Sensory Profile Evaluation Using the CATA (Check-All-That-Apply) Method: A Case Study on Commercial Dipped Wedang Uwuh

Evaluasi Profil Sensori Menggunakan Metode CATA (Check-All-That-Apply): Studi Kasus Wedang Uwuh Celup Komersial

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ABSTRACT

Wedang uwuh is a functional drink commonly made of ginger, sappanwood, cinnamon, clove, and sugar. Wedang uwuh has immunomodulatory properties that can help strengthen the immune system. Making wedang uwuh dip is one of the efforts to make it more appealing and easier to serve. Many MSMEs (Micro, Small, and Medium Enterprises) in Indonesia manufacture wedang uwuh dyes. This study aims to determine the sensory profile of wedang uwuh celup products sold on e-commerce by several producers, to determine the sensory profile of wedang uwuh celup products, and to determine the characteristics preferred by panelists based on the attributes tested by 50 panelists with an age range of 18-60 years, with a ratio of 53% male and 47% female. The techniques employed are FGD (Focus Group Discussion), which is used to determine sensory qualities, and CATA (Check-All-That-Apply), which is used to create sensory profiles. The test results revealed a total of 12 sensory attributes, including bright red color, orange-brown color, herbal aroma, ginger aroma, sweet taste, bland taste, bitter taste, spicy sensation, warm sensation, warm afterfeel, bitter aftertaste, and spicy aftertaste. According to the test results, sample code 160 is the most preferred wedang uwuh sample because it is considered ideal by the panelists, namely having a ginger aroma, warm taste, warm feeling after drinking, brownish orange color, and spicy taste after drinking.

Keywords: CATA; FGD; sensory profile; wedang uwuh

ABSTRAK

Wedang uwuh adalah minuman fungsional yang umumnya terbuat dari jahe, secang, kayu manis, cengkeh, dan gula. Wedang uwuh memiliki sifat imunomodulator yang dapat membantu memperkuat sistem kekebalan tubuh. Pembuatan wedang uwuh celup merupakan salah satu upaya untuk membuatnya lebih menarik dan lebih mudah disajikan. Banyak UMKM (Usaha Mikro, Kecil, dan Menengah) di Indonesia yang memproduksi pewarna wedang uwuh. Penelitian ini bertujuan untuk mengetahui profil sensori produk wedang uwuh celup yang dijual di e-commerce oleh beberapa produsen, mengetahui profil sensori produk wedang uwuh celup, dan mengetahui karakteristik yang disukai panelis berdasarkan atribut yang diuji oleh 50 panelis dengan rentang usia 18-60 tahun, dengan rasio 53% laki-laki dan 47% perempuan. Teknik yang digunakan adalah FGD (Focus Group Discussion), yang digunakan untuk menentukan kualitas sensori, dan CATA (Check-All-That-Apply), yang digunakan untuk membuat profil sensoris. Hasil pengujian menunjukkan total 12 atribut sensoris, meliputi warna merah cerah, warna oranye-coklat, aroma herbal, aroma jahe, rasa manis, rasa hambar, rasa pahit, sensasi pedas, sensasi hangat, rasa hangat setelah diminum, rasa pahit setelah diminum, dan rasa pedas setelah diminum. Berdasarkan hasil pengujian, sampel kode 160 merupakan sampel wedang uwuh yang paling disukai karena dinilai ideal oleh panelis, yaitu memiliki aroma jahe, rasa hangat, rasa hangat setelah diminum, warna oranye kecoklatan, dan rasa pedas setelah diminum.

Kata kunci: CATA; FGD; profil sensorik; wedang uwuh

INTRODUCTION

Sappan wood, ginger, cinnamon, and sweeteners like sugar or honey make the beverage wedang uwuh. Cinnamon, ginger, and secang are among the substances that support wedang uwuh's functional qualities and have intense antioxidant activity. Wedang uwuh is also reported to help lower cholesterol, prevent osteoporosis, and function as an anti-cancer agent. It can also make the body more resilient (Widyaningsih et al., 2020). The dry herbal herbs and sugars are frequently mixed before being boiled with hot water to form wedang uwuh. Wedang dregs, a byproduct of the procedure, are not well-liked by the general public. One effort to make this wedang uwuh product more attractive, enduring, and simple to give is the development of a dipped wedang uwuh. Wedang uwuh dip has been extensively commercialized in Indonesia so that people can readily consume it.

Whether sold offline or online, professionally made wedang uwuh dip has to offer enticing sensory attributes and benefits for customers. The manufacturers must know the preferences of the target customer. The sensory characterization of commercial Dipped Wedang Uwuh can be effectively conducted using various descriptive analysis techniques, specifically Quantitative Descriptive Analysis (QDA) and Flavor Profile Analysis (FPA). QDA enables trained panelists to generate and quantify detailed sensory attributes, offering a high level of flexibility and facilitating a

comprehensive assessment of the drink's flavor, aroma, and visual properties (Mihafu et al., 2020). However, this method requires extensive training for panelists and is time-consuming. In contrast, FPA focuses on identifying the predominant flavor components and developing a consensus profile, making it more efficient, less time-consuming, and demanding in terms of training (Silva et al., 2020). Nevertheless, its dependence on moderator expertise and the potential for omitting subtle sensory nuances may limit its effectiveness. Together, these methodologies provide complementary insights into the complex herbal, spicy, and aromatic profile of Wedang Uwuh, each offering unique advantages and limitations in terms of analytical precision, operational efficiency, and the expertise required from panelists.

One technique for learning is the CATA (Check-All-That-Apply) approach (Weerawarna et al., 2022). CATA is one of the most well-liked consumer-based sensory evaluation methods. The CATA technique may be easily deployed since consumers can be used in place of trained panelists. Panelists who are consumers can save time because no training is required. Consumer panelists can discuss the likelihood that a newly produced product will hit the market. The CATA approach can determine how customers experience items on a sensory level (Moss et al., 2021). The sensory profile of commercial wedang uwuh dip will be evaluated in this study using the CATA (Check-All-That-Apply) technique. Based on this backdrop, it is clear that the CATA (Check-All-That-Apply) approach may be utilized to determine the sensory profile of a product.

METHODOLOGY

Focus Group Discussion

Only a small panel of participants panelists familiar with the elements of a sensory assessment conducted the Focus Group Discussion (FGD). There are 8 members of the forum. The panelists are QCs in the food processing sector, specializing in beverages. Every three and six months, panelists undergo sensory training. Before testing, a focus group discussion (FGD) will be held to collect information about the qualities that will be examined. Sensory characteristics, such as taste, scent, color, and mouthfeel, are the expected data. The research method modified. The methods modified (Heo et al., 2019).

Panelist Selection

Consumer panelists were recruited for this study. A preliminary questionnaire was administered to gather demographic information, including age and gender. In total, 50 panelists aged between 18 and 60 years participated in the evaluation, consisting of 53% males and 47% females. The methods were adapted and modified as needed (Heo et al., 2019).

Sample Preparation

The first step in preparing the Commercial Wedang Uwuh dip purchased online from the marketplace was to brew the sample using 250 mL of hot water in a glass or similar container, following the serving instructions provided on the commercial packaging. The recommended brewing temperature was 96°C. After brewing, the sample was transferred into a 40 mL plastic cup. To minimize bias, the samples were randomly ordered, coded with three-digit random numbers, and served individually in a random sequence to each panelist. The serving temperature was maintained between 38°C and 40°C, in accordance with the recommendations stated on the package. The methods were adapted and modified as necessary (Heo et al., 2019). Details regarding the sample are shown in (Table 1)

Sensory Test

A total of 50 consumer panelists, aged between 18 and 60 years, participated in the evaluation, with 53% identifying as male and 47% as female. Each panelist received a 40 mL sample, along with a 250 mL glass of mineral water and plain biscuits to cleanse their palate and eliminate any residual aftertaste. The samples were served individually in a random sequential order to minimize bias.

Before tasting, the panelists were asked to indicate their perception of the ideal sensory profile of wedang uwuh by marking the sensory attributes they felt represented the product. They then evaluated each sample using a 4-point hedonic preference scale (1 = strongly dislike, 2 = dislike, 3 = like, 4 = very much like). A 4-point scale was chosen to avoid neutral responses, which are undesirable in product development because they do not indicate whether the panelist tends to like or dislike the product (Moskowitz et al., 2005).

After the tasting, panelists identified the sensory attributes they perceived in each sample by marking the corresponding descriptors. These sensory attributes were derived from the results of a focus group discussion (FGD), and the methods were adapted and modified based on the work of (Heo et al., 2019).

Table 1. Wedang uwuh dip product sample

Sample	Sample Code	Product Composition	Sample After Brewing
Wedang Uwuh Commercial Brand A	106	Ginger, sugar, secang wood, cloves	
Wedang Uwuh Commercial Brand B	992	Ginger, cloves, nutmeg, cinnamon, shavings	
Wedang Uwuh Commercial Brand C	366	Clove leaves, nutmeg leaves, ginger, and other spices	
Wedang Uwuh Commercial Brand D	257	Ginger, secang, clove leaves, nutmeg leaves, cinnamon leaves	

Data analysis

Sensory evaluation data were analyzed using the CATA (Check-All-That-Apply) method. CATA data analysis consists of Cochran's Q test, correspondence analysis, principal coordinate analysis, and penalty analysis. The available data will be processed and analyzed using the XLSTAT 2022 software. The results of the CATA analysis can be seen through the Marranuilo Cochran Q test table, which compares the attributes of each sample with a test rate of 5% to detect significant differences between samples The methods modified (Heo et al., 2019).

The results of the Cochran test showed significant differences or no attributes for each sample. If the p-value < 0.05, there is a significant difference from the sample. Correspondence analysis will then represent the ideal product and test the product into a biplot map according to the sensory attributes The methods modified (Heo et al., 2019). Principal Coordinates Analysis (PCA) will visualize the correlation of sensory attributes and preference data in the form of points where if the "liking" point is close to a specific attribute point, the product that consumers like is the one that has a dominant intensity on that attribute (Ismawan, 2015). In addition, penalty analysis is also carried out to determine sensory attributes that can decrease or increase consumer preferences to be useful for future product development.

Preference mapping data analysis produces a contour plot that describes the percentage of panelists who give preference values above the average. Preference Mapping will show a map of the panelists' preferences for the tested wedang uwuh dip. Preference mapping data analysis produces a 2-dimensional contour plot that describes information about product attributes that consumers like and dislike. The methods modified (Heo et al., 2019).

RESULTS AND DISCUSSIONS

Focus Group Discussion (FGD)

Focus group discussion (FGD), which enables panelists to compare and contrast their perceptions of the characteristics of wedang uwuh dip, is the most effective qualitative method for obtaining a sensory description of a product and evaluating the questionnaire characteristics used for sensory wedang uwuh dip. Focus groups were done before consumer panelists' sensory evaluation of the CATA method. The FGD was conducted with the participation of eight panelists. Satisfies the criteria for FGD members, consisting of between 8 people (Mahdi et al., 2023). The FGD begins with the opening and explanation or purpose of holding this activity by the researcher as a moderator. All panelists were first introduced to the wedang uwuh dip product and the raw materials consisting of ginger, secang, clove leaves, nutmeg, and cinnamon. Then each panelist determines the sensory attributes in the wedang uwuh dip product by filling out a sensory attribute questionnaire. The following is a discussion session and mutual agreement on determining the attributes in wedang uwuh dip. The results are that there are 12 attributes in the wedang uwuh dip product, which can be seen in **(**Table 2).

Ginger's aromatic qualities are a result of its volatile components. Zingiberen, Sequiphellandren, Ar-curcumin, and sesquiterpene derivatives are the primary volatile substances found in fresh ginger rhizomes (Oriani et al., 2016). These substances enter the nasal cavity and are recognized by receptors to produce the odor of ginger. The different ways the panelists reacted to the odor may have been caused by the different expectations each had when they initially viewed the sample. The panelists' psychological state, namely their differing expectations for taste and fragrance depending on the sample's color, may affect how strongly they perceive the intensity of aroma and flavor. This may lead to different opinions on ginger's aroma among the panelists. Wedang uwuh is created from various spices and herbs, giving it the sensory quality of an herbal scent. The Cochran Q Test findings show that the panelists believed the herbal odor in the sample to be genuine. That may be the result of different component proportions that substantially impact how fragrance is formed. The spicy feeling quality is frequently seen in beverage items, with ginger as the primary component since it gives off a spicy sensation when touched. The pungent sensation is the term used scientifically to describe the spicy feeling. Because it includes the volatile oils Gingerol, shogaol, and Oleoresin, ginger naturally provides a spicy feeling. This substance causes cholestatic sensations (Syu et al., 2023).

The warm sensation attribute is an attribute that exists in ginger-based drinks because of the Gingerol compound contained in ginger. This Gingerol compound gives a chemisthetic sensation, which is a warming sensation when the product is consumed. The sensation is different from the taste or smell that is only felt on the nose or tongue but can also be felt in other areas of the body. This sensation is influenced by the original system (Kaur & Riar, 2020). Due to the presence of gingerol compounds in ginger, it is included in original stimuli. This trigeminal stimulus produces a longer-lasting effect even in the presence of multiple mouth neutralizing processes. Trigeminal stimuli have different characteristics from taste and smell, where the trigeminal sensation will increase in intensity through repeated consumption (Mahdi et al., 2023).

Table 2. The results of the FGD of the sensory attributes of the commercial dyed wedang uwuh

No	Attribute	Information
1	Bright Red Color	Bright red brewed water
2	Color Orange-Brown	Orange-brown brewed water
3	Herbal Scent	Aroma associated with spices
4	Ginger scent	Strong and sharp ginger aroma
5	Sweetness	Sugar base taste
6	Bland taste	Bargain gives a flat impression when consuming
7	Bitter taste	
8	Spicy Sensation	The sensation of heat and burning felt by the nerve endings of the tongue
9	Warm Sensation	Warm sensation in the throat
10	The remaining warm (afterfeel)	A warm sensation that is still felt in the throat area after tasting the product
11	Bitter Aftertaste	The bitter taste left in the mouth
12	Spicy Aftertaste	Spicy taste that lingers in the mouth

Table 3. The results of the Cochran's Q Test analysis of wedang uwuh dipped drinks.

Attribute	p-values
Herbal scent	0,008
Herbal scent	0,022
Sweet	<0,0001
Tasteless	<0,0001
Bitter	<0,0001
Warm sensation	0,006
Spicy sensation	<0,0001
Left warm	0,049
Bright red	<0,0001
Orange-brown	<0,0001
Bitter aftertaste	<0,0001
Spicy aftertaste	0,001

Due to variations in the component content, the steeping water from each sample has a different hue. The final color of the product might depend on the components present in the material. Wedang uwuh employed in this study involves commercial goods; hence the composition of the spices and herbs may vary from sample to sample, resulting in variations in the finished product's hue. Ginger is the primary component of beverages that are a vivid reddish yellow hue. Brazilein, a reddish pigment found in secang, is what gives wedang uwuh its characteristic hue. Each sample's ultimate steeping color varied in the presence of a brilliant red-yellow hue from ginger and red from secang wood. The presence of pigments in ginger and sappan wood during the processing of each sample has an impact on the variation in color tendency that results. The degradation of ginger and sappan pigments during processing might cause variations in color between wedang uwuh samples.

Panelist Profile

The selected panelists met specific inclusion criteria: they were between 18 and 60 years old, in good health at the time of testing, and had prior experience consuming wedang uwuh or herbal beverages in general. The target panelists were defined as regular consumers of wedang uwuh, meaning they drank it at least three times a week for a minimum of six months. This group included both males and females within the specified age range, representing the target consumers of herbal beverages. For the taste sensitivity assessment, panelists ranged in age from 18 to 60 years. A full-mouth gustatory test was conducted to determine sensitivity thresholds for the four basic tastes. The results showed age-related differences in taste sensitivity among the groups. Final selection of the panelists was based on these findings to minimize potential bias and ensure that the sensory preference data accurately represented the target consumer population (Mahdi et al., 2023).

Sensory Profile of Wedang Uwuh Dip

Using four different commercially available product brands, Products A, B, C, and D the CATA (check-all-that-apply) approach was used to determine the sensory profile of wedang uwuh dip. The Cochran Q test was used to compare each sensory feature between samples at a 5% significance level. (Table 3) displays the outcomes of the Cochran Q test.

Cochran's Q test analysis was used to compare the sensory characteristics of the four samples, and a significance threshold of 5% was used. When using Cochran's Q Test, the alternatives are considered substantially different if the p-value is less than the 5% significance threshold (0.05). Table 3 shows that with a significance level of 5%, all but one (0.05) of the 12 assessed attributes had a p-value of less than 0.05. These attributes include the characteristics of herbal aroma, ginger aroma, sweet taste, bland taste, bitter taste, spicy sensation, warm sensation, and remaining warmth, as well as the characteristics of bright red color and orange-brown color. Cochran's Q test with Marascuilo multiple pairwise comparisons utilizing the Critical Distinct (Sheskin) Procedure was used to assess different features that were significantly different in order to have a better knowledge of the test product. The features of two items that share the same letter are not considerably different, but two products that share a different letter are significantly different (Tarigan et al., 2024).

Based on the outcomes of the Critical Different (Sheskin) Procedure with Marascuilo multiple pairwise comparisons and the Cochran's Q test. The warm feeling attribute is the same in examples A, B, C, and D. This demonstrates that samples A, B, C, and D do not significantly differ from one another in terms of the lagging warm feeling characteristic. Compared to samples A, B, and D, sample C's ginger scent and herbal aroma characteristics differed significantly. Based on the characteristics of the ginger scent and herbal aroma, Sample C had the lowest frequency among the panelists' selections of the three samples. Sample A's sweet feature distinguished itself significantly from samples B, C, and D.

The panelists offered a high frequency for the selection of bitter qualities in sample B, which exhibited the most significant amount of bitterness compared to the other three samples. The judges' least favorite feeling quality in sample C was warm. The panelists only noticed a few characteristics of the spicy feeling in samples A and C, and these two samples did not differ from one considerably. The bright red hue of Samples C and D is the one the panelists preferred the best, but they are not statistically different from one another. Compared to examples B, C, and D, the orange-brown color characteristic in sample A stood out significantly. Compared to other samples, Sample A had a reasonably weak bitter aftertaste. Sample D has a spicy aftertaste, which is distinctive from the other samples and is frequently chosen by the panel. The sensory profile of the wedang uwuh dip can be seen in (Figure 1).
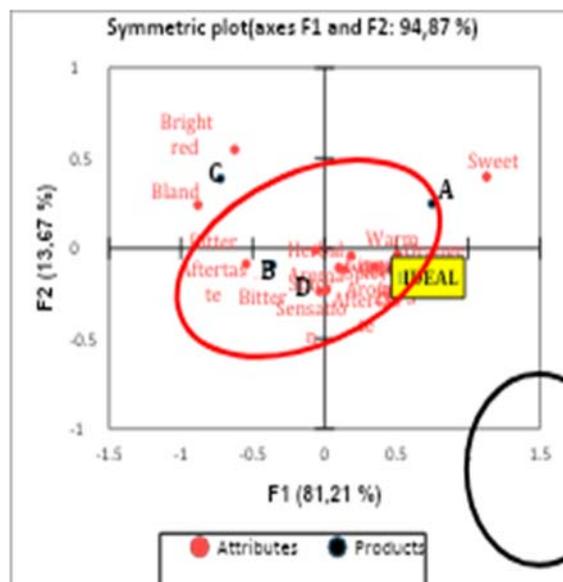

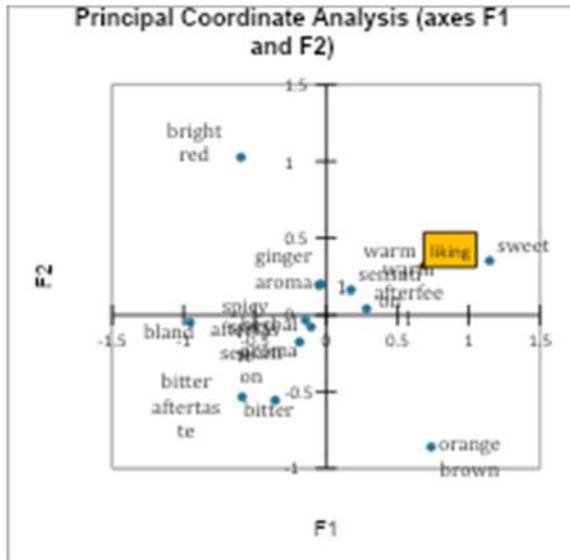Figure 1. Sensory profile of wedang uwuh celup drink

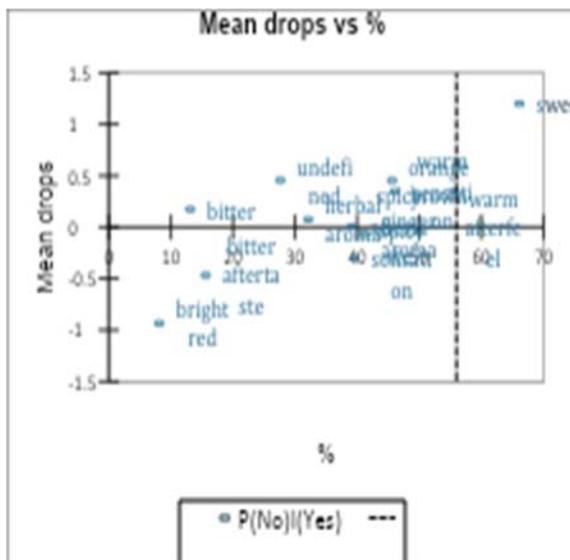Figure 2. Correlation of sensory attributes with likes

Figure 3. Must have attribute analysis map

According to the panelists, the CATA test findings also demonstrated the perfect sensory qualities of the wedang uwuh dip. Correspondence Analysis illustrates this feature. The Correspondence Analysis's findings are presented as plots that display the optimal sensory qualities of the tested samples as determined by the panelists. Product qualities are mapped in the location most similar to the ideal, at which time they are considered ideal. According to the panelists, the ideal wedang uwuh dip drink product is located in quadrant 4 of the test results shown in Figure 1, which possesses the sensory qualities of ginger scent, warm feeling, left behind, brownish orange hue, and spicy aftertaste (Tarigan et al., 2024).

Samples A and D were samples closest to the ideal product, according to the panelists. Sample A in quadrant 1 has a sweet taste attribute, and an orange-brown color attribute, sample D in quadrant 3 has a dominant attribute of herbal aroma, ginger aroma, spicy sensation, and spicy aftertaste. While sample B in quadrant 3 has a dominant sensory attribute of bitter taste and bitter aftertaste. Product sample C in quadrant 2 is a product sample with sensory attributes farthest from the ideal product. Sample C has sensory attributes of bland taste and bright red color. The sour taste of juice drinks has the effect of a lack of desire to

consume the product, regardless of whether the product has the effect of increasing "physical endurance and energy," "mental alertness and memory," or "mood and emotional well-being." However, consumers in the study were more willing to consume the product if the expected benefits were associated with improved physical or cognitive performance than if it was associated with increased emotional well-being (Jaeger et al., 2013). Therefore, the taste attribute plays an essential role in the panelists' preferences. The correlation of sensory attributes with liking can be seen in (Figure 2).

The mapping of panelists' preferences for sample products is then shown in the Principal Coordinates Analysis (PcoA) which will map the attributes of the sample with the panelists' preferences for the sample as a whole. The "liking" point on the plot shows the location of the panelists' preferences for an attribute. The attribute point closest to the liking point indicates that the attribute is liked by the panelists. The results of the PcoA test in Figure 3 show that the dominant attributes that have a positive influence on panelists' liking are the sweet, warm sensation and warmth attributes which are left behind with correlation values between the attributes and the liking score respectively of 0.637, 0.228, 0.140. A product was said to be successful and good if it has the attributes that consumers expect. Product attributes are components which are product characteristics that guarantee that the product can meet the needs and desires expected by consumers (Hanmontree et al., 2022). Product attributes are elements that are considered important by consumers and are used as a basis for making purchasing decisions, which means that of the four products listed. Must have attribute analysis map (Figure 3).

The findings of the CATA method analysis are displayed in the penalty analysis, which indicates the extent to which differences in the sensory profiles of the sample and the ideal product lower the overall favorability rating. Penalty analysis can indicate which way a product's qualities are rising (Hanmontree et al., 2022). Product developers can utilize penalty analysis as a foundation for their work, concentrating on the features that have the greatest potential to impact the acceptability of their product as a whole (Tarigan et al., 2024).

The penalty analysis, which shows the degree to which variations in the sensory profiles of the sample and the ideal product affect the overall favorability rating, presents the results of the CATA method analysis. According to Ares et al. (2014), penalty analysis can show which direction a product's attributes are trending in. Penalty analysis may serve as a basis for product developers' work, allowing them to focus on the features that have the most potential to affect how well-received their product will be overall (Heo et al., 2019).

The analysis results shown in Figure 13 conclude that the sensory attributes that have the potential to become must have attributes are the attributes found in the top right of the biplot graph (Mahdi et al., 2023). However, a potential sensory attribute can be included in the must have category if the sensory attribute has a P(No)|P(Yes) condition that is greater than 20% or crosses the dotted line and has a positive mean drop value (Heo et al., 2019) . The analysis results in Appendix 4 show that the attributes of herbal aroma, ginger aroma, sweet taste, warm sensation, spicy sensation, lingering warmth, spicy aftertaste and orange-brown color are attributes with a percentage value of >20%, but only the attributes of sweet taste, sensation warm and orange-brown color which are attributes that are included in the must have category because they have a p-value <5% (significantly different at the 5% significance level) and have a positive mean drops value. Nice to have and must not have attribute analysis curve (Figure 4)
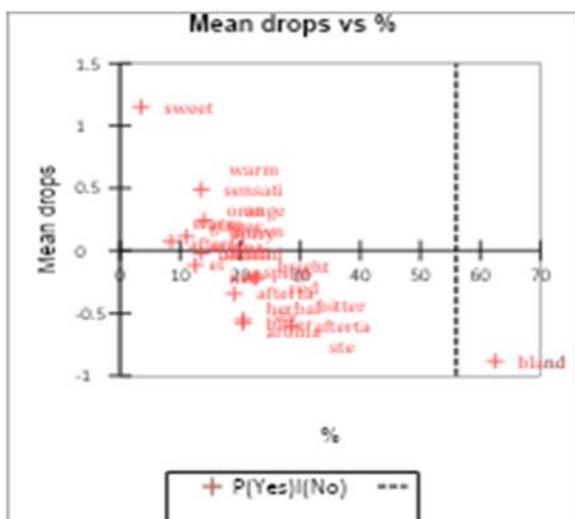
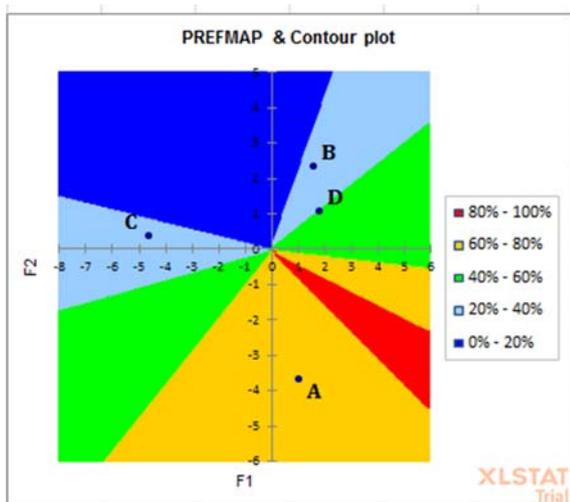Figure 4. Nice to have and must not have attribute analysis curve

Figure 5. Prefmap & contour plot

The nice to have and must not have attributes are not found in ideal products, but are present in real products (Meyners et al., 2013). This attribute was checked when the panelists tasted the wedang uwuh dip sample, but was not checked in the question regarding the ideal sensory profile of wedang uwuh dip. This attribute is based on the conditions P(No)IP(No) and P(Yes)IP(No). Condition P(No)IP(No) is a condition when a sensory attribute is not present in the wedang uwuh product or ideal wedang uwuh product, while P(Yes)IP(No) is a condition where a sensory attribute is present in the wedang uwuh product, but is not there in the ideal wedang uwuh product. An attribute becomes a nice to have and must not have attribute if the attribute has a P(Yes)IP(No) condition of more than 20%, when the mean drops value is positive, the attribute becomes a nice to have attribute, but if the mean drops value is negative, This attribute is a must not have attribute (Reis et al., 2018).

The nice to have and must not have attributes can be seen from the P(Yes)IP(No) results which are more than 20%. Based on the table in Appendix 5, these attributes are herbal aroma 20.50%, bland taste 62.50%, bitter taste 20.50% and bitter aftertaste 47.50%. In this study there were no nice to have attributes because no one had a positive mean drops value. All of these attributes have a negative mean drops value so that herbal aroma, bland taste, bitter taste and bitter aftertaste are attributes that have the potential to become must not have attributes. Sensory

attributes that fall into the must not have category can reduce the favorability value of the test product, so this attribute should be removed. The analysis curve for the mean drops value can be seen in Figure 5. The curve displays the percentage of attributes checked by the panelists on real products but not checked on ideal products. A summary of the attributes included in the must have and must not have categories is presented in Table 4.

Map of Panelists' Likes for Wedang Uwuh Celup Products

The Preference Mapping method is generally used in sensory science to map consumer groupings regarding various products. According to (Hanmontree et al., 2022) stated that Preferences Mapping is a technique that links consumer preference ratings (hedonic) with the sensory characteristics of a product. The results of the analysis are displayed in the form of a contour plot (favorability map) which is divided into 5 color areas, the red area provides an interpretation of favorability values above the average of 80-100%, the yellow area is 60-80%, the green area is 40-60%. %, the light blue area is 30-40% and the dark blue area is 0-20%. The results of the analysis can be seen in (Figure 5).

The panelists' preference map can be seen from the results of the preference mapping analysis. In Figure 6, it can be seen that product A gets the highest contour plot percentage compared to other products, namely 78%. This shows that the panelists gave a liking score above the average for product A of 78%. For product D, panelists rated the product as having a favorability value above the average of 44%. Meanwhile, products C and B received presentations of 33% and 22%. The results of this preference mapping are in accordance with the results of the correspondence analysis which shows that products A and D were the products closest to the ideal product characteristics.

According to the distribution of contour plot color areas, the attributes that influence panelists' preferences for the treatment sample as a whole are the attributes of orange-brown color, sweet taste, and lingering warm sensation where these three attributes are in the red contour plot, which means they have the highest percentage of panelists who rate the attributes. These people have above average preferences (80-100%). These results are in accordance with the graph (PcoA) above which states that these three attributes have a positive effect on the panelists' liking scores. The attributes that the panelists somewhat desired in the product were the attributes of a warm sensation, spicy sensation, and spicy aftertaste, while the attributes that were somewhat undesirable for the panelists were the attributes of bitterness, bitter aftertaste, ginger aroma, and herbal aroma. The attributes that panelists least wanted to have in the product were bland taste and bright red color.

Table 4. Summary of penalty analysis results

Must have	Nice to have	Does not influence	Does not harm	Must not have
Sweet		Herbal aroma		Tasteless
Warm sensation		Ginger aroma	Bright red	Bitter
Orange brown		Spicy sensation	Spicy aftertaste	Bitter aftertaste
		The warmth that remains		

CONCLUSIONS

The research results show that the most preferred wedang uwuh dip drink is one that has the attributes of a ginger aroma, a warm, lingering sensation, a brownish orange color, and a spicy aftertaste. The panelists' preference map for sensory attributes is the attribute of sweet taste, warm sensation and afterfeel. Disliked attributes are bland taste and bright red color. Based on the results of the sensory profile of the CATA method, sample A which has a sensory profile of sweet taste and brownish orange color and sample D which has a sensory profile of herbal aroma, ginger aroma, spicy sensation and spicy aftertaste are the products closest to the ideal product of Wedang Uwuh according to panelist. Product A is the product most liked by the panelists in this study as a whole. As many as 78% of panelists gave a favorability score above the average for product A. From the results of the penalty analysis, it is necessary to have several sensory attributes that must be present and improved in the product, such as sweet taste, orange-brown color and warm sensation. These sensory attributes can increase product acceptance by consumers.

ACKNOWLEDGEMENTS

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