ISSN (electronic): 2302-4399 http://jurnal.fp.unila.ac.id/index.php/jthp/index

Texture profile of jelly agar cup products and evaluation of recommendation and warning labels related to choking risk

[Profil tekstur produk jeli agar cup serta evaluasi terhadap label saran dan peringatannya terkait risiko tersedak]

Firanindyta Hade[1], Dias Indrasti[1,2], dan Nur Wulandari[1,2*]

[1] Departemen Ilmu dan Teknologi Pangan, Fakultas Teknologi Pertanian, IPB University, Kampus IPB Darmaga Bogor ,16680, Jawa Barat.
[2] South-East Asia Food & Agricultural Science and Technology (SEAFAST) Center, IPB University, Kampus IPB Darmaga Bogor, 16680, Jawa Barat.

*Correspondence email: wulandari_n@apps.ipb.ac.id

Received : 28 February 2025, Revised: 14 July 2025, Accepted : 9 December 2025, DOI : 10.23960/jtihp.v31i1.87-98

ABSTRACT

Jelly agar in plastic cup packaging (jelly agar cup) is a practical, economical dessert with a chewy texture, but it can cause choking. The texture profile of commercial jelly agar cups needs to be studied to obtain an overview of choking risks that may occur. This risk is informed to consumers through recommendations and warnings on the label, so consumer understanding is important to prevent undesirable conditions. The purpose of this study was to obtain the texture profile of the jelly agar cup and see its relation with choking risk, and evaluate jelly agar cup label information and consumer perceptions, especially recommendations and warnings. Texture profile was determined on parameters of cohesiveness, hardness, adhesiveness, springiness, and chewiness. Label identification was carried out on primary and secondary packaging. Consumer perceptions of the label were obtained through a survey. Data showed that jelly agar cups that cause choking risk are products with jelly powder hydrocolloid (contains gum and agar or carrageenan) and carrageenan at fairly high concentrations. The high hardness and cohesiveness values of jelly agar cup produce a firmer texture, difficult to chew and swallow. Jelly agar cups that have included recommendations tend to have high cohesiveness values and use konnyaku flour. Secondary packaging has higher regulatory compliance than primary packaging. Warning information regarding choking risk prevention hasn't been regulated. Respondents' perceptions of jelly agar cup label, especially recommendation and choking risk warnings, and food additives, are dominated by agree and strongly agree choices more than 75%.

Keywords: choking risks, consumers, hydrocolloids, jelly agar cups, recommendation and warning information

ABSTRAK

Jeli agar dalam kemasan *cup* plastik (jeli agar *cup*) merupakan makanan penutup yang praktis, ekonomis, dan bertekstur kenyal, namun dapat menyebabkan tersedak. Profil tekstur jeli agar *cup* komersial perlu dikaji untuk memperoleh gambaran risiko tersedak yang mungkin terjadi. Risiko ini diinformasikan kepada konsumen melalui saran dan keterangan peringatan pada label, sehingga pemahaman konsumen menjadi penting untuk mencegah kondisi yang tidak diinginkan. Tujuan penelitian ini adalah mendapatkan profil tekstur jeli agar *cup* dan mengkaji kaitannya dengan risiko tersedak, serta mengevaluasi informasi label jeli agar *cup* dan persepsi konsumen, khususnya saran dan keterangan peringatan. Profil tekstur ditentukan pada parameter *cohesiveness*, *hardness*, *adhesiveness*, *springiness*, dan *chewiness*. Identifikasi label dilakukan pada kemasan primer dan sekunder. Persepsi konsumen terhadap label diperoleh melalui survei. Data menunjukkan jeli agar *cup* yang berisiko menyebabkan tersedak adalah produk dengan hidrokoloid jeli bubuk (mengandung gum dan agar atau karagenan) dan karagenan pada konsentrasi cukup tinggi. Nilai *hardness* dan *cohesiveness* jeli agar *cup* yang tinggi menghasilkan tekstur lebih kokoh, serta sulit dikunyah dan ditelan. Jeli agar *cup* yang telah mencantumkan saran cenderung memiliki nilai *cohesiveness* yang tinggi dan menggunakan tepung konyaku. Kemasan sekunder memiliki kesesuaian terhadap regulasi lebih tinggi dibandingkan kemasan primer. Keterangan peringatan terkait pencegahan risiko tersedak belum diregulasikan. Persepsi responden terhadap label jeli agar *cup*, khususnya saran dan keterangan peringatan risiko tersedak dan Bahan Tambahan Pangan (BTP), didominasi oleh pilihan setuju dan sangat setuju lebih dari 75%.

Kata kunci: hidrokoloid, jeli agar *cup*, konsumen, saran dan keterangan peringatan, risiko tersedak

ISSN (electronic): 2302-4399 http://jurnal.fp.unila.ac.id/index.php/jthp/index

Introduction

Jelly is a food product favored by people of all ages, from children to adults, because it is practical, economical, and widely popular in society (Saputri et al., 2021). Jelly generally has a firm, chewy texture and a sweet taste (Lidiasari et al., 2023). Jelly is packaged in various forms, one of which is a plastic cup (jelly agar cup). The cup has a diameter of approximately 4 cm and can be consumed in a single bite, making it convenient for consumption. Jelly agar cups are stable at room temperature and are available in various colors and flavors to enhance their appeal, particularly for child consumers. Texture is a primary quality parameter of jelly agar cup products that influences consumer acceptance (Alemu, 2023). The chewy texture of jelly agar cups is produced by gel-forming agents (hydrocolloids) and water as the main components. On the other hand, their chewy and elastic texture may pose a risk of choking or suffocation (Kawawa, 2013). This risk may increase if jelly agar cups are consumed by directly pushing the contents from the packaging into the mouth without using eating utensils such as a spoon.

Choking is defined as a partial or complete obstruction of the airway (Maisyaroh et al., 2022). Suartini and Kusniawati (2020) reported that choking can be caused by food (59.5%), foreign objects (31.4%), and unknown causes (9.1%). Although comprehensive statistical data on choking incidents are not yet available, many choking cases have been reported in Indonesia (Istiqomah et al., 2024). Triwidiyantari (2023) reported that at Ponorogo Regional General Hospital, there were 157 cases of choking due to foreign objects in 2009 and 112 cases in 2010. In Japan, 32 cases of food-related choking, including severe cases involving jelly, were reported over a 14-year period, along with 22 deaths caused by jelly agar cups over a 6-year period (Kawawa, 2013). Choking can occur in children and the elderly and poses a risk of death (Ma et al., 2020). Given the wide availability of commercial jelly agar cups on the market, differences in texture profiles are suspected due to variations in ingredient composition and types of hydrocolloids used. Studies on the texture profiles of commercial jelly agar cups can provide baseline information related to choking hazard risks. In addition to hydrocolloids as gel-forming agents, jelly agar cups are also formulated with food additives to improve quality and shelf life. These additives include acidity regulators, preservatives, artificial sweeteners, and others. The type and amount of food additives used must comply with regulations. Certain additives, such as artificial sweeteners, require careful intake consideration, as they are less suitable for children under five years of age, pregnant women, and breastfeeding mothers. Daily consumption of artificial sweeteners during pregnancy can increase the risk of preterm birth by 18% compared to non-consumption. This is because most artificial sweeteners cannot be directly digested, leading to alterations in gut microbiota. Prenatal exposure to artificial sweeteners may also increase the risk of allergies in children. Therefore, their consumption must be carefully considered due to potential short- and long-term health implications (Cai et al., 2021).

The presence of choking hazards associated with jelly agar cups and the use of food additives that require controlled intake highlight the importance of consumer understanding of label information. According to Imani et al. (2023), hazard information and usage warnings on labels can help ensure consumer health and safety. Not all jelly agar cup producers include information on safe consumption practices, such as cutting the jelly into small pieces before consumption. Regulations in Indonesia do not yet mandate the inclusion of choking prevention warnings; instead, they require warnings related to the use of artificial sweeteners and polyols, as stipulated in BPOM Regulation No. 20 of 2021 on Amendments to BPOM Regulation No. 31 of 2018 concerning Processed Food Labeling (Badan Pengawas Obat dan Makanan, 2021). Information regarding warnings on raw materials and food additives that should be limited for certain population groups is also not consistently provided. The inclusion of consumption advice and warning statements may minimize the risk of hazards when consuming jelly agar cups, particularly for vulnerable consumers such as toddlers and the elderly. Consumer perceptions of advisory

ISSN (electronic): 2302-4399 http://jurnal.fp.unila.ac.id/index.php/jthp/index

information and warning statements on jelly agar cup labels also need to be evaluated. Thus, the objectives of this study were to: (1) determine the texture profiles of commercial jelly agar cups and examine their relationship with choking hazard risks; (2) evaluate jelly agar cup product label information, particularly regarding consumption advice, warning statements, and the use of food additives; and (3) assess consumer perceptions, particularly in the Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek) areas, regarding consumption advice, warning statements, and the use of food additives on jelly agar cup labels.

Materials and methods

Materials and equipment

The materials used consisted of 20 brands of commercial jelly agar cups obtained from online stores and supermarkets in the Jakarta, Bekasi, and Bogor areas. The criteria for the primary packaging were cups with a diameter of approximately 4 cm, suitable for single-bite consumption, and accompanied by secondary packaging containing multiple jelly agar cups. Product age based on production date was not considered and constituted a limitation of the sampling. Additional materials included an online questionnaire. The equipment used comprised a Texture Analyzer (TA1 model, LLOYD brand by Ametek STC, USA), a ruler, a knife, and computer equipment.

Research methods

This study employed a quantitative approach consisting of laboratory testing and a consumer survey. Laboratory analysis aimed to obtain texture profile data of jelly agar cups using the Texture Profile Analysis (TPA) method, with parameters including hardness, cohesiveness, adhesiveness, springiness, and chewiness. The data were processed using Nexygen Plus 4.0 software and Microsoft Excel version 2019. . Other parameters were gumminess = cohesiveness × hardness, springiness = S2/S1 (the distance of the second compression divided by the first), and chewiness = gumminess × springiness (Yusof et al., 2019).

The second method involved a consumer survey conducted in the Jabodetabek regions. Survey participants were selected using purposive sampling (Firmansyah & Dede, 2022). The target population comprised respondents residing in the Jabodetabek area, ranging from 11 years to over 45 years. Validity and reliability tests were performed to assess the accuracy and consistency of the questionnaire.

Research implementation

This study comprised three stages: (1) texture profile analysis of commercial jelly agar cups, (2) evaluation of compliance with advisory and warning information on product labels, and (3) assessment of consumer perceptions of advisory and warning labels. Twenty jelly agar cup brands with BPOM RI distribution permits (MD or ML) were selected through screening of PIRT and BPOM databases based on cup-type primary packaging and multi-cup secondary packaging. Texture profile analysis was performed using a modified Texture Profile Analysis (TPA) method (Yusof et al., 2019) with compression levels of 40% and 60% of sample height, using a 3.5 cm cylindrical probe at 0.5 mm/s; samples (1 × 1 × 1 cm) were analyzed in triplicate, and force–time curves were obtained. Stage 2 involved identifying and assessing primary and secondary label compliance with BPOM Regulation No. 20 of 2021, expressed as percentage conformity. Stage 3 used a consumer survey in the Jabodetabek area to evaluate perceptions of advisory and warning information. A minimum of 273 respondents was determined using G*Power, and the questionnaire was validated and shown to be reliable if Cronbach's alpha > 0.60), —covered respondent profiles, consumption patterns, and perceptions of labeling, food additives, advisories, and warnings. Responses were measured using a five-point Likert scale and analyzed as percentage scores to illustrate consumer perceptions graphically.

ISSN (electronic): 2302-4399 http://jurnal.fp.unila.ac.id/index.php/jthp/index

Research parameters

The research parameters included physical characteristics of texture profiles, label identification data and their compliance with regulations, and consumer perceptions of labeling. Texture profiles were analyzed using TPA with the parameters of hardness, cohesiveness, adhesiveness, chewiness, and springiness. Label identification covered general labeling compliance as well as specific compliance related to advisory statements and warning information. Consumer perceptions of jelly agar cup labels were obtained through a questionnaire survey, consisting of five-point scale (1–5) questions related to choking risk and multiple-choice questions concerning warnings on the use of food additives. The respondents' questionnaire results were converted into percentages and presented in the form of label perception graphs.

Results and discussion

Texture profile of commercial jelly agar cups

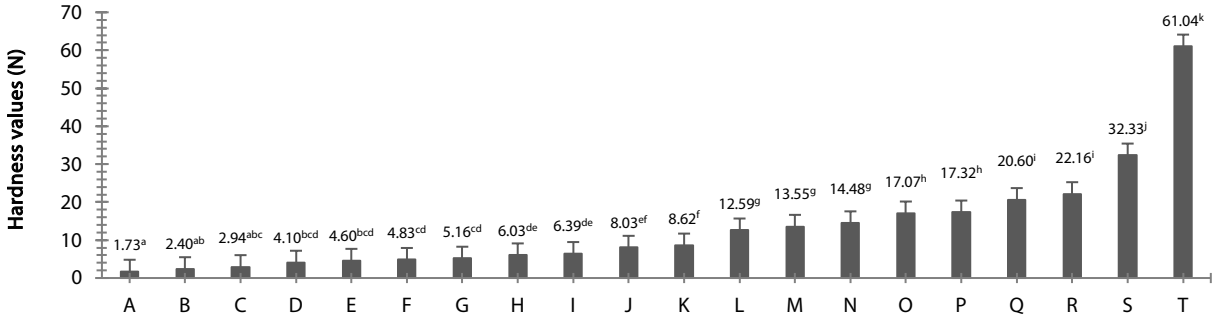
Jelly agar cup samples were obtained through screening of products listed on the BPOM website (https://cekbpom.pom.go.id/) and the PIRT database (https://sppirt.pom.go.id/), with the criteria of having cup-type primary packaging and secondary packaging containing multiple jelly agar cups. Based on product availability, 20 brands were selected as samples. Jelly agar cups are made using various hydrocolloids depending on the desired product characteristics. The hydrocolloid composition of the tested samples was predominantly jelly powder and carrageenan. Based on the evaluation of the 20 jelly agar cup samples shown in Table 1, the cup shapes used were predominantly cylindrical, with an average diameter of 4 cm and an average height of 2.7 cm. The average net weight of the jelly agar cup samples was 16 g. The dominant gel-forming agents (hydrocolloids) used were jelly powder and carrageenan.

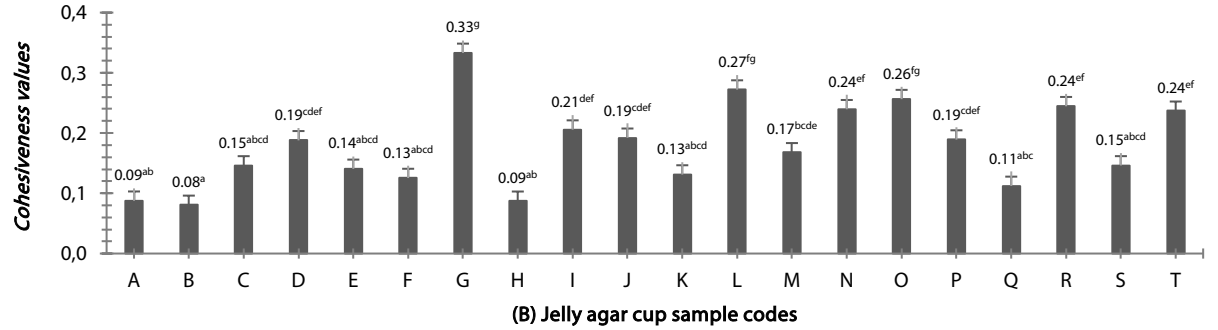
Table 1. Information on dimensions, net weight, and types of gel-forming agents used in commercial jelly agar cup samples.

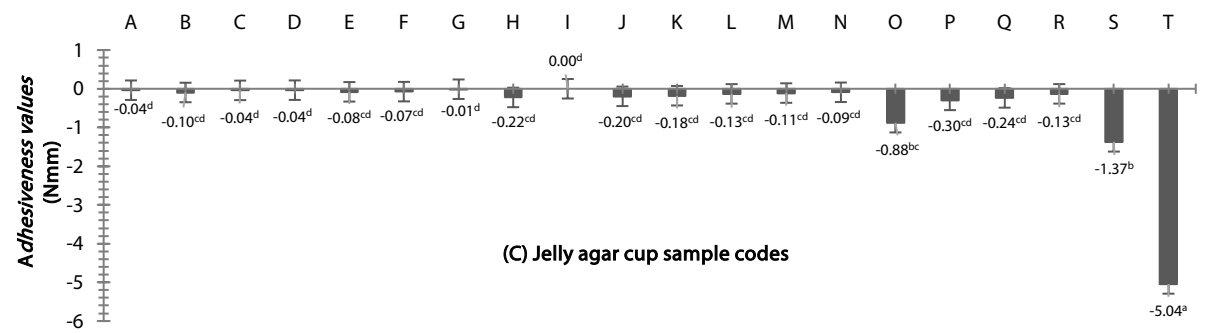
Jelly agar cup brand codes	Cup shape	Cup dimensions (mm)		Net weight per cup (g)	Gel-forming ingredients (Hydrocolloids)
		Height	Diameter		
A	Flower with 4 petals	31	57	35	Seaweed powder
B	Cylinder	30	39	16	Seaweed powder
C	Cylinder	21	38	10	Carrageenan
D	Cylinder	21	38	10	Jelly powder
E	Cylinder	45	39	19	Seaweed extract
F	Cylinder	22	38	10	Jelly powder
G	Star	25	37	14	Jelly powder and konjac powder
H	Cylinder	39	46	28	Jelly powder
I	Cylinder	22	38	10	Konjac flour and carrageenan
J	Flower with 8 petals	42	56	40	Jelly powder
K	Cylinder	22	38	10	Jelly powder
L	Cylinder	30	39	15	-
M	Cylinder	22	38	21	Jelly powder
N	Cylinder	27	38	15	Carrageenan
O	Cylinder	26	38	14	Jelly powder and konjac powder
P	Cylinder	25	38	11	Carrageenan
Q	Cylinder	46	45	35	Tepung konyaku
R	Fruit shape	15	27	7.1	-
S	Fruit shape	12	26	4.2	Jelly powder
T	Fruit shape	12	25	4.2	Jelly powder
	Average value	26.75	38.9	16.43	-

ISSN (electronic): 2302-4399 http://jurnal.fp.unila.ac.id/index.php/jthp/index

The texture profiles of the jelly agar cups are presented in Figure 1. The hardness parameter, also referred to as gel strength or structural firmness, is defined as the peak force during the first compression cycle (Zhou et al., 2025). Based on Figure 1(A), the jelly agar cup with the highest hardness was sample code T (61.04 N), while the lowest hardness was observed in sample code A (1.73 N). Sample T required the greatest chewing effort. The high hardness value is presumed to be influenced by the type of hydrocolloid used, namely jelly powder at a relatively high concentration. Jelly powder may be formulated from porang flour and agar in specific proportions. A lower proportion of porang flour increases jelly hardness, and higher agar concentrations further enhance gel firmness (Herawati & Kamsiati, 2022). The cohesiveness parameter shown in Figure 1(B) represents the internal structural integrity or compactness of the food texture. Cohesiveness values ranged from 0.08 (sample B) to 0.33 (sample G), where lower values indicate easier chewing and swallowing (Yusof et al., 2019); accordingly, sample B was the easiest to consume, likely due to the use of low-concentration seaweed powder or carrageenan. Adhesiveness, which reflects stickiness (Dwiloka et al., 2024), was highest in sample T (−5.04 N·mm), presumably due to a higher concentration of jelly powder. Springiness, representing elasticity (Azizaah et al., 2022), ranged from 7.10% (sample S) to 35.89% (sample G); the high springiness of sample G suggests greater chewing energy requirements, likely resulting from the combined use of jelly powder and konjac powder, which at higher ratios form a denser and more elastic gel network (Yang et al., 2021).







ISSN (electronic): 2302-4399 http://jurnal.fp.unila.ac.id/index.php/jthp/index

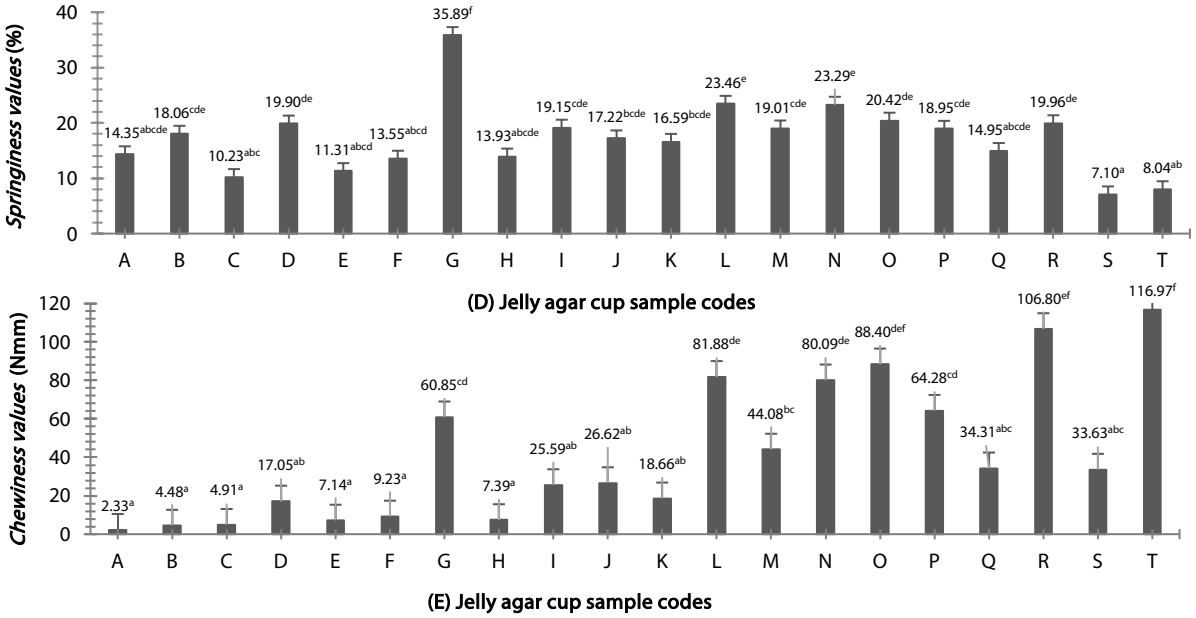


Figure 1. Texture profiles of commercial jelly agar cup samples for hardness (A), cohesiveness (B), adhesiveness (C), springiness (D), and chewiness (E)

High elasticity prevents gels from breaking easily (Fatmawati et al., 2022). Chewiness reflects the energy required to chew a product and increases with higher hydrocolloid concentrations (Soedirga & Marchellin, 2022), while lower chewiness indicates easier fracture and mastication (Lam et al., 2025). As shown in Figure 1(E), chewiness was highest in sample T (116.97 N·mm) and lowest in sample A (2.33 N·mm), likely due to the lower content of seaweed powder or carrageenan in sample A. Cohesiveness and hardness are critical texture parameters, as higher values increase product density and compactness, potentially making jelly agar cups more difficult to chew and increasing choking risk when product size is large (Ma'arif et al., 2021). Hardness showed a direct relationship with chewiness and adhesiveness, whereas cohesiveness did not consistently correlate with hardness, likely due to differences in processing methods, hydrocolloid type and concentration, and other ingredients. PCA results (Figure 2) indicate that the five texture parameters exhibit comparable variability.

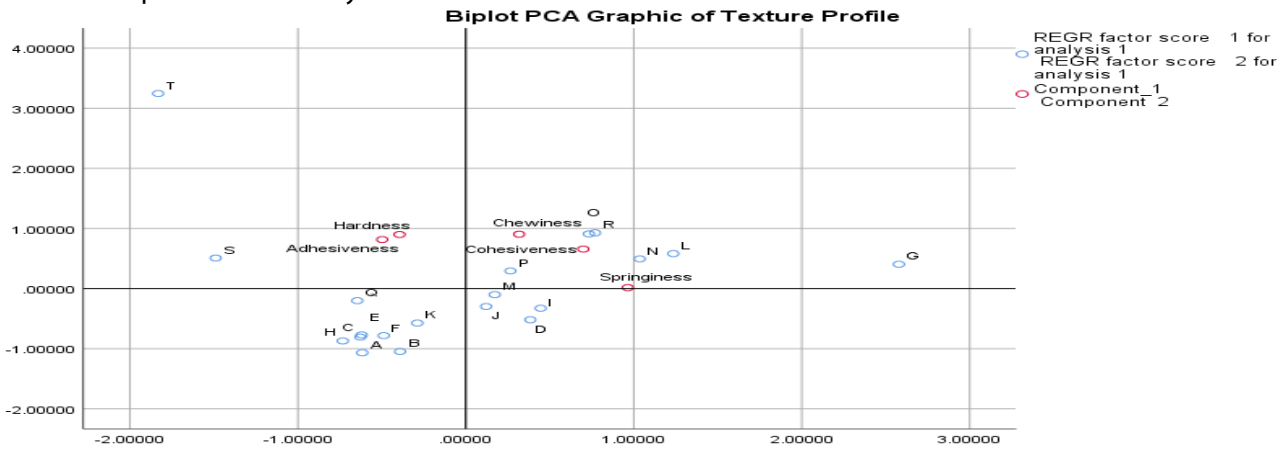


Figure 2. PCA biplot of texture profiles of jelly agar cup samples.

Based on the type of hydrocolloid used, samples containing konjac (codes G, I, O, and Q) were predominantly located in Quadrant I. They were more closely associated with the cohesiveness and chewiness parameters. Samples formulated with carrageenan (codes C, I, N, and P) were also mainly distributed in Quadrant I and showed stronger associations with springiness and cohesiveness. Jelly

ISSN (electronic): 2302-4399 http://jurnal.fp.unila.ac.id/index.php/jthp/index

powder–based hydrocolloids (codes D, F, G, H, J, K, M, O, S, and T) were primarily located in Quadrants III and IV and were more closely related to the chewiness, adhesiveness, and hardness parameters. Samples using powdered seaweed (codes A, B, and E) were positioned in Quadrant III. The distribution of jelly agar cup samples across different quadrants was influenced by hydrocolloid concentration, where higher concentrations tended to increase the values of texture parameters.

Compliance of jelly agar cup labeling with labeling regulations

BPOM Regulation No. 20 of 2021, which amends BPOM Regulation No. 31 of 2018, regulates mandatory labeling information for processed foods in Indonesia. Producers of retail-packaged processed foods are required to display labeling information in a visible and readable manner (BPOM, 2018). For individually sold jelly agar cups, mandatory information must appear on the primary packaging, whereas products registered as secondary packaging must display mandatory information on the secondary packaging. Of the 20 jelly agar cup brands evaluated, one was registered as primary packaging only, two as both primary and secondary packaging, and 17 as secondary packaging. Label compliance was assessed based on conformity with BPOM Regulation No. 20 of 2021. Among the three brands with primary packaging, the highest compliance (100%) was observed for brand name, product name, net weight, producer/importer name and address, and distribution permit number (Table 2).

Table 2. Compliance of labeling information on jelly agar cup packaging samples with BPOM Regulation No. 20 of 2021 on processed food labeling

Label components	Label information compliance (%) (n = 20)		Label information compliance by registration type (%)	
	Primary	Secondary	Primary (n=3)	Secondary (n=19)
Brand name	75	100	100	100
Product type	40	95	100	100
Ingredient list	20	60	67	63
Net weight	30	95	100	100
Manufacturer/importer name and address	50	90	100	95
Halal certification	25	65	67	68
Production date and code	30	90	67	89
Expiration information	30	100	67	100
Distribution permit number	20	95	100	100
Warning statement	25	80	67	84
Consumption recommendation	15	55	0	53

Among the 19 brands identified as secondary packaging, the highest compliance was observed for the brand name, product name, net weight, expiration date, and distribution permit number (100%). These results indicate that many labeling components on both primary and secondary packaging comply with regulations; however, several other components still require improvement. Secondary packaging demonstrated higher compliance with labeling regulations than primary packaging, as it generally provides a larger surface area that allows for the inclusion of more information. According to Faiha et al., (2025), one of the key functions of packaging is to serve as a medium for product information and identity, as well as to convey other important information. The predominance of products registered as secondary packaging reflects their role as the final food packaging, which is required to display labeling information in accordance with regulations (BPOM, 2018). Non-compliance with certain labeling elements highlights the need for increased education and greater attention from producers regarding adherence to labeling regulations.

ISSN (electronic): 2302-4399 http://jurnal.fp.unila.ac.id/index.php/jthp/index

Inclusion of advisory information on jelly agar cup labels

Advisory information is a non-mandatory label component under BPOM Regulation No. 20 of 2021 (BPOM, 2021), yet it supports product quality maintenance and consumer safety. As part of packaging's role as an information medium (Faiha et al., 2025), advisory statements were found on 15% of primary packaging and 55% of secondary packaging (Table 2). Of the 20 samples, 40% did not include advisory information, 30% included non–choking-related advice, and 30% provided choking-related advisories. These advisories generally warned against consumption by children under three years, recommended supervision for children and the elderly, and advised cutting the product into small pieces and chewing thoroughly before swallowing.

Products that included advisory information generally exhibited higher cohesiveness values (sample codes G, L, N, and O), indicating denser and more compact textures that may increase chewing difficulty and choking risk (Ma'arif et al., 2021). Advisory statements were most commonly found in samples containing konjac (codes G, O, and Q), which swells and increases viscosity when hydrated (Amelia et al., 2023). Increased konjac proportions can produce denser, stiffer, and more elastic gel structures (Yang et al., 2021). PCA results (Figure 2) showed that samples with choking-related advisories (codes A, G, L, N, O, and Q) clustered in Quadrant I, closely associated with chewiness, cohesiveness, and springiness, highlighting the influence of these texture parameters on advisory inclusion.

Inclusion of warning statements on jelly agar cup labels

Warning statements are mandatory label components when processed foods contain specific ingredients. For example, if a processed food contains artificial sweeteners such as aspartame or polyols, a warning statement must be included on the label (BPOM, 2021). In this study, warning statements were predominantly related to artificial sweeteners and allergen information. Table 2 shows that not all samples included warning statements, with compliance rates of 25% for primary packaging and 80% for secondary packaging. The inclusion of such warnings depends on the raw materials or production facilities used (in relation to allergens), as well as the food additives applied.

Five of the 20 samples displayed allergen warnings such as "produced using equipment that also processes milk" or "may contain milk." Although milk was not an ingredient, shared manufacturing facilities justified these warnings to protect consumers with milk intolerance, as allergen labeling is critical for consumer safety in Indonesia (Muhammad et al., 2023). Thirteen samples contained artificial sweeteners; 11 provided complete and correct warning statements, while two were incomplete or absent. The warnings generally stated that products containing artificial sweeteners are not recommended for children under five, pregnant women, and breastfeeding mothers, with an additional phenylalanine warning required for aspartame-containing products (BPOM, 2021). Only one imported product (BPOM RI ML, code E) included a choking risk warning, while none of the domestic products did. This reflects the absence of regulatory requirements for choking-related warnings in BPOM Regulation No. 20 of 2021, despite documented choking risks associated with jelly agar cups (Kawawa, 2013).

Consumer perceptions of jelly agar cup labels

Consumer perceptions of jelly agar cup labels were obtained through an online survey. A total of 410 respondents met the research criteria, comprising residents of the Jabodetabek area aged 11 years and above, including respondents over 45 years of age. Prior to the main survey, the questionnaire underwent validity and reliability testing with 39 preliminary respondents. The questionnaire consisted of 10 items, all of which were valid (Sig. < 0.05) and reliable, with a Cronbach's alpha value of 0.666 (> 0.60) (Dewi & Sudaryanto, 2020). Validity testing indicates that the questionnaire items accurately measure the intended variables, while reliability testing demonstrates that the measurement instrument is consistent (Sanaky et

ISSN (electronic): 2302-4399 http://jurnal.fp.unila.ac.id/index.php/jthp/index

al., 2021). These results confirm that the questionnaire appropriately reflected the study objectives related to consumer perceptions of jelly agar cup labeling and was suitable for use in the main survey.

Respondent profile and jelly agar cup consumption patterns

The respondent profile was dominated by adults aged 20–45 years (49.51%), followed by children and adolescents aged 11–19 years (28.05%), and pre-elderly to elderly respondents aged over 45 years (22.44%). These findings support the study by Saputri et al. (2021), which reported that jelly products are favoured by a wide range of age groups, not only children. A total of 158 respondents acted as consumption companions, supervising 61.39% of children aged 6–10 years, 37.34% of toddlers aged 1–5 years, and 1.29% of elderly individuals over 45 years of age. This indicates awareness among respondents of the importance of adult supervision during jelly agar cup consumption by vulnerable groups.

Regarding consumption methods, 72.20% of respondents consumed jelly agar cups directly in one bite, 3.66% cut the jelly into smaller pieces, and 24.15% used a spoon. These results indicate that more than half of respondents habitually consumed jelly agar cups directly. The method of consumption by holding the bottom of the package and directly pushing the contents into the mouth, as designed for jelly cup products, can increase the risk of choking (Kawawa, 2013) , particularly among children and the elderly. Only a small proportion of respondents adopted safer practices such as cutting the jelly into smaller pieces, which could reduce choking risk

Consumer perceptions of advisory information, choking risk warnings, and food additives on jelly agar cup labels

Perception can be defined as an individual's response to stimuli based on personal experience (Gandhy et al., 2023). In this study, consumer perceptions of jelly agar cup labels were assessed through 10 Likert-scale questions (1–5) and two multiple-choice questions related to labeling, advisory information, choking risk warnings, and food additives. Four Likert-scale questions related to choking risk were predominantly answered with "Agree" and "Strongly Agree" (79.4%), while two Likert-scale questions related to food additives were dominated by "Agree" and "Strongly Agree" responses (82.2%). These findings indicate a high level of consumer awareness regarding choking risks associated with jelly agar cup consumption and the use of food additives in such products. Responses to the multiple-choice questions revealed that 81.95% of respondents were aware that jelly agar cups commonly contain artificial sweeteners, which are not recommended for consumption by certain groups, such as children under five years of age, pregnant women, and breastfeeding mothers (BPOM, 2021). Overall, these results demonstrate that more than half of the respondents possess good awareness and concern regarding choking risks and food additive use in jelly agar cups. However, a proportion of respondents still exhibited differing perceptions, likely due to information gaps among consumers.

Conclusion

Jelly agar cups with higher elasticity and density (codes T and R) were harder to chew and posed a greater choking risk due to incomplete mastication. High hardness and cohesiveness were mainly associated with jelly powder and carrageenan, which at high concentrations produced a firmer texture. Choking-related advisory and warning information was still limited, appearing in only 30% and 5% of products, respectively, and choking prevention warnings are not yet regulated in Indonesia. Products with high cohesiveness due to higher hydrocolloid concentrations (codes P, R, S, and T) are recommended to include choking prevention advisories. Consumer perceptions in Jabodetabek toward choking-risk advisories and food additive warnings were predominantly positive (>75% agree/strongly agree), indicating good awareness, though further education by regulators and producers remains necessary.

References

Alemu, T. (2023). Texture profile and design of food product. *Journal of Agriculture Horticulture Research,* 6(2), 272-281. https://doi.org/10.33140/jahr.06.02.03

Amelia, J.R., Pujilestari, S., Hamidatun, H., & Monica, P. (2023). Karakterisasi mutu minuman jeli okra nanas dengan perbedaan konsentrasi karagenan-konjak. *Jurnal Teknologi & Industri Hasil Pertanian*, 28(2), 140-149. https://doi.org/10.23960/jtihp.v28i2.140-149

Azizaah, E.N., Supriyanto, & Indarto, C. (2022). Profil tekstur *snack bar* tepung jagung talango yang diperkaya antioksidan dari tepung kelor (*Moringa oleifera* L.). *Jurnal Teknologi dan Industri Pangan Unisri*, 7(2), 100-108. https://doi.org/10.33061/jitipari.v7i2.7511

Badan Pengawas Obat dan Makanan. (2018). Peraturan Badan Pengawas Obat dan Makanan Nomor 31 Tahun 2018 tentanlg Label Pangan Olahan. BPOM RI.

Badan Pengawas Obat dan Makanan. (2021). Peraturan Badan Pengawas Obat dan Makanan Nomor 20 Tahun 2021 tentang Perubahan Atas Peraturan Badan Pengawas Obat dan Makanan Nomor 31 Tahun 2018 tentang Label Pangan Olahan. BPOM RI.

Cai, C., Sivak, A., & Davenport, M.H. (2021). Effects of prenatal artificial sweeteners consumption on birth outcomes: a systematic review and meta-analysis. *Public Health Nutrition*, 24(15), 5024-5033. https://doi.org/10.1017/S1368980021000173

Dewi, S.K., & Sudaryanto, A. (2020). Validitas dan reliabilitas kuisioner pengetahuan, sikap dan perilaku pencegahan demam berdarah, *Prosiding Seminar Nasional Keperawatan Universitas Muhammadiyah Surakarta* (pp. 73-79). Repository Horizon University Indonesia.

Dwiloka, B., Latifah, A.F., & Pramono, Y.B. (2024). Daya oles, viskositas, tekstur, dan warna selai bit (*Beta vulgaris* L.) dengan penambahan karagenan sebagai bahan pengental. *Jurnal Pangan dan Gizi*, 14(1), 1-11. https://jurnal.unimus.ac.id/index.php/JPDG/article/view/14576/0

Faiha, G., Cantika, H.S., & Latifah, N. (2025). Peran material pengemas primer dan sekunder dalam menjaga mutu obat. *Jurnal Riset Ilmu Farmasi dan Kesehatan*, 3(4), 112-123. https://doi.org/10.61132/obat.v3i4.1517

Fatmawati, N.D., Harsanti, R.S., & Utami, A.U. (2022). Pengaruh konsentrasi agar-agar terhadap kualitas kimia dan hedonik permen *jelly* belimbing wuluh (*Averrhoa blimbi* L.). *Jurnal Teknologi Pangan dan Ilmu Pertanian*, 4(1), 13-21. https://doi.org/10.36526/jipang.v4i1.2674

Firmansyah, D., & Dede. (2022). Teknik pengambilan sampel umum dalam metodologi penelitian: *literature review. Jurnal Ilmiah Pendidikan Holistik*, 1(2), 85-114. https://doi.org/10.55927/jiph.v1i2.937

Gandhy, A., Karmila, J.T., Pakpahan, R., & Hardini, S.Y.P.K. (2023). Persepsi konsumen terhadap keputusan pembelian di bukalapak. *Jurnal Ilmiah Manajemen Kesatuan*, 11(1), 175-1861. https://doi.org/10.37641/jimkes.v11i1.1731

Herawati, H., & Kamsiati, E. (2022). The characteristics of low sugar jelly made from porang flour and agar. *IOP Conference Series: Earth and Environmental Science*, 1024(1), 1-8. https://doi.org/10.1088/1755 1315/1024/1/012019

Imani, R.D, Sucipto, H., Afridah, N., Syaifulloh, M., & Riono, S.B. (2023). Penyuluhan pentingnya label pada kemasan produk usaha mikro kecil menengah (UMKM) Desa Randusanga Wetan. *Jurnal Pengabdian Masyarakat*, 1(1), 43-55. https://doi.org/10.63922/citakarya.v2i02.235

Istiqomah, H.N., Widodo, K.W., Chiendytya, N.D., Herawati, N., & Pamukhti, B.B.D. (2024). Edukasi pertolongan pertama tersedak dengan teknik *heimlich maneuver* pada siswa MTS Al-Ihsan. *Jurnal Pengabdian Bidang Kesehatan*, 2(2), 33-41. https://doi.org/10.57214/jpbidkes.v2i2.67

Kawawa, N. (2013). Jelly mini-cups containing konjac: is a warning enough to protect vulnerable consumers?. *Australian Journal of Asian Law*, 13(2), 1-18. https://ssrn.com/abstract=2228461

Lam, Y.B., Yusri, A.S., & Sarbon, N.M. (2025). Effect of gelling agents on the techno-functional, collagen bioavailability and phytochemical properties of botanic gummy jelly containing marine hydrolyzed collagen. *Food Chemistry Advances*, 6, 1-8. https://doi.org/10.1016/j.focha.2025.100915

Lidiasari, E., Syafutri, M.I., Parwiyanti, Syaiful, F., Widowati, T.W., Pratama, F., & Rosidah, U. (2023). Sosialisasi dan pelatihan pengolahan *jelly* nata siap saji dan minuman nata *ready to drink* pada ukm nata de coco di Kota Prabumulih. *Jurnal Pengabdian Kepada Masyarakat*, 3(2), 389-398. https://doi.org/10.53625/jabdi.v3i2.6010

Ma'arif, J.M., Dewi, E.N., & Kurniasih, R.A. (2021). Formulasi dan karakterisasi fisikokimia selai lembaran anggur laut (*Caulerpa racemosa*). *Jurnal Ilmu dan Teknologi Perikanan*, 3(2), 123-130. https://doi.org/10.14710/jitpi.2021.13149

Maisyaroh, A., Kurnianto, S., & Widianto, E.P. (2022). Efektifitas pelatihan bantuan hidup dasar terhadap peningkatan kemampuan siswa MTS Negeri 1 Lumajang dalam penanganan kegawatdaruratan tersedak akibat obstruksi benda asing. *Jurnal Media Karya Kesehatan*, 5(2), 151-161. https://doi.org/10.24198/mkk.v5i2.35521

Majidah, A.S., Susilawati, & Nawasih, O. (2024). Pengaruh lama pemasakan terhadap sifat sensori, sifat kimia, dan sifat fisik permen *jelly* susu kambing. *Jurnal Agroindustri Berkelanjutan,* 3(1), 96-110. https://jurnal.fp.unila.ac.id/index.php/JAB/article/view/8855

Muhammad, D.W., Kautsar, I.A., & Latifah, E. (2023). Pencantuman label alergen dalam pelabelan produk pangan sebagai bentuk perlindungan konsumen. *Jurnal Hukum IUS QUIA IUSTUM,* 30(2), 420-441. https://doi.org/10.20885/iustum.vol30.iss2.art9

Sanaky, M.M., Saleh, L.M., & Titaley, H.D. (2021). Analisis faktor-faktor penyebab keterlambatan pada proyek pembangunan gedung asrama MAN 1 Tulehu Maluku Tengah. *Jurnal Simetrik*, 11(1), 432-439. https://doi.org/10.31959/js.v11i1.615

Saputri, R., A'yun, R.Q., Huriyati, E., Lestari, L.A., Rahayoe, S., Yusmiati, Sulistyo, O.H., & Harmayani, E. (2021). Pengaruh pemberian *jelly* mengandung glukomanan porang (*Amorphophalus oncophyllus*) dan inulin sebagai makanan selingan terhadap berat badan, IMT, lemak tubuh, kadar kolesterol total, dan trigliserida pada orang dewasa obesitas. *Jurnal Gizi Klinik Indonesia*, 17(4), 166-183. https://doi.org/10.22146/ijcn.58343

Soedirga, L.C., & Marchellin. (2022). Physicochemical properties of jelly candy made with pectin from red dragon fruit peel in combination with carrageenan. *Caraka Tani: Journal of Sustainable Agriculture*, 37(1), 1-14. https://doi.org/10.20961/carakatani.v37i1.53798

Suartini, E., & Kusniawati. (2020). Pengaruh pendidikan kesehatan pertolongan pertama tersedak dengan *mobile aplication* dan *phantom* pada orang tua di TK Taman Sukaria terhadap kemampuan keluarga. *Jurnal Media Informasi Kesehatan,* 7(2), 411-422. https://doi.org/10.36743/medikes.v7i2.231

Triwidiyantari, D. (2023). Hubungan pengetahuan ibu tentang tersedak dengan penanganan pertama tersedak pada anak usia dini di Desa Jayamekar. *Usada Nusantara: Jurnal Kesehatan Tradisional*, 1(1), 57-65. https://doi.org/10.47861/usd.v1i1.143

ISSN (electronic): 2302-4399 http://jurnal.fp.unila.ac.id/index.php/jthp/index

Yang, J., Kim, J., Choi, Y.J., & Hahn, J. (2021). Elastic gels based on flaxseed gum with konjac glucomannan and agar. *Food Science Biotechnology*, 30(10), 1331-1338. https://doi.org/10.1007/s10068-021-00977x

Yusof, N., Jaswir, I., Jamal, P., & Jami, M.S. (2019). Texture profile analysis (TPA) of the jelly dessert prepared from halal gelatin extracted using high pressure processing (HPP). *Malaysian Journal of Fundamental and Applied Sciences,* 15(4), 604-608. https://doi.org/10.11113/mjfas.v15n4.1583

Zhou, S., Meenu, M., & Xu, B. (2025). Gelling, textural, and sensory properties of grass jelly formulated with different starches. *Food Production, Processing and Nutrition*, 7(1), 1-13. https://doi.org/10.1186/s43014-024-00279-9