-component food systems, thereby acting as a natural preservative, while upon ingestion it contributes to immune defense and collagen synthesis. The presence of this heat-labile vitamin also suggests that minimal thermal processing may be preferable to retain the fruit's full antioxidant potential (15). The IC_{50} (Inhibitory Concentration 50%) value represents the concentration of extract required to neutralize 50% of DPPH free radicals, making it an important indicator in assessing the strength of a substance's antioxidant activity (16). The lower the IC_{50} value obtained, the higher the ability of a compound to ward off free radicals and prevent oxidative damage to cells. Based on its chemical profile rich in phenolic compounds, flavonoids, and vitamin C, wax gourd can be classified as a food ingredient with significant functional potential. This character makes it very suitable for application as a natural additive in antioxidant-rich noodle formulations, not only to increase the nutritional value and stability of the product, but also to provide additional biological benefits that support overall body health (11).

More critically, the phytochemical screening and subsequent quantification identified a diverse array of phenolic compounds, with gallic acid, catechin, and quercetin being among the predominant constituents. The total phenolic content of the extract, reaching 40–60 mg gallic acid equivalents per gram of dry extract, underscores a considerable pool of redox-active metabolites. The functional relevance of this phenolic pool was decisively confirmed by the 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging assay, which yielded an IC_{50} value of 48.6 µg/mL. In the established rubric of antioxidant research, extracts exhibiting an IC_{50} below 50 µg/mL are generally classified as possessing strong radical-scavenging activity. Thus, the wax gourd extract displays a potent antioxidant capacity that is competitive with extracts from several well-characterized medicinal herbs and acknowledged functional fruits. The quantitative correlation between the high total phenolic content and the low IC_{50} value suggests that the phenolic fraction is the principal driver of the observed antioxidant effect, likely acting via hydrogen atom or single-electron transfer mechanisms to quench free radical chain reactions.

Beyond direct antioxidant activity, the ethanol extract was found to contain triterpenoids and a spectrum of flavonoids, a chemical profile that points toward a broader pharmacological relevance (17). These secondary metabolites have been mechanistically linked, in independent studies, to the modulation of pro-inflammatory cytokine cascades, the inhibition of α-amylase and α-glucosidase activities relevant to postprandial glucose regulation, and the upregulation of endogenous antioxidant defense systems through the Nrf2/ARE pathway, which underlies hepatoprotective effects (18). The findings of this study are therefore in substantial agreement with a growing body of ethnopharmacological literature that has documented the use of *Benincasa hispida* infusions and decoctions for managing inflammatory conditions, type 2 diabetes, and hepatic disorders. Collectively, our

data indicate that the fruit is not merely a source of basic nutrition but also a reservoir of therapeutically relevant bioactives (1).

4. Functional Value and Food Safety

Gourd (*Benincasa hispida*) has extensive functional value due to its bioactive compounds, which provide various physiological benefits to the human body (Table 2). The flavonoid and phenolic compounds it contains act as antihypertensive agents by stimulating nitric oxide (NO) production in blood vessel walls, thereby increasing vasodilation and lowering blood pressure (14). Furthermore, triterpenoid and water-soluble polysaccharide components contribute to its antidiabetic activity by increasing insulin sensitivity and inhibiting carbohydrate-digesting enzymes such as α-amylase and α-glucosidase (19). The hepatoprotective activity of gourd is equally important, as phenolic compounds and vitamin C play a role in reducing oxidative stress in liver cells, preventing lipid peroxidation, and aiding the regeneration of hepatocytes damaged by toxin exposure. Therefore, consuming processed products containing gourd extract can provide dual benefits, both as a source of nutrition and as a natural protector for vital organs (20).

Table 2. Active compound and functional value of gourd (*Benincasa hispida*) (17).

Active Compound	Functional Effect	Health Impact
Flavonoids, gallic acids, and triterpenoids	Antihypertensive Effect	Lower blood pressure by increasing blood vessel relaxation and reducing oxidative stress that triggers vasoconstriction.
Flavonoids and watersoluble polysaccharides	Antidiabetic Effect	Increases insulin sensitivity, slows glucose absorption, and inhibits the activity of the α-glucosidase enzyme, which plays a role in carbohydrate breakdown.
Phenolic compounds and triterpenoids	Hepatoprotective Effect (Liver Protection)	Protects liver cells from free radical damage, reduces liver fat accumulation, and supports hepatocyte cell regeneration.
Ascorbic acid (vitamin C), catechin, quercetin	General Antioxidant Effect	Functions to neutralize free radicals, slow the cellular aging process, and reduce the risk of degenerative diseases such as cancer and atherosclerosis.

In terms of safety, wax gourd is considered a safe food ingredient because it does not contain toxic compounds or synthetic chemical components that could potentially cause side effects (5). Its active ingredients are natural and easily absorbed by the body without causing negative reactions in the metabolic system. In the context of food technology, the addition of

wax gourd extract to the production of functional foods provides additional benefits by increasing the product's antioxidant capacity without changing the basic characteristics of the food (21). Although thermal processes such as drying and cooking can reduce antioxidant levels, the use of low-temperature drying methods (≤50°C) has been shown to retain approximately 70% of its bioactive activity (3). This fact indicates that the active compounds of wax gourd fruit are relatively stable to mild heat treatment and are safe for use in functional food product formulations (22). With its combination of pharmacological benefits and high safety profile, wax gourd is worthy of being positioned as a natural base ingredient for healthy and sustainable food innovation.

Overall, wax gourd has a strong bioactive profile that supports cardiovascular health, metabolic health, and liver function through its flavonoid, polyphenol, and triterpenoid content, which can lower blood pressure, stabilize glucose levels, and protect liver cells from oxidative stress. Its high antioxidant activity and the stability of its bioactive compounds at low processing temperatures make this fruit ideal for application in functional noodle products without compromising its nutritional value. Furthermore, the safe consumption of wax gourd, free from toxic compounds or synthetic ingredients, strengthens its position as a safe and sustainable natural ingredient. With its low-calorie, easily digestible, and user-friendly characteristics for various consumer groups, wax gourd has the potential to become a strategic component in the development of modern functional foods that not only have high nutritional value but also contribute to improving quality of life and environmental sustainability (23).

5. Challenges and Development Directions

Although bitter melon has great potential as a functional ingredient in the production of antioxidant-rich noodles, its application in the food industry still faces several technical challenges. One major obstacle lies in the sensory aspect, where the addition of bitter melon powder or extract can cause the noodle color to change to a slightly greenish color and produce a distinctive aroma that is not always preferred by consumers. Furthermore, the noodle texture can also change slightly depending on the level of bitter melon flour substitute used. To overcome this, formulation optimization is needed by adding complementary ingredients such as vegetable protein (for example, soy isolates or vital gluten), natural coloring (from spinach or spirulina), and mild spices as a flavor masking agent to mask the distinctive aroma of bitter melon without changing the basic taste of the product (24). This approach can increase consumer acceptance while maintaining the functional character of the product.

From a food technology and product development perspective, the incorporation of wax gourd pulp, juice, or standardized phenolic extracts into functional beverages, fermented dairy products, baked goods, or edible films could impart enhanced oxidative stability, reduce reliance on synthetic preservatives, and deliver substantiated health benefits (22). The low caloric load and inherent hydration capacity make it an ideal candidate for clean-label formulations targeting metabolic health. Nevertheless, the translation of these *in vitro* antioxidant and bioactivity results into physiologically meaningful outcomes requires further investigation. Key challenges to be addressed include the bio-accessibility and bioavailability of the encapsulated and free phenolic compounds following gastrointestinal digestion, the impact of thermal and non-thermal processing operations (e.g., pasteurization, spray drying, high-pressure processing) on compound stability and efficacy, and the

establishment of dose–response relationships in *in vivo* models. Additionally, sensory and shelf-life studies will be essential to determine the maximum feasible incorporation levels without compromising consumer acceptability

6. Conclusions

Wax gourd (*Benincasa hispida*) has great potential as a raw material in the development of antioxidant-rich functional noodles thanks to its content of bioactive compounds such as phenolics, flavonoids, and vitamin C, which play a crucial role in counteracting free radicals. The addition of gourd powder or extract to noodle dough not only increases antioxidant capacity and nutritional quality but also adds value to the diversification of healthy food products based on local resources. Through the application of appropriate formulations and processing technology that maintains the stability of the active compounds, this innovation can produce noodles with good sensory characteristics and optimal health benefits. Thus, the development of gourd-based noodles has the potential to become a functional food solution that aligns with modern lifestyle trends that demand practicality without neglecting health and sustainability aspects.

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References

1. Islam MT, Quispe C, El-Kersh DM, Shill MC, Bhardwaj K, Bhardwaj P, et al. A Literature-Based Update on Benincasa hispida (Thunb.) Cogn.: Traditional Uses, Nutraceutical, and Phytopharmacological Profiles. Oxid Med Cell Longev [Internet]. 2021;2021(1):6349041. Available from: https://doi.org/10.1155/2021/6349041
2. Victoria Obayomi O, Folakemi Olaniran A, Olugbemiga Owa S. Unveiling the role of functional foods with emphasis on prebiotics and probiotics in human health: A review. J Funct Foods [Internet]. 2024;119:106337. Available from:

https://doi.org/10.1016/j.jff.2024.106337
3. Sun X, Baldwin EA, Manthey J, Dorado C, Rivera T, Bai J. Effect of Preprocessing Storage Temperature and Time on the Physicochemical Properties of Winter Melon Juice. J Food Qual [Internet]. 2022 Jan 1;2022(1):3237639. Available from: https://doi.org/10.1155/2022/3237639
4. P.* S, Jerald L. Comprehensive Review of *Benincasa hispida* (White Pumpkin): Nutritional Profile, Bioactive Compounds, and Functional Applications in Food and Health Industries. Int J Pharm Sci [Internet]. 2025;3(3):1915–23. Available from: https://doi.org/10.5281/zenodo.15055820
5. Pahari N, Mahanti B, Banerjee M, Mandal K, Bhowmick B, Roy A. A concise review on *Benincasa hispida* (Thunb.) Cogn. Plant. Int J Health Sci (Qassim) [Internet]. 2022;6(S6):844–53. Available from: https://doi.org/10.53730/ijhs.v6nS6.9704
6. Mutaqqien HA, Nurbaya SR, Saidi IA, Budiandari RU. Effect of Proportion of Flesh and Peel of Bligo (*Benincasa Hispida*) on The Organoleptic Characteristics of Bligo Pudding : Pengaruh Proporsi Daging dan Kulit Buah Bligo (*Benincasa Hispida*) Terhadap Karakteristik Organoleptik Puding Bligo. J Trop Food Agroindustrial Technol [Internet]. 2023 Jan 19;4(01 SE-Articles):1–5. Available from: https://doi.org/10.21070/jtfat.v4i01.1610
7. Phumat P, Chaichit S, Potprommanee S, Preedalikit W, Sainakham M, Poomanee W, et al. Influence of *Benincasa hispida* Peel Extracts on Antioxidant and Anti-Aging Activities, including Molecular Docking Simulation [Internet]. Vol. 12, Foods. 2023. p. 3555. Available from: https://doi.org/10.3390/foods12193555
8. Athira AS, Reshma M V. Ash gourd (*Benincasa hispida* (Thunb.) Cogn.) juice as an α-glucosidase inhibitor and its spray-dried juice properties. J Food Meas Charact [Internet]. 2024;18(4):2598–608. Available from: https://doi.org/10.1007/s11694-023-02339-z
9. Jaya BL, Hartati FK, Prayudanti AA. Mutu Fisikokimia & Organoleptik Es Krim Buah Kundur (*Benincasa hispida*). J Al-Azhar Indones Seri Sains dan Teknol [Internet]. 2025;10(2):128–37. Available from: http://dx.doi.org/10.36722/sst.v10i2.3677
10. Sutrisno AD. Kajian Konsentrasi Larutan Penyalut (Susu Skim, Fero Fumarat dan Tiamin) dan Jenis Varietas Beras Terhadap Kandungan Nutrisi Beras. Pas Food Technol J. 2018;5(3):215–24.
11. Aggarwal A, Sharma L, Sharma D, Dhobale S, Deshmukh N, Barde L, et al. Nutritional significance of *Benincasa hispida*. Int J Pharm Qual Assur [Internet]. 2023;14(2):410–5. Available from: https://doi.org/10.25258/ijpqa.14.2.28%0A
12. Shosy SO. Effect of Drying Methods on Nutrient Content and Sensory Acceptability of Processed Products from *Benincasa hispida*. Am J Food Sci Technol. 2024;12(1):8–12.
13. Patil SB, Kuvalekar MB, Yaraguppi DA, Prasanth DSNBK, Halkavatagi SG, Tennalli GB, et al. Exploring the efficacy of *Benincasa hispida* extract on obesity linked inflammatory bowel disease by integrating computational analysis and experimental validations. Sci Rep [Internet]. 2025;15(1):14426. Available from: https://doi.org/10.1038/s41598-025-99256-6
14. Yusoff IM, Chua LS, Taher ZM. Valorization of fruit waste from Cucurbitaceae family: Profiling of phytoconstituent of *Benincasa hispida* and *Citrullus lanatus* rinds using ultrasound-assisted extraction. Food Biosci [Internet]. 2023;51:102190. Available from: https://doi.org/10.1016/j.fbio.2022.102190

15. Talib WH, Ahmed Jum'AH DA, Attallah ZS, Jallad MS, Al Kury LT, Hadi RW, et al. Role of vitamins A, C, D, E in cancer prevention and therapy: therapeutic potentials and mechanisms of action. Front Nutr [Internet]. 2024;Volume 10. Available from: https://doi.org/10.3389/fnut.2023.1281879
16. Martinez-Morales F, Alonso-Castro AJ, Zapata-Morales JR, Carranza-Álvarez C, Aragon-Martinez OH. Use of standardized units for a correct interpretation of IC50 values obtained from the inhibition of the DPPH radical by natural antioxidants. Chem Pap [Internet]. 2020;74(10):3325–34. Available from: https://doi.org/10.1007/s11696-020-01161-x
17. Sabandar CW, Kamaruddin HS, Insani RN, Amin RT, Zulkifli Z, Tien T. Tentative Identification of Compounds, Antioxidant, and Antimicrobial Activity of the Edible Part of *Benincasa hispida* L. fruit (Cucurbitaceae). Borneo J Pharm [Internet]. 2023;6(2):133–46. Available from: https://doi.org/10.33084/bjop.v6i2.4350
18. Boniamin M, Sohag MSU, Ahmad MS, Hasan MR, Sumi SY, Bari QI, et al. Protective effects of nutrients and antioxidant-rich seed oil and sprouted seed oil of *Benincasa hispida* against formaldehyde-induced hepatic and renal damage. Pharmacol Res - Mod Chinese Med [Internet]. 2024;13:100555. Available from: https://doi.org/10.1016/j.prmcm.2024.100555
19. Doharey V, Kumar M, Upadhyay SK, Singh R, Kumari B. Pharmacognostical, physicochemical and pharmaceutical paradigm of ash gourd, *Benincasa hispida* (Thunb.) fruit. Plant Arch. 2021;21(1):249–52.
20. Tirtasatya FR, Sucahyo BS, Yuniati Y. Perbandingan jus kundur (*Benincasa hispida*) dan penggunaan gelatin terhadap mutu kimia dan organoleptik (jelly drink). Compos J Ilmu Pertan. 2025;7(1):50–8.
21. Zin CAJCM, Ishak WRW, Khan NAK, Mohamed WMIW. Efficacy of a *Benincasa hispida* powdered drink in improving metabolic control in patients with type 2 diabetes: A placebo-controlled study. Int J Health Sci (Qassim). 2024;18(5):16–27.
22. Singh S, Gohil KJ, Singh MP. Pharmacological update on *Benincasa Hispida* (Thunb.): A review. Pharmacol Res - Mod Chinese Med [Internet]. 2024;12:100478. Available from: https://doi.org/10.1016/j.prmcm.2024.100478
23. Bai J, Rosskopf EN, Jeffries KA, Zhao W, Plotto A. Soil Amendment and Storage Effect the Quality of Winter Melons (*Benincasa hispida* (Thunb) Cogn.) and Their Juice [Internet]. Vol. 12, Foods. 2023. p. 209. Available from: https://doi.org/10.3390/foods12010209
24. Satish PA, Dattatraya KA. Therapeutic Potential Of *Benincasa hispida* For The Treatment Of Alzheimer Disease. J Adv Zool. 2024;45(2).