Consumer preference level of fried shallots from several varieties

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Abstract. Fried shallot is one of the most tasteful products that is normally used as a condiment for appetites such as noodles, fried chicken, and sticky rice. The study aimed to analyze the level of consumer preference for fried shallots from local varieties of Lansuna, Tajuk, Batu Ijo, and Bima Brebes by using additional ingredients of tapioca flour and $CaCl_2$. An organoleptic test was carried out on 24 panelists on 12 samples of fried shallots treatment. Data collected were analyzed using a scoring system and anova statistical analysis. The result showed that there is a diversity of panelists' preferences of fried shallot from slightly like to very like in Panelist perceptions, with the highest percentage value being Batu Ijo with $CaCl_2$ for the color parameter (62.5%), Bima Brebes with tapioca flour for the flavor parameter (50%), and in Lansuna with tapioca flour for texture and taste parameters (50%). The addition of tapioca flour can increase the level of panelist acceptance of the texture and taste of 4 varieties of fried shallots, compared to the use of $CaCl_2$ and without the use of additional ingredients.

1 Introduction

Shallot is a horticultural commodity of high economic value in North Sulawesi that is easily damaged during the growth process and after harvest. Due to poor post-harvest activities, shallot plants can experience long-lasting immortality, which tends to harm farmers [1]. As with other horticultural products, the selling price of shallots is unstable and depends on the growing season. At the time of the bumper harvest, its production was abundant, causing the price to be relatively cheap [2]. Because it is easily damaged, it was necessary to make the effort to extend its shelf life through postharvest processing, such as converting the red shallot into a branded product with a long shelf life [3].

Shallots are a commodity rich in nutritional value. Shallots are a source of carbohydrates, vitamin A, B, and C [4], and comprise several types of sugars, amino acids, minerals, sulphur components, enzymes, phytohormones (gibberellin and auxin), flavonoids, and saponins). It has essential fatty acids and mineral elements [5] and also contains nutrients and compounds that are classified as non-nutritional substances and enzymes that are useful for therapy and improve and maintain the health of the human body [6]. Consumption has been proven to increase high-density lipoprotein (HDL) cholesterol, reduce low-density lipoprotein (LDL),

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reduce cholesterol in the blood, and control blood sugar. Thus, it would be beneficial to develop a snack from shallot [7].

Shallot contains a high level of quercetin that can be absorbed by the human body. The daily intake of quercetin in the human diet has been estimated to be about 5–40 mg/day. [8] As a horticultural commodity, shallot is widely used as a spice blend or in processed forms such as shallot flour, shallot extract, powder, essential oils, fried shallots, and even as medicinal materials. The potential for shallot development is still wide open, not only for domestic but also for foreign needs [9]. Fried shallot is one of the most tasteful products of shallot, which is normally used as a condiment for appetites such as noodles, fried chicken, and sticky rice. Conventionally fried shallot is mainly produced by the deep-frying process after peeling the skin, washing to remove soil, and slicing [10]. In general, fried shallots are produced from process of sliced fresh shallots frying with high moisture content using vegetable oils as the frying medium, with or without the addition of salt, seasoning, and/or flour [11]. Crispy fried shallots can improve the tastefulness of cuisine and also the aesthetic visual of cuisine. A crispy fried shallot can be served as a snack when enjoying teatime.

Good food processing was required to extend the shelf life of the crispy fried shallot and maintain the crispy texture due to its characteristic of being easily damaged. Therefore, processing modifications are required to solve this issue, such as additional starch and a selection of packaging types capable of maintaining the quality of crispy fried shallots [3].

To obtain a quality product, fried shallot processing can be combined with wheat flour, tapioca flour, and other additives. The quality of fried food (chemical, physical, and sensory properties) is largely determined by the quality of raw materials (water content, protein, starch, material size, composition of coating materials or batters and additives) as well as processing variables such as frying time and temperature, frequency of oil use, humidity control, and reduction of oil content.

Sensory quality has a key influence on how consumers perceive the quality of a product and on consumers' preferences [12]. Organoleptic quality is a component of food quality that can be judged based on the preferences of panelists using the five senses of seeing, discoloration (smell), taste buds (tongue taste buds), body flavorings, and listeners [13]. The study of consumer preference for several types of fried shallot products of different varieties is still limited, so it is necessary to research consumer acceptance of the fried shallots produced and their physical properties.

2 Research Method

The research was carried out in the Post-Harvest laboratory of the North Sulawesi Agricultural Technology Assessment Center from February to March 2021. The main material used is fresh shallots from four varieties, namely Lansuna, Tajuk, Bima Brebes, and Batu Ijo, which are grown on farmers' land in the village of South Tonsewer. The latitude of Tonsewer is 833 m.

The processing of fried shallots includes peeling shallots, washing, and slicing using a slicer. The sliced shallots were then soaked in a solution of $CaCl_2$ (0.1%) for the $CaCl_2$ treatment or adding tapioca flour (2%) treatment. Next, the oil is drained. The sliced shallots are then fried in 800 ml of cooking oil, then cooled and packaged. The components of fried shallot quality observed included (a) physical quality that is color (using and (b) organoleptic quality by testing the panelists' preference for flavor, taste, texture, and color. Color type by measure with RHS color chart in detail indicated by the letter symbols (A, B, C, D).

The fried shallots were stored for 3 days, and an organoleptic test was carried out involving 24 panelists. Respondents who become panelists are aged 30 to 55 years old, women and men with jobs as housewives, civil servants, and students, with a favorite level

score of 7: very like, 6: like, 5: slightly like, 4: neutral, 3: slightly disliked, 2: disliked, 1: very disliked. The study was conducted with 3 variations of treatment, namely the use of additional ingredients of tapioca flour and $CaCl_2$ and without addition to 4 types of shallot varieties that were processed so that the number of treatments became 12. The research design used is a complete randomized design. The analysis method was Anova, and to find differences among treatments, the BNT test. The data was analyzed using univariate SPSS, the scoring method, and the percentage method [14]. The score calculation uses the following formula (1): and percentage values are calculated using formula (2).

$$Score\ value = (ni\text{-}si)/Ni \quad (1)$$

$$Percentage\ value = ni/\sum Ni \times 100 \quad (2)$$

In this case: the number of respondents who stated (person) in the column i (i=1,2,3,…7)
Si = score statement to i (i=1,2,3,…7)
∑Ni = number of respondents (people) on the ith line (i=1,2,3,…7) [11]

3 Results and Discussion

3.1 Organoleptic Test

The organoleptic properties of shallots, such as color, flavor, texture, and taste, largely determine the consumer's acceptance of the product. The results of the study on the level of acceptance from the panelists on the resulting fried shallots and their statistical analysis are presented in Table 1.

3.1.1 Color

Color is one of the important characteristics of food materials [15] and for most food products, color is an important quality attribute closely related to consumer preferences for the resulting product because it is the first thing seen by consumers. The panelists' range of preferences for shallot color is from neutral to like. The highest average level of liking for color was found in the treatment of fried shallots of the variety Batu Ijo with the addition of $CaCl_2$ with a favorability value of 6,250, close to the like value, and the lowest in the treatment of *tajuk* fried shallots with flour with a favorability value of 4,583, close to the value of slightly like.

Based on the results of statistical tests, the treatment of adding tapioca and $CaCl_2$ had a significant effect on the level of panelists' liking for color. It was significantly different in color of fried shallots in Batu Ijo with the addition of $CaCl_2$, with treatment of Lansuna varieties with $CaCl_2$, with treatment of Batu Ijo, Bima brebes, and Tajuk treatment with tapioca flour, and Batu Ijo without treatment. However, in general, there is no difference between treatment using tapioca and $CaCl_2$ addition with treatment without the use of additives. The use of $CaCl_2$ tends to increase the acceptance of product colors. In general, the calcium contained in $CaCl_2$ can reduce enzymatic reactions because the formation of Ca-pectate in cell walls can reduce the amount of polyphenol oxidase (PPO) and/or reactive substrates released [16]. Calcium chloride has numerous uses in different food products, and it is designed not only as a nutrient supplement but also as a firming agent, pH controller, stabilizer, and thickener [17].

Table 1. The average level of panelists' preference for the organoleptic properties of fried shallots.

Treatment	Color	Flavour	Texture	Taste
Lansuna without treatment	6,125±0.74 ^{ef}	5,833±1.19 ^{bc}	4,583±1.665 ^{a}	5,042±1.197 ^{abc}
Lansuna with $CaCl_2$	5,416±1.13 ^{bcde}	5,041±1.267 ^{a}	4,708±1.267 ^{a}	4,792±1.444 ^{a}
Lansuna with tapioca	4,875±1.65 ^{ab}	5,416±1.138 ^{abc}	**6,041±1.160** ^{c}	**6,208±1.020** ^{e}
Tajuk without treatment	5,541±1.31 ^{bcdef}	**6,000 ±1.021** ^{c}	5,583±1.212 ^{bc}	5,625±1.013 ^{bcde}
Tajuk with $CaCl_2$	5,875±0.61 ^{def}	5,625±1.055 ^{abc}	6,041±0.954 ^{c}	5,125±1.226 ^{abcd}
Tajuk with tapioca	4,583±1.58 ^{a}	5,166±1.239 ^{ab}	6,000±0.978 ^{c}	5,916±1.212 ^{de}
Batu Ijo without treatment	5,416±1.34 ^{bcde}	5,583±0.775 ^{abc}	5,958±0.858 ^{c}	4,875±1.801 ^{ab}
Batu Ijo with $CaCl_2$	**6,250**±0.89 ^{f}	5,625±1.377 ^{abc}	5,916±0.928 ^{C}	5,833±1.167 ^{cde}
Batu Ijo with tapioca	5,000±1.44 ^{abc}	5,666±1.239 ^{abc}	**6,125**±0.991 ^{c}	6,167±1.274^{e}
Bima Brebes without treatment	5,708±0.95 ^{cdef}	5,792±1.102 ^{abc}	4,958±1.601 ^{ab}	4,958±1.366 ^{ab}
Bima Brebes with $CaCl_2$	5,916±0.82 ^{def}	5,792±1.102 ^{abc}	5,916±0.829 ^{c}	5,666±1.129 ^{bcde}
Bima Brebes with tapioca	5,333±1.00 ^{bcd}	5,708±1.082 ^{abc}	5,875±0.899 ^{c}	5,875±1.075 ^{de}

Remarks: Mean value in each colum with the same letter are not significantly different by DMRT (p=5%),
Notes: 7: really like; 6: like; 5: like slightly; 4: Neutral; 3: dislike slightly; 2: dislike; 1: really dislike

3.1.2 Flavor

The flavor of fried shallots is very distinctive because it is the result of frying, which forms from the degradation of the constituent components of food ingredients due to the presence of heat. That heat produces a volatile component so that it smells like a distinctive flavor.

Based on the results of statistical analysis in Table 1, the flavor of all fried shallots is influenced significantly by the use of tapioca flour additives and CaCl2. The range of favorability levels is from slightly like to like. While based on the test of the real difference, preference level of flavor for fried shallots with the treatment of the addition of tapioca flour and CaCl2 tended not to differ markedly between treatments. The organoleptic properties of the flavor that are most preferred are in the treatment of *tajuk* varieties of fried shallots without additional treatment, with a preference value of 6 (likes), and the lowest in the treatment of Lansuna with CaCl2. It also found that the flavor of fried shallots without the use of additives was preferred by panelists, especially for the *Tajuk* variety. In the same research [17] for flavor attributes, the uncoated fried shallot was the most preferred fried shallot by panelists.

3.1.3 Texture

One of the elements that determine the quality of fried shallots is the texture, which is characterized by the crispness of the product. The texture of fried shallots is assessed by tasting the product through the oral organs by biting. The data in Table 1 shows that adding flour treatment and CaCl2 to fried shallots has a noticeable effect on their texture. The range of favorability for the texture of fried shallots was from slightly like to like. The highest degree of favorability in the treatment of Batu Ijo with flour differed markedly from the treatment of lansuna without treatment and Bima Brebes without treatment.

The treatment of adding tapioca flour for Lansuna and Bima Brebes varieties tended to be significantly different from fried shallots without treatment, while for Batu ijo and Tajuk varieties there was no real difference, this means that the level of favorability for fried shallot products with tapioca flour treatment was higher than without flour. The use of flour could improve the texture of the resulting fried shallots, especially for the Lansuna and Batu ijo varieties.

The Lansuna varieties tended to have a high moisture content so the use of flour could improve their texture. The addition of wheat flour result in a decrease in water and fat content, as well as an increase in the content of ash, protein, and carbohydrates [9]. The use of additives could result in a decreased migration of oil into the ingredients, resulting in a crispier product texture.

Tapioca starch contains approximately 17% of amylose [18], while amylose is the one that is less soluble in water. Because of the branches' amylopectin structure's capacity to hold and interact strongly with water, the batter was mushy. Coatings have an impact on starch gelatinization which can result in a crust forming on the food's surface, and the lower the moisture content, the crunchier the product will be obtained [19].

3.1.4 Taste

Consumers will evaluate all the products they consume to find out which products suit their taste preferences. Consumer evaluation of taste determines the next purchase decision, so the taste factor is very important in producing a product. Based on the results of statistical analysis, the addition of flour and $CaCl_2$ had a significant effect on the taste of fried shallots produced from 4 varieties and based on the results of the BNT test there were differences between treatments.

The taste of fried shallots of the Lansuna variety with flour does not differ markedly from some treatments of ~~Leader~~, Batu Ijo and Bima Brebes with flour, as well as the addition of CaCl2 to the varieties Batu Ijo and Bima Brebes. The use of flour and $CaCl_2$ can improve the taste of fried shallots because the use of both ingredients reduces the migration of oil to the ingredients so that the resulting fried shallots feel less greasy [10].

Some factors that affect the taste of a product include chemical compounds, temperature, concentration, and interaction with other components. The taste of a food ingredient can come from the ingredient itself and if it gets processing treatment, the taste can be influenced by the added ingredients, for example, spices (flavoring agents) [20].

3.2 Scoring Analysis and Percentage

Analysis using scoring aims to find the extent of panelists' perceptions of the treatment offered and the level of diversity through organoleptic.

3.2.1 Color

Color is one of the attributes that determine the assessment of a product being accepted by consumers or not because it is immediately seen when seeing the product presented or displayed. Based on the scoring results, the values presented in Table 2 are obtained.

Table 2. The value of perception score on fried shallots color.

Treatment	Score						Score
	2	3	4	5	6	7	
Lansuna without treatment	0.25	0.75	0.17	0.83	2.00	0.58	4.58
Lansuna with $CaCl_2$	0.08	0.50	0.67	1.67	1.50	0.29	4.71
Lansuna with tapioca	0.00	0.25	0.00	0.63	2.25	2.92	6.04
Tajuk without treatment	0.08	0.13	0.17	1.04	3.00	1.17	5.58
Tajuk with $CaCl_2$	0.00	0.00	0.33	0.83	2.25	2.63	6.04
Tajuk with tapioca	0.00	0.00	0.33	1.04	2.00	2.63	6.00
Batu Ijo without treatment	0.00	0.00	0.17	1.25	2.50	2.04	5.96
Batu Ijo with $CaCl_2$	0.00	0.13	0.17	0.42	3.75	1.46	5.92
Batu Ijo with tapioca	0.00	0.13	0.17	0.21	3.00	2.63	6.13
Bima Brebes without treatment	0.25	0.25	0.50	0.83	2.25	0.88	4.96
Bima Brebes with $CaCl_2$	0.00	0.00	0.17	1.25	2.75	1.75	5.92
Bima Brebes with tapioca	0.00	0.00	0.17	1.67	2.00	2.04	5.88
Score total							**5.64**

Notes: 7: really like; 6: like; 5: like slightly; 4: Neutral; 3: dislike slightly; 2: dislike; 1: really dislike

The results of the study in Table 2 showed that the highest color score value was found in fried shallots of the Batu ijo variety with the addition of flour (6.13). In other varieties, namely the Tajuk variety and Bima brebes with no treatment, the score value for the color parameter is smaller than that with the treatment, while in Batu Ijo it is somewhat higher in value. This result shows that the addition of flour and CaCl2 can increase the level of acceptance for the color of the product. The results of the study in Table 2 indicated that the highest color score value was found in fried shallots of the batu ijo variety with the addition of flour (6.13).

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Table 3. Percentage of panelists' perception of fried shallots color from 4 varieties.

Treatment	Score (%)						Total (%)
	2	3	4	5	6	7	
Lansuna without treatment	12.50	25.00	4.17	16.67	33.33	8.33	100.00
Lansuna with $CaCl_2$	4.17	16.67	16.67	33.33	25.00	4.17	100.00
Lansuna with tapioca	0.00	8.33	0.00	12.50	37.50	41.67	100.00
Tajuk without treatment	4.17	4.17	4.17	20.83	50.00	16.67	100.00
Tajuk with $CaCl_2$	0.00	0.00	8.33	16.67	37.50	37.50	100.00
Tajuk with tapioca	0.00	0.00	8.33	20.83	33.33	37.50	100.00
Batu Ijo without treatment	0.00	0.00	4.17	25.00	41.67	29.17	100.00
Batu Ijo with $CaCl_2$	0.00	4.17	4.17	8.33	**62.50**	20.83	100.00
Batu Ijo with tapioca	0.00	4.17	4.17	4.17	50.00	37.50	100.00
Bima Brebes without treatment	12.50	8.33	12.50	16.67	37.50	12.50	100.00
Bima Brebes with $CaCl_2$	0.00	0.00	4.17	25.00	45.83	25.00	100.00
Bima Brebes with tapioca	0.00	0.00	4.17	33.33	33.33	29.17	100.00

Notes: 7: really like; 6: like; 5: like slightly; 4: Neutral; 3: dislike slightly; 2: dislike; 1: really dislike

Table 3 showed that, based on the percentage value, the favorability rate for color was highest in the Batu Ijo variety with CaCl2 at 62.50% with a like score, followed by the treatment of Batu Ijo with flour and Tajuk without treatment. Based on the results of research and statistical analysis, there is a diversity in consumer acceptance of the color of fried shallots produced.

In addition to organoleptic tests, colors are also studied based on measurements using color paper as presented in Table 4. Table 4 shows that the color for the treatment of Batu ijo with the addition of CaCl2 is moderate orange-yellow, and the color is almost the same as the treatment of Tajuk with flour, Bima brebes with flour, and CaCl2.

Table 4. The color of fried shallot based on observations with color paper.

Treatment	Color
Lansuna without treatment	Dark reddish orange B
Lansuna with $CaCl_2$	Brownish orange B
Lansuna with tapioca	Moderate orange C
Tajuk without treatment	Brownish orange B
Tajuk with $CaCl_2$	Brownish orange C
Tajuk with tapioca	Moderate orange yellow C
Batu Ijo without treatment	Moderate orange A
Batu Ijo with $CaCl_2$	Moderate orange yellow B
Batu Ijo with tapioca	Moderate orange yellow C
Bima Brebes without treatment	Brownish orange B
Bima Brebes with $CaCl_2$	Moderate orange yellow C
Bima Brebes with tapioca	Moderate orange yellow C

3.2.2 Flavor

The test results based on the score on the level of preference for the flavor of fried shallots from 4 varieties are presented in Table 5.

Table 5. The value of perception score on fried shallots flavor.

Treatment	Score						Total score
	2	3	4	5	6	7	
Lansuna without treatment	0.00	0.13	0.33	1.04	2.00	2.33	5.83
Lansuna with $CaCl_2$	0.08	0.13	1.00	1.46	1.50	0.88	5.04
Lansuna with tapioca	0.00	0.00	1.17	1.04	1.75	1.46	5.42
Tajuk without treatment	0.00	0.13	0.17	0.63	2.75	2.33	**6.00**
Tajuk with $CaCl_2$	0.00	0.13	0.33	1.46	2.25	1.46	5.63
Tajuk with tapioca	0.00	0.25	1.17	0.63	2.25	0.88	5.17
Batu Ijo without treatment	0.00	0.00	0.17	2.29	2.25	0.88	5.58
Batu Ijo with $CaCl_2$	0.08	0.13	0.50	0.63	2.25	2.04	5.63
Batu Ijo with tapioca	0.00	0.13	0.67	1.04	1.50	2.33	5.67
Bima Brebes without treatment	0.00	0.13	0.33	1.04	2.25	2.04	5.79
Bima Brebes with $CaCl_2$	0.00	0.00	0.50	1.67	1.00	2.63	5.79
Bima Brebes with tapioca	0.00	0.13	0.50	0.63	3.00	1.46	5.71
							5.60

Notes: 7: really like; 6: like; 5: like slightly; 4: Neutral; 3: dislike slightly; 2: dislike; 1: really dislike

Table 5 shows that the panelists' perceptions of flavor ranged from "slightly like" to "like. The results of the analysis showed that the flavor score of fried shallots was highest in the Tajuk variety without treatment (6.00) and the lowest in Lansuna with $CaCl_2$ treatment (5.04). Based on the data in Table 5, it shows that for all the varieties studied, the flavor of fried

shallots without the use of additional ingredients has a higher score than the addition of $CaCl_2$ and tapioca. It indicates that the panelists prefer the natural flavor of fried shallots.

Table 6 shows that there is a diversity of panelists' perceptions of the flavor of shallots, with the highest percentage for a score of 6 of the level of preference for flavor in Bima Brebes with flour and the lowest in Bima Brebes with $CaCl_2$.

Table 6. Value Percentage of panelists' perception of fried shallot's flavor from 4 varieties.

Treatment	Score (%)						Total (%)
	2	3	4	5	6	7	
Lansuna without treatment	0.0	4.2	8.3	20.8	33.3	33.3	100.00
Lansuna with $CaCl_2$	4.2	4.2	25.0	29.2	25.0	12.5	100.00
Lansuna with tapioca flour	0.0	0.0	29.2	20.8	29.2	20.8	100.00
Tajuk without treatment	0.0	4.2	4.2	12.5	45.8	33.3	100.00
Tajuk with $CaCl_2$	0.0	4.2	8.3	29.2	37.5	20.8	100.00
Tajuk with tapioca	0.0	8.3	29.2	12.5	37.5	12.5	100.00
Batu Ijo without treatment	0.0	0.0	4.2	45.8	37.5	12.5	100.00
Batu Ijo with $CaCl_2$	4.2	4.2	12.5	12.5	37.5	29.2	100.00
Batu Ijo with tapioca	0.0	4.2	16.7	20.8	25.0	33.3	100.00
Bima Brebes without treatment	0.0	4.2	8.3	20.8	37.5	29.2	100.00
Bima Brebes with $CaCl_2$	0.0	0.0	12.5	33.3	16.7	37.5	100.00
Bima Brebes with tapioca	0.0	4.2	12.5	12.5	**50.0**	20.8	100.00

Notes: 7: really like; 6: like; 5: like slightly; 4: Neutral; 3: dislike slightly; 2: dislike; 1: really dislike

3.2.3 Taste

Table 7 shows the score of panelists' perceptions of the taste of fried shallots.

Table 7. The value of perception score on fried shallots color taste.

Treatment	Score						Total
	2	3	4	5	6	7	
Lansuna without treatment	0.00	0.50	0.33	1.88	1.75	0.58	5.04
Lansuna with $CaCl_2$	0.08	0.50	1.00	0.83	1.50	0.88	4.79
Lansuna with tapioca	0.00	0.13	0.00	0.83	1.75	3.50	6.21
Tajuk without treatment	0.00	0.13	0.33	1.25	2.75	1.17	5.63
Tajuk with $CaCl_2$	0.08	0.25	0.33	1.88	2.00	0.58	5.13
Tajuk with tapioca	0.08	0.00	0.33	0.42	2.75	2.33	5.92
Batu Ijo without treatment	0.33	0.38	0.33	0.42	2.25	1.17	4.88
Batu Ijo with $CaCl_2$	0.00	0.13	0.50	0.63	2.25	2.33	5.83
Batu Ijo with tapioca	0.08	0.13	0.00	0.21	2.25	3.21	5.88
Bima Brebes without treatment	0.08	0.50	0.33	1.46	2.00	0.58	4.96
Bima Brebes with $CaCl_2$	0.00	0.25	0.00	1.67	2.00	1.75	5.67
Bima Brebes with tapioca	0.00	0.13	0.17	1.25	2.00	2.04	5.58
							5.46

Notes: 7: really like; 6: like; 5: like slightly; 4: Neutral; 3: dislike slightly; 2: dislike; 1: really dislike

The results of the study in Table 7 show that the highest organoleptic score was found in Lansuna treatment with tapioca (6.21) and the lowest was in Lansuna treatment with $CaCl_2$ (4.79). This means that the panelists' perception of the use of tapioca in the processing of fried shallots is good, with a score ranging from slightly like to like.

The results of the analysis in Table 8 show that the highest value was found in the Lansuna treatment with tapioca treatment and the lowest in the tapioca flour with $CaCl_2$, Lansuna without treatment, and Bima Brebes without treatment. There is a diversity of panelists'

perceptions of the taste of fried shallots, with the highest percentage level in Lansuna with tapioca flour treatment.

Tabel 8. Percentage of panelists' perception of fried shallot's taste from 4 varieties.

Treatment	Score						Total
	2	3	4	5	6	7	
Lansuna without treatment	0.0	16.7	8.3	37.5	29.2	8.3	100.00
Lansuna with $CaCl_2$	4.2	16.7	25.0	16.7	25.0	12.5	100.00
Lansuna with tapioca	0.0	4.2	0.0	16.7	29.2	**50.0**	100.00
Tajuk without treatment	0.0	4.2	8.3	25.0	45.8	16.7	100.00
Tajuk with $CaCl_2$	4.2	8.3	8.3	37.5	33.3	8.3	100.00
Tajuk with tapioca	4.2	0.0	8.3	8.3	45.8	33.3	100.00
Batu Ijo without treatment	16.7	12.5	8.3	8.3	37.5	16.7	100.00
Batu Ijo with $CaCl_2$	0.0	4.2	12.5	12.5	37.5	33.3	100.00
Batu Ijo with tapioca	4.3	4.3	0.0	4.3	39.1	47.8	100.00
Bima Brebes without treatment	4.2	16.7	8.3	29.2	33.3	8.3	100.00
Bima Brebes with $CaCl_2$	0.0	8.3	0.0	33.3	33.3	25.0	100.00
Bima Brebes with tapioca	0.0	4.3	4.3	26.1	34.8	30.4	100.00

Notes: 7: really like; 6: like; 5: like slightly; 4: Neutral; 3: dislike slightly; 2: dislike; 1: really dislike

3.2.4 Texture

The results of the analysis of panelists' perceptions of texture based on the scoring system and percentages are presented in Tables 9 and 10.

Table 9. The value of perception score on fried shallots texture.

Treatment	Score						Total
	2	3	4	5	6	7	
Lansuna without treatment	0.00	0.50	0.33	1.88	1.75	0.58	5.04
Lansuna with $CaCl_2$	0.08	0.50	1.00	0.83	1.50	0.88	4.79
Lansuna with tapioca	0.00	0.13	0.00	0.83	1.75	3.50	**6.21**
Tajuk without treatment	0.00	0.13	0.33	1.25	2.75	1.17	5.63
Tajuk with $CaCl_2$	0.08	0.25	0.33	1.88	2.00	0.58	5.13
Tajuk with tapioca	0.08	0.00	0.33	0.42	2.75	2.33	5.92
Batu Ijo without treatment	0.33	0.38	0.33	0.42	2.25	1.17	4.88
Batu Ijo with $CaCl_2$	0.00	0.13	0.50	0.63	2.25	2.33	5.83
Batu Ijo with tapioca	0.08	0.13	0.00	0.21	2.25	3.21	5.88
Bima Brebes without treatment	0.00	0.25	0.00	1.67	2.00	1.75	5.67
Bima Brebes with $CaCl_2$	0.08	0.50	0.33	1.46	2.00	0.58	4.96
Bima Brebes with tapioca	0.00	0.13	0.17	1.25	2.00	2.04	5.58
							5.46

Notes: 7: really like; 6: like; 5: like slightly; 4: Neutral; 3: dislike slightly; 2: dislike; 1: really dislike

Based on the data in Table 9, it can be seen that the scoring value of the texture with the treatment of tapioca flour is the highest with a value of 6.21. This means that the level of consumer perception of this type of fried shallot is the highest. From this data, it can be seen that with the use of flour, the level of consumer perception is generally higher than with $CaCl_2$, and without treatment.

The results of the analysis in Table 10 show that the highest percentage value was found in Lansuna treatment with tapioca flour treatment and the lowest was in the canopy with $CaCl_2$, Lansuna without treatment, and Bima Brebes without treatment. This indicates that

the number of panelists who liked the tapioca treatment fried shallot Lansuna more than the other treatments.

Table 10. Percentage of panelists' perception of fried shallots's taste from 4 varieties.

Treatment	Score						Total
	2	3	4	5	6	7	
Lansuna without treatment	0,0	16,7	8,3	37,5	29,2	8,3	100,00
Lansuna with $CaCl_2$	4,2	16,7	25,0	16,7	25,0	12,5	100,00
Lansuna with tapioca	0,0	4,2	0,0	16,7	29,2	**50,0**	100,00
Tajuk without treatment	0,0	4,2	8,3	25,0	45,8	16,7	100,00
Tajuk with $CaCl_2$	4,2	8,3	8,3	37,5	33,3	8,3	100,00
Tajuk with tapioca	4,2	0,0	8,3	8,3	45,8	33,3	100,00
Batu Ijo without treatment	16,7	12,5	8,3	8,3	37,5	16,7	100,00
Batu Ijo with $CaCl_2$	0,0	4,2	12,5	12,5	37,5	33,3	100,00
Batu Ijo with tapioca	4,3	4,3	0,0	4,3	39,1	47,8	100,00
Bima Brebes without treatment	4,2	16,7	8,3	29,2	33,3	8,3	100,00
Bima Brebes with $CaCl_2$	0,0	8,3	0,0	33,3	33,3	25,0	100,00
Bima Brebes with tapioca	0,0	4,3	4,3	26,1	34,8	30,4	100,00

Notes: 7: really like; 6: like; 5: like slightly; 4: Neutral; 3: dislike slightly; 2: dislike; 1: really dislike

The panelists' acceptance of fried shallots from 4 varieties with the addition of tapioca flour and $CaCl_2$ was indicated by the level of preference for flavor, color, texture, and taste. From the analysis of the percentage of scores, the panelists most liked the taste and texture attributes with a percentage value of 50% (for a score of very like), followed by color (41.5%) and flavor (37.5%. Similar results on Palu fried shallots, that the organoleptic quality attributes most favored by the panelists were the crunch of fried shallot, then the taste and flavor [13].

Based on result of the research, it found that the use of additional ingredients of tapioca flour and $CaCl_2$ has a significant effect on the level of panelist preference for fried shallot products from the varieties of Lansuna, Tajuk, Batu ijo, and Bima Brebes. It means acceptance by panelist of fried shallot is influence by adding tapioca flour and CaCl2. The use of additional materials, especially tapioca flour in the processing of fried shallots, significantly increases the panelists' preference for organoleptic properties, so that these materials can be recommended in the processing of fried shallots on a home industry scale.

The organoleptic properties of the taste and texture of fried shallots with the addition of tapioca flour tended to be significantly different with the addition of $CaCl_2$ and without addition, but the organoleptic properties for color and flavor tended to be not significantly different. The organoleptic properties of the taste and texture of fried shallots with the addition of tapioca flour tended to be significantly different with the addition of $CaCl_2$ and without addition, but the organoleptic properties for color and flavor tended to be not significantly different. Panelists' perceptions of fried shallot products with the addition of tapioca flour and $CaCl_2$ with a scoring system generally are slightly like-to-like. The highest score of panelist preference level for the flavor of fried shallots was in the Tajuk treatment without addition (6.00), for taste was Lansuna with tapioca flour (6.21), for texture was Lansuna with tapioca flour (6.21); and for color it was Batu Ijo with flour (6.13). Lansuna local shallots are preferred both in taste and texture, because this variety is sweeter than other types of onions and the addition of flour can improve their texture.

A fried shallot is a processed product that can be an alternative when the harvest is abundant, and the price is low. The use of calcium chloride and tapioca flour can improve the quality of the fried onions produced. The fried shallot industry has quite the potential to be developed because of its ability to extend the efficiency of shallots. Furthermore, it is

capable of prospering the society surrounding the household industry, reducing the abundance of production, and maintaining market price and supply stability [21].

4 Conclusion

There is a diversity of panelists' preferences of fried shallot from slightly like to very like in Panelist perceptions, with the highest percentage value being Batu Ijo with $CaCl_2$ for the color parameter (62.5%), Bima Brebes with tapioca flour for the flavor parameter (50%), and in Lansuna with tapioca flour for texture and taste parameters (50%). The addition of tapioca flour can increase the level of panelist acceptance of the texture and taste of 4 varieties of fried shallots, compared to the use of $CaCl_2$ and without the use of additional ingredients.

References

1. E. Indrawati, H. A. Munawi, A. Suwardono, R. Santoso, Int.J for Educat and Vocational Studies **81** (2019)
2. N.A. Permatasari, I. Yuliasih, A. Suryani, J. Teknologi Indust. Pert. **272** (2017)
3. W Trisnawati, A.R.K Sari, N.K.A.T Yanti, IOP Publsh, **782** 032067 (2021)
4. W. Sun, M. Shahrajabian, Q. Cheng. J. Medicinal Plant Research. (2019)
5. A.E. Adeyemo, O. S Omoba, A. Olagunju, S. Solomon. Bul. Nat. Research Centre **4685** (2022)
6. Susanawati, M. Fauzan, Widodo, IOP Publsh. **518** 012048 (2020)
7. N.Therdthai, P. Wuttijumnong, A.Jangchud, C. Kusucharid. Kasetsart J. (Nat. Sci.) **41** (2007)
8. F. Ren, Y. Nian. C. Perussel. Food Research. Int. **132** 108953 (2020)
9. Y. Khasanah, E. R.N. Herawati, A.S. Praharasti. A. Kusumaningrum, A. Frediansyah. J. Food and Culinary. **21** (2019)
10. T.N. Ngan, N. Anuniwat, T.Q.Le, W. Jittanit. Meet.of Thai Society for Biotech. and Int. Conf. O-04. (2019)
11. Yofanda, O. C.H. Wijaya, H. N. Lioe, Sobir. Current Res in Nutrition and Food Science. **8**, 97-106 (2021)
12. Amaya dan Nickell E. Amaya, D. Nickel. Food Science, Tech, and Nutrition. Woodhead Publs 269-298 (2015)
13. N. Alam, Rostiati, Muhardi. J. Agritech, **344** (2014)
14. R. Hendayana. Persepsi dan Adopsi (IAARD Press, Jakarta (2016)
15. Wani, S. A., Sharma, V. and Kumar, P. Int. Food Research J. **244**,1407-1413 (2017)
16. S. Sabahannur, Zulkifar. J.Aplikasi Tek. Pangan. **104** (2021)
17. Kubo, M.L. Rojasb, S. Cureta, L. Boillereauxa , P.E.D. Augusto. Food and Science Tech. **89**, 610-616 (2018)
18. Elisabeth, T. Permana, E.K. Prabawati. Advances in Biologic.Sciences Research, **16** (2021)
19. R. Wibowo, C. Eminawati, P. Haryanti, Wicaksono. Food Res **4** (2020)
20. T.D.Kusuma, T.I.P.Suseno, S.Surjoseputro**.** J.of Food Tech.and Nutr. **121**,17-28 (2013)
21. Astuti. Academic Research International. **92** (2018)