World Journal of Pharmaceutical Science and Research
www.wjpsronline.com
Research Article
ISSN: 2583-6579
SJIF Impact Factor: 5.111
Year - 2025
Volume: 4; Issue: 4
Page: 290-298

QUALITY AND STANDARD CHARACTERISTICS OF KOREAN RAMEN CONTAINING *ALOE VERA* GEL SPRAY DRIED POWDER AS K-FOOD

DongMyong Kim[1,6*†], ChaeYun Yang[2†], YeoJin Lee[3], SeoHyeon Hwang[4], Sung-Yeun Park[5], Na-Yeun Kim[5], Hyung-Kon Lee[1], Yong-Seong Kwon[1], and Yeon-Mea Choi[6]

[1]*R&D Center KJMBIO Ltd, Korea.*
[2]*Department of Chemical & Biomolecular Engineering, KAIST, Korea.*
[3]*Department of Biomedical Engineering, UNIST, Korea.*
[4]*Department of Biological Sciences, KAIST, Korea.*
[5]*Department of Food & Nutrition, Seoul National University, Korea.*
[6]*KimJeongMoon Aloe Ltd, Korea.*
†: contributed equally

Article Received: 24 June 2025 | | Article Revised: 15 July 2025 | | Article Accepted: 08 August 2025

***Corresponding Author: DongMyong Kim**
R&D Center KJMBIO Ltd, Korea.
DOI: https://doi.org/10.5281/zenodo.16885309

How to cite this Article: DongMyong Kim, ChaeYun Yang, YeoJin Lee, SeoHyeon Hwang, Sung-Yeun Park, Na-Yeun Kim, Hyung-Kon Lee, Yong-Seong Kwon and Yeon-Mea Choi (2025) QUALITY AND STANDARD CHARACTERISTICS OF KOREAN RAMEN CONTAINING *ALOE VERA* GEL SPRAY DRIED POWDER AS K-FOOD. World Journal of Pharmaceutical Science and Research, 4(4), 290-298. https://doi.org/10.5281/zenodo.16885309

ABSTRACT

This study investigates the addition of Aloe vera gel dry powder to K-food Ramen to improve their nutritional and functional properties. Aloe vera, well known for its medicinal properties, has potential as a functional food ingredient. This study aimed to analyze the changes in the preparation, quality characteristics, and texture of Korean Ramen as a function of the concentration of aloe vera gel dry powder (0%, 1.4%, 2.8%, and 4.2%). The weight and volume gain, pH, turbidity, and texture characteristics of the ramens were evaluated. The results showed that increasing the aloe vera content significantly improved the weight and volume of the cooked ramens due to the water absorption properties of Aloe vera polysaccharides. However, higher concentrations of Aloe vera decreased the hardness and cohesion of the ramens, and sensory evaluation showed that the ramens containing 2.8% Aloe vera gel dry powder were the most preferred in terms of taste, texture, and overall palatability. This study highlights the potential for adding Aloe vera to ramen products to spur innovation in health-oriented functional foods.

KEYWORDS: Aloe vera gel, Korean ramen, Functional food, Organoleptic evaluation, Texture, K-food.

I. INTRODUCTION

Noodles are a food product made from wheat flour, which is kneaded with salt and water to form noodles, which are then pulled into long, thin strips and cut into uniform sizes. Noodles have been an integral part of human diet and culture for centuries, transcending geographical boundaries to become a staple food in many societies. The history of noodles dates back more than 4,000 years and is believed to have originated in ancient China.[1] From the famous Italian pasta to the Japanese ramen, noodles have evolved into a diverse and beloved food around the world and have become an important component of everyday meals due to their adaptability to different flavors, ease of preparation, and satisfying properties.

Exploring new ingredients in food manufacturing plays an important role to meet the diverse consumer tastes and nutritional needs. Recent literature has emphasized the growing consumer demand for functional foods that provide health benefits beyond basic nutrients.[2,3] Recent studies in the field of noodles have reported on the preparation of various noodles made by adding health functional ingredients in addition to basic ingredients. In particular, many studies have been conducted on noodles made by adding various ingredients such as chlorella, isolated soy protein, job's tears, arrowroot starch, seaweed powder, powdered green tea, sprouted soybean powder, hydrocolloids, wax gourd juice, wolfberry powder, etc.[4-7]

Aloe vera is a succulent plant in the Liliaceae family, which has been known for centuries for its medicinal and therapeutic properties. Originating from the Arabian Peninsula, *Aloe vera* is cultivated worldwide, especially in warm climate regions.[8-10] The leaves of *Aloe vera* contain a clear gel rich in bioactive compounds, including vitamins, minerals, enzymes, and polysaccharides, which provide a variety of health benefits. Due to its wound healing, anti-inflammatory, and antimicrobial properties, it has been used to treat skin conditions, address digestive issues, and even as a natural laxative. Recent research has highlighted the potential for *Aloe vera* to contribute to human health through its antioxidant, immunomodulatory, and anti-aging properties. For example, the polysaccharides contained in *Aloe vera* gel have been shown to stimulate the immune system and promote skin moisturization, while its anti-inflammatory and antioxidant activities make it a useful ingredient in the management of oxidative stress and inflammation-related conditions.[11-15] In modern times, the scope of application of *Aloe vera* has expanded considerably, playing an important role in the cosmetic, pharmaceutical, and food industries. In the food industry, research has shown that *Aloe vera* is emerging as a functional ingredient that can enhance the nutritional profile and health benefits of various products.[16,17] However, previous research on *Aloe vera* in food applications has mainly focused on beverages and supplements, resulting in a lack of understanding of its effects when used in solid food matrices such as noodles.

Therefore, in this study, we aimed to incorporate *Aloe vera* gel dry powder into the production of Korean ramen, which are widely consumed by people worldwide, to investigate the preparation and quality characteristics of ramen incorporating *Aloe vera* gel dry powder as a functional food ingredient to improve the nutritional and functional properties of ramens. In doing so, we hope to provide valuable insights into the potential of *Aloe vera* as a functional food ingredient, contributing to the innovation and diversity of health-oriented food products.

II. MATERIAL & METHOD

Ingredients

For the preparation of the ramens, commercially available plain flour was used (Qone Premium Wheat Flour for Ramens, Samyang Co., Seoul, Korea), and aloe salt was purchased (KimJeongMoon Aloe Co., Seoul, Korea). Aloe raw

gel dried powder (2.4% moisture, 78.5% carbohydrate, 12.1% crude protein, 0.5% crude fat, 6.5% ash, 2.4% dietary fiber) manufactured by ALoeBali, Indonesia was used as a gift from KJMBio Research Institute.

Ramen Manufacturing

Aloe vera gel dried powder was added to replace 0% (Sample 1), 1.4% (Sample 2), 2.8% (Sample 3), and 4.2% (Sample 4) of wheat flour in the preparation of the ramens, as shown in Table 1. The mixture of flour and *Aloe vera* gel dried powder was placed in a kneader (SN6A type P, Sanuki Noodle Maker, Tokyo, Japan) and salt dissolved in water was added to the kneader little by little and kneaded for about 10 minutes at room temperature. The initial dough was hand-formed and placed into the rolling machine (RP1A type P, Sanuki Noodle Maker) and rolled for 3 minutes while pressing with the convex roller. After rolling, the noodles were rolled again with the convex roller in a ramen maker equipped with a steel rolling machine and a line cutter (Type M305, Sanuki Noodle Maker) to form ramens. The ramens were rolled from step 1 to step 2.5 in turn according to the noodle thickness control device of the noodle maker to adjust the thickness of the noodles to 2.0 mm. A little starch powder was sprinkled on the surface of the ramens to prevent the ramens from sticking together, and then the ramens were cut into square ramens with a width × thickness of 2.5 mm × 2.0 mm. The prepared ramens were analyzed for quality as raw ramens and cooked ramens without any drying process.

Table 1: Mixing ratios of materials used to make wet ramen.

Sample	Wheat flour (g)	*Aloe vera* gel dry powder (g)	Salt (g)	Water (g)
1	600.0	0	11.4	228
2	591.6	8.4	11.4	228
3	583.2	16.8	11.4	228
4	574.8	25.2	11.4	228

Calculation of weight and volume growth rates

80 g of ramens were cooked in 500 mL of boiling water for 6 minutes, then cooled in 500 mL of cold water for 30 seconds, drained, and weighed. The weight gain of the ramens was calculated from the weight of the ramenss before cooking and the weight of the ramens after cooking.

$$\text{Weight gain (\%)} = \{(\text{weight after cooking} - \text{weight before cooking}) / \text{weight before cooking}\} \times 100$$

The volume of ramens was measured as the volume of water added to a 500 mL measuring-cylinder filled with 250 mL of room temperature water and 80 g of ramens. The ramens were removed and cooked in 500 mL of boiling water for 6 minutes, then placed in cold water to cool for 30 seconds, drained, and placed in a 500 mL measuring-cylinder filled with 250 mL of room temperature water to measure the volume of water added. The volume increase rate of the noodles was calculated from the volume of the raw ramens and the volume of the cooked ramens.

$$\text{Volume growth (\%)} = \{(\text{volume of cooked ramens} - \text{volume of raw ramens}) / \text{volume of raw ramens}\} \times 100$$

From the weight and volume of the ramens before cooking and the weight and volume of the ramens after cooking, we calculated the density before and after cooking.

Measuring pH and turbidity of broth

The pH was measured using a pH meter (model F-55, Horiba Co., Kyoto, Japan) after the soup remaining after cooking was cooled at room temperature. The turbidity of the soup was expressed as absorbance at 675 nm using a spectrophotometer (DU-530, Beckman, Fullerto, CA, USA).

Measuring mastication

The mastication of the ramens was measured by the squeeze test. The mastication measurement was performed using a physical property tester (Compac-100, Sun Scientific Co., Ltd, Tokyo, Japan) and the associated measurement program under the conditions shown in Table 2. The hardness, adhesiveness, cohesiveness, springiness, and gumminess of the ramen samples were measured using two repeated squeeze tests in which one ramen sample was placed on the test stand, the sample was fixed, and the sample was squeezed once using a circular plunger-shaped adapter with a diameter of 20 mm, followed by another squeeze. For each test piece, 20 replicates were performed and the average value was obtained after excluding the maximum and minimum values.

Table 2: Device conditions for measuring mastication.

Test type	Mastication test
Test mode	Mode 21
Max. force of load cell	10 kg
Table speed	120 mm/min
Adaptor (plunger)	Round type (diameter 20 mm)
Distance	12 mm

Organoleptic tests

To investigate the sensory characteristics of the manufactured ramens, Organoleptic tests were conducted on the appearance, color, taste, fragrance, texture, and overall preference of the cooked ramens. Thirty-two students from the Department of Food and Nutrition at Seoul National University were selected and trained on each item to be tested and evaluated on a 7-point scale ranging from 1 (very bad) to 7 (very good).

Statistical analysis

The experimental results for each sample were subjected to analysis of variance (ANOVA) using SPSS program (Standard version, USA), and Duncan's multiple comparison test was used to test for significant differences between samples (α=0.05). Paired samples t-test was used to compare the characteristics of ramens before and after cooking.

III. RESULTS & DISCUSSION

Weight growth rate Volume growth rate calculation results

The weight gain, volume gain, and density of the ramens with *Aloe vera* raw gel dry powder are shown in Table 3. The weight gain of the ramens due to cooking was not significantly different between samples 1, 2, and 3, but sample 4 showed a higher weight gain. The volume gain was significantly greater for samples 3 and 4 compared to samples 1 and 2, indicating that the addition of *Aloe vera* raw gel dry powder affected the volume gain of the cooked ramens. The increase in weight gain was thought to be due to the starch and polysaccharides in the *Aloe vera* gel dry powder absorbing more moisture during the cooking process, while the increase in volume gain was thought to be due to the decrease in protein content in the ramens as more *Aloe vera* gel dry powder was mixed in. The increase in weight and volume growth rate was also thought to be related to the fact that the gel starch in the *Aloe vera* raw gel dry powder had a relatively low gelatinization initiation temperature of 57.4°C at pH 7 compared to other starches, making it easier to

gel and swell. Similarly, it was reported that ramens with arrowroot starch increased both weight gain and volume gain after cooking compared to the control.[18]

There was a significant difference in density between the ramens before cooking depending on the amount of *Aloe vera* gel dry powder added, but the density after cooking ranged from 1.12 g/mL to 1.14 g/mL, which was not significantly different between the samples. The paired samples t-test showed a significant difference in the density of the ramens before and after cooking for samples with the same amount of *Aloe vera* gel dry powder added, indicating that the cooking process itself makes the ramens less dense, regardless of the amount of *Aloe vera* gel dry powder added. This was due to the greater increase in volume compared to the increase in weight due to the absorption of moisture during cooking.

The addition of *Aloe vera* raw gel dried powder increases the weight and volume gain, which is desirable for product producers because it increases yield, and it also has the advantage of relatively short cooking time and digestion time after consumption.

Table 3: Weight gain, volume gain, and density of ramens with *Aloe vera* raw gel dry powder added.

Sample[1)]	Rate of weight increase (%)	Rate of volume increase (%)	Density (g/mL)	
			Uncooked	Cooked
1	86.00± 1.65[a2)]	104.60± 0.00[a]	1.23± 0.00[a]	1.12± 0.01[a*3)]
2	86.83± 0.99[a]	104.67± 1.60[a]	1.24± 0.01[ab]	1.13± 0.01[a*]
3	86.70± 1.13[a]	110.77 ±3.87[b]	1.29± 0.02[c]	1.14± 0.02[a*]
4	92.67± 1.25[b]	113.63 ±2.53[b]	1.26± 0.01[b]	1.13± 0.01[a*]

[1)]Refer to Table 1

[2)]Different superscripted letters in a column indicate significant difference among samples at α = 0.05 level by Duncan's multiple range test.

[3)]*in a column indicates significant difference between uncooked and cooked samples added with same amount of the *Aloe vera* raw gel dry powder by paired samples *t*-test.

Measure pH and turbidity of broth

The results of the broth pH and turbidity of the ramens with the addition of *Aloe vera* gel dry powder are shown in Table 4. Both the pH and turbidity of the broth increased significantly as the amount of *Aloe vera* gel dry powder added increased. The increase in turbidity of the broth after cooking is thought to be due to the elution of free sugars and other soluble substances from the broth as the amount of *Aloe vera* gel dry powder added increased. This trend was similar for other additives, including powdered green tea.[19-22]

Table 4: pH and turbidity of boiled ramens broth with *Aloe vera* raw gel dried powder.

Sample[1)]	pH	Turbidity of soup (Abs. at 675 nm)
1	6.94± 0.06 [a2)]	0.46±0.01[a]
2	7.25± 0.02[b]	0.48±0.01[b]
3	7.39± 0.02[c]	0.53±0.01[c]
4	7.49± 0.03[d]	0.58±0.01[d]

[1)]Refer to Table 1

[2)]Different superscripted letters in a column indicate significant difference among samples at α = 0.05 level by Duncan's multiple range test.

Mastication test results

The texture of the ramens made with different amounts of *Aloe vera* gel dry powder is shown in Table 5. The hardness, springiness, and gumminess of the raw ramens were highest in the control sample 1. There was no significant difference in the cohesiveness, springiness, and gumminess of samples 2, 3, and 4 with *Aloe vera* gel dry powder. In other words, the addition of *Aloe vera* gel dry powder had the effect of reducing the hardness, springiness, and gumminess of the raw ramens. In the case of adhesiveness, all samples were 0. This is because the ramens are slightly starched to prevent the ramens from sticking to each other during the production of ramens, so the ramens did not adhere to the plunger when the plunger that squeezed the ramens during the texture measurement was returned to its original position.

For the cooked ramens, the hardness and springiness were highest for sample 1, with no significant difference for samples 2, 3, and 4. Numerically, it was determined that there was an optimum amount of *Aloe vera* gel dry powder that was not appropriate to add too much because the more *Aloe vera* gel dry powder was added, the more likely it was to produce unsuitable ramens with weak hardness and springiness. The cohesiveness and gumminess tended to decrease numerically as the amount of *Aloe vera* gel dry powder added increased, with samples 3 and 4 decreasing significantly more than samples 1 and 2, but there was no significant difference between samples 1 and 2 and samples 3 and 4, respectively. The trend of decreasing textural properties with increasing amounts of *Aloe vera* raw gel dried powder compared to the control was similar to the results for ramens with wolfberry, sprouted soybean powder, and Raphanus sativus.[20,23-25]

In this study, adhesiveness is an additional property created by the removal of starch from the surface of the ramens during cooking and the enrichment of the starch in the raw material. Adhesiveness was highest for sample 2, but did not show a clear trend with the amount of *Aloe vera* gel dry powder added.

Paired samples t-test showed that for the same concentration of *Aloe vera* gel dry powder added, there was a significant difference in hardness, adhesiveness, and gumminess before and after cooking. On the other hand, the cohesiveness of samples 1 and 2 was not significantly different before and after cooking, but it was different for samples 3 and 4. Springiness did not differ between pre- and post-cooking in all experimental groups, indicating that the cooking process did not change the Springiness of the ramens.

Table 5: Texture characteristics of ramens with *Aloe vera* gel dry powder added.

Sample[1)]	Hardness (g/cm^2)	Adhesiveness (g)	Cohesiveness (%)	Springiness (%)	Gumminess (g)
Uncooked					
1	14770±880^{c2})	0±0^{a}	60.2± 9.7^{a}	52.8 ±7.2^{a}	4360± 700^{b}
2	13350±890^{a}	0±0^{a}	55.8± 8.3^{a}	48.2 ±5.2^{b}	3760± 520^{a}
3	13920±640^{ab}	0±0^{a}	55.9± 8.3^{a}	47.7 ±3.4^{b}	4020± 420^{ab}
4	14690±870^{bc}	0±0^{a}	56.4± 8.9^{a}	48.9 ±6.5^{b}	3860± 590^{a}
Cooked					
1	5820± 520$^{b*3)}$	18.6±8.5^{ab*}	57.7± 11.8^{b}	55.9 ±8.1^{a}	1380± 310^{b*}
2	4970± 510^{a*}	20.6±8.1^{b*}	50.8± 13.5^{b}	46.0 ±7.2^{b}	1240± 290^{b*}
3	5220± 230^{a*}	13.7±8.5^{a*}	41.0± 7.9^{a*}	46.2 ±5.9^{b}	1060± 220^{a*}
4	5120± 550^{a*}	17.4±7.4^{ab*}	40.4± 8.2^{a*}	45.1 ±6.8^{b}	0940± 220^{a}

[1)]Refer to Table 1

[2)]Different superscripted letters in a column indicate significant difference among samples at α = 0.05 level by Duncan's multiple range test.

[3)]* in a column indicates significant difference between uncooked and cooked samples added with same amount of the *Aloe vera* raw gel dry powder by paired samples *t*-test.

Organoleptic tests result

Organoleptic tests were conducted on the ramens with *Aloe vera* gel dry powder and the results are shown in Table 6. Appearance was not significantly different for all four samples, but based on the evaluation score alone, the control sample 1 was the most preferred with a score of 4.44, and the palatability of each sample's appearance tended to decrease as the amount of *Aloe vera* gel dry powder added increased. In terms of color, samples 1 and 2 had a higher preference than samples 3 and 4. For flavor, there was no significant difference among all four samples, but the evaluation scores showed that, contrary to the appearance, the palatability tended to improve as the amount of *Aloe vera* gel dry powder increased. In terms of taste, the experimental group with *Aloe vera* gel dry powder added was significantly higher than the control group, with sample 3 having the highest score of 4.81. In terms of texture, sample 3 was the most preferred with a score of 5.03, while the control group showed the lowest palatability. The overall palatability was significantly higher for Sample 3 at 5.03. This was thought to be due to the fact that sample 3 received relatively good ratings for flavor, taste, and texture. In addition to this, when *Aloe vera* gel dry powder was added appropriately, the surface of the ramens became smooth due to the properties of *Aloe vera* gel dry powder itself, and the noodles felt soft when eaten after cooking. As a result, it was determined that 2.8% of *Aloe vera* gel dry powder should be added as a substitute for wheat flour to produce ramens with *Aloe vera* gel dry powder.

Table 6: Organoleptic evaluation of cooked ramens with *Aloe vera* gel dried powder.

Sample[1)]	Appearance	Color	Flavor	Taste	Texture	Overall acceptability
1	4.44± 1.39[a2)]	4.91± 1.03[b]	3.75 ±0.84[a]	4.00 ±1.27[a]	4.41 ±1.13[ab]	4.03± 0.95[a]
2	4.34± 1.41[a]	4.84± 1.11[b]	3.84 ±1.17[a]	4.44 ±1.13[ab]	4.72 ±1.02[ab]	4.39± 1.14[a]
3	4.09± 1.61[a]	4.00± 1.30[a]	4.09 ±1.15[a]	4.81 ±1.33[b]	5.03 ±1.20[b]	5.03± 1.56[b]
4	3.91± 1.59[a]	4.03± 1.69[a]	4.22 ±1.23[a]	4.44 ±1.29[ab]	4.59 ±1.04[a]	4.42± 1.12[a]

[1)]Refer to Table 1

[2)]Different superscripted letters in a column indicate significant difference among samples at α = 0.05 level by Duncan's multiple range test.

IV. CONCLUSION

Ramens were prepared with *Aloe vera* gel dry powder at 0% (Sample 1), 1.4% (Sample 2), 2.8% (Sample 3), and 4.2% (Sample 4) replacement of wheat flour and investigated for various properties. The L-values of raw and cooked ramens decreased significantly as the amount of *Aloe vera* gel dry powder added increased. The b-value of cooked noodles decreased significantly as the amount of *Aloe vera* gel dry powder increased, but the a-value increased significantly for all four samples. The weight gain of ramens during cooking was highest for sample 4. The volume increase rate of 3 and 4 samples was greater than that of 1 and 2 samples. The density of the cooked ramens was not significantly different among the samples. The pH and turbidity of the broth increased significantly with increasing amounts of *Aloe vera* fresh gel dry powder. The hardness and elasticity of the cooked ramens were highest in sample 1, with no significant differences in samples 2, 3, and 4. Cohesion and blackness were significantly smaller in samples 3 and 4 compared to samples 1 and 2. Sensory testing showed no significant differences in appearance and flavor acceptability between the four samples. For color, samples 1 and 2 had higher acceptability than samples 3 and 4. Sample 3 was the most preferred for taste, texture, and overall acceptability. Therefore, it was concluded that 2.8% of *Aloe vera* gel dried powder as a substitute for wheat flour is appropriate for the production of ramens with *Aloe vera* gel dried powder.

V. ACKNOWLEDGMENTS

The research was supported by the Korea Technology and Information Promotion Agency for SMEs through the "Commercialization of brain-enhancing health functional food from swallow sialic acid based on affinity bead technology"(grant number: S2953529). Also, the research was supported by the Korea Institute for Advancement of Technology through the "Industry-academia focused technology development field training support project" (grant number: N0001395).

REFERENCES

1. Mahmud, N., Islam, J., Tahergorabi, R., Noodles. In: Shah, M.A., Valiyapeediyekkal Sunooj, K., Mir, S.A. (eds) Cereal-Based Food Products. Springer, Cham, 2023.
2. Baker, M.T.; Lu, P.; Parrella, J.A.; Leggette, H.R. Consumer Acceptance toward Functional Foods: A Scoping Review. *Int. J. Environ. Res. Public Health*, 2022; *19*: 1217.
3. Asli E Ozen, Antoni Pons, Josep A Tur, Worldwide consumption of functional foods: a systematic review, *Nutrition Reviews*, 1 August 2012; 70(8): 472–481.
4. Koh, W.Y.; Matanjun, P.; Lim, X.X.; Kobun, R. Sensory, Physicochemical, and Cooking Qualities of Instant Noodles Incorporated with Red Seaweed (*Eucheuma denticulatum*). *Foods*, 2022; *11*: 2669.
5. Mepba, Horsefall D., Nkechi Juliet Tamuno Emelike, Emmanuel Agiriga, and Emmanuel Uchechi Mary, "Quality Characteristics and Sensory Properties of Noodles Produced from Blends of Wheat, Acha (Digitaria exilis), Bambara Groundnut, and Cocoyam Composite Flours". *Asian Food Science Journal*, 2021; 20(8): 15-25.
6. Komal N Pakhare, Amol C Dagadkhair and Irana S Udachan. Enhancement of Nutritional and Functional Characteristics of Noodles by Fortification with Protein and Fiber: A Review. J Pharmacogn Phytochem, 2018; 7(1): 351-357.
7. Rachman, A., Huang, Y., Brennan, M. *et al.* Effect of soy protein isolates inclusion on physicochemical, functional, and nutritional properties of buckwheat gels. *Eur Food Res Technol*, 2024; 250: 1061–1067.
8. Surjushe A, Vasani R, Saple DG. Aloe vera: a short review. Indian J Dermatol, 2008; 53(4): 163-6. doi: 10.4103/0019-5154.44785. PMID: 19882025; PMCID: PMC2763764.
9. Dr. Indu Mehta, "History OF Aloe Vera" – (A Magical Plant), IOSR Journal Of Humanities And Social Science (IOSR-JHSS), August. 2017; 22(8): 16: 21-24.
10. Karkala Manvitha, Bhushan Bidya. Aloe vera: a wonder plant its history, cultivation and medicinal uses. J Pharmacogn Phytochem, 2014; 2(5): 85-88.
11. Gao Y, Kuok KI, Jin Y, Wang R. Biomedical applications of *Aloe vera*. Crit Rev Food Sci Nutr, 2019; 59(sup1): S244-S256. doi: 10.1080/10408398.2018.1496320. Epub 2018 Sep 13. PMID: 29999415.
12. Hamman, J.H. Composition and Applications of Aloe vera Leaf Gel. *Molecules*, 2008; *13*: 1599-1616.
13. Añibarro-Ortega, M.; Pinela, J.; Barros, L.; Ćirić, A.; Silva, S.P.; Coelho, E.; Mocan, A.; Calhelha, R.C.; Soković, M.; Coimbra, M.A.; et al. Compositional Features and Bioactive Properties of *Aloe vera* Leaf (Fillet, Mucilage, and Rind) and Flower. *Antioxidants*, 2019; *8*: 444.
14. Hęś, M., Dziedzic, K., Górecka, D. *et al. Aloe vera* (L.) Webb: Natural Sources of Antioxidants – A Review. *Plant Foods Hum Nutr*, 2019; 74: 255–265.
15. Ceravolo, I.; Mannino, F.; Irrera, N.; Squadrito, F.; Altavilla, D.; Ceravolo, G.; Pallio, G.; Minutoli, L. Health Potential of *Aloe vera* against Oxidative Stress Induced Corneal Damage: An "In Vitro" Study. *Antioxidants*, 2021; *10*: 318.

16. Rodríguez Rodríguez E, Darias Martín J, Díaz Romero C. Aloe vera as a functional ingredient in foods. Crit Rev Food Sci Nutr, 2010 Apr; 50(4): 305-26. doi: 10.1080/10408390802544454. PMID: 20301017.
17. Sonawane, S.K., Gokhale, J.S., Mulla, M.Z. *et al.* A comprehensive overview of functional and rheological properties of aloe vera and its application in foods. *J Food Sci Technol*, 2021; 58: 1217–1226.
18. Young Soon Lee et al. "A Study on the Preparation and Evaluation of Dried Noodle Products made from Composite Flours utilizing Arrowroot Starch" KOREAN J. SOC. FOOD SCI, 2000; 16(6): 681. Print.
19. Yu, K.; Zhou, H.-M.; Zhu, K.-X.; Guo, X.-N.; Peng, W. Water Cooking Stability of Dried Noodles Enriched with Different Particle Size and Concentration Green Tea Powders. *Foods*, 2020; *9*: 298.
20. Mpalanzi , Victoria Thobias, Davis Naboth Chaula, and Alex Wenaty, "Textural, Cooking Quality and Sensory Acceptability of Noodles Incorporated With Moringa Leaf and Sardine Powders". *European Journal of Nutrition & Food Safety*, 2023; 15 (10): 1-20.
21. Marciniak-Lukasiak, K.; Zbikowska, A.; Marzec, A.; Kozlowska, M. The Effect of Selected Additives on the Oil Uptake and Quality Parameters of Fried Instant Noodles. *Appl. Sci*, 2019; *9*: 936.
22. Li, X.; Wu, Y.; Li, C.; Tong, S.; Zhang, L.; Jin, J. Improvement in Noodle Quality and Changes in Microstructure and Disulfide Bond Content through the Addition of Pepper Straw Ash Leachate. *Foods*, 2024; 13: 1562.
23. Narsih, Agato, Nutrition Components of Dry Noodles From Substitution of Aloe vera Skin Extract and Maize's Sprout Flour , Current Nutrition & Food Science, 2019; 15(5).
24. Vidović, B.B.; Milinčić, D.D.; Marčetić, M.D.; Djuriš, J.D.; Ilić, T.D.; Kostić, A.Ž.; Pešić, M.B. Health Benefits and Applications of Goji Berries in Functional Food Products Development: A Review. *Antioxidants*, 2022; 11: 248.
25. Young-Soon Lim et al. "Quality Characteristics of Wet Noodle with *Lycii fructus* Powder" KOREAN J. FOOD SCI. TECHONL, 2003; 35(1): 77–83. Print.