



Standing Pouch Packaging On Red Chili Puree During Storage

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Abstract. Standing pouch packaging is a flexible type of packaging, and this lack of rigidity affords numerous benefits. The objective of this research was to conducted the effect of red chili puree on using standing pouch packaging types to the good quality of red chili puree during storage. Research was conducted used a factorial completely randomized design, consisted of the types standing pouch packaging (plastic transparant, aluminium foil full window, combination of plastic and aluminum foil, plastic window and paper kraft window) and storage time for 24 days. Fresh curl red chili used for making puree. Research showed that the various types of standing pouch packaging can be used for red chili puree during storage. Standing pouch packaging of red chili puree affected the quality of product mainly moisture content, pH, Total soluble solids, vitamin C and the color of puree. Research conduced that: Standing pouch of Aluminium foil full window storage was the best packaging for for 16 days because of the quality of red chili puree for moisture content of 85,52%, pH of 3,91, total soluble soil of 8,7 oBrix, vitamin C of 111,96 mg/100g and light red yellow color.

Keywords: Standing Pouch · Packaging · Storage · Red Chilli Puree

1 Introduction

Chili is a horticultural commodity that has a fairly high economic value in Jambi Province. Consuemen interest in the commodity of red chili is due to its use in daily life as a kitchen spice or spices in adding the taste of a food. According to the Central Statistics Agency (2020) the level of consumption of red chili in Jambi Province is quite high, reaching an average consumption per capita of 0.41 kg per month.

The spicy taste it causes can increase appetite and appetite. Since chili is widely known by the public, almost every food in Indonesia includes chili as a flavoring in food. Generally, Indonesian people consume chili that has been processed such as chili paste, chili sauce, chili puree, chili powder, and ground chili. Processing red chili into a practical product, with a high selling value, one of which is chili puree. Puree is a product that is easy to use and has the original color and taste in a semi-solid form [1].

Chili puree is crushed chili fruit in the form of semi-solid pulp which is processed with the addition of water and other additives. Red chili puree is a general term used

for processed foods that have been mashed and pasteurized. Chili puree is a product that can maintain color and taste in a semi-solid form, has a quality that is close to fresh quality. Chili puree can be used directly in cooking or in food preparations for household purposes and as a base for sauces and other food production. Puree packaging usually uses various types of vacuum-packed plastic, jar bottles, and standing pouches.

Packaging is an activity to protect the freshness of the product in the process of transportation, distribution and or storage so that product quality is maintained. The function of packaging is to protect the commodity from physical, mechanical and microbiological damage, so that it can create attractiveness for consumers and provide added value to the product and extend the shelf life of the product.

Food packaging in the form of a standing pouch made of paper metal is a material made of layers of paper (paper) and metalized or aluminum foil (alufo). This metalized layer prevents liquids and oils from penetrating the outer surface of the packaging, and protects the product from moisture, air, odor, light, and microorganisms and is suitable for packaging food products. Paper metal packaging is able to package products properly and safely [2]. Foil is a sheet of metal material that has a thickness of less than 0.15 mm. This packaging has an important position in packaging, because the surface is shiny and attractive to look at. Foil which has a thickness between 0.0375 – 0.1125 mm is used to make semi-rigid packaging. Aluminum foil has good waterproof properties, the surface can reflect light so that its appearance is attractive, not affected by light, resistant to high temperatures up to 290 °C, tasteless, odorless, non-toxic and hygienic. Foil packaging can be used to package bread, frozen foods, medicines, pharmaceuticals, chemicals, hygroscopic foods, jams, jams and sauces. When used to package food, the foil is usually placed on the inside, but if it is for decorative purposes, the foil is placed on the outside [3].

The use of plastic as a packaging material has the advantage compared to other packaging materials because it is light, transparent, strong, thermoplastic and selective in plastic permeability to water vapor and air, causing plastic to play a role in regulating the humidity of the storage space. The selection of packaging materials in the form of plastic from polypropylene (PP) because this type has a lightweight, easy to form, transparent, has the strength of a larger pull and is more rigid and is not easily torn so that it can be used in the subscription and distribution of chili and other food products [4]. The use of cardboard packaging can maintain the quality of chili for better than mesh packaging and plastic sacks at a temperature of 10 °C to 17 days of storage.

Based on research by Renate, regarding the packaging of red chili puree with various types of plastic that was vacuum-packed for 2 months, it show the effect on red chili puree that was stored still showed good red chili puree quality [5]. In addition, red chili puree storage for up to 9 weeks gave the best results during storage [6].

The objective of this research was to conducted the effect of red chili puree on using standing pouch packaging types to the good quality of red chili puree during storage.

2 Method

Research was conducted in Mei-September 2022 at the Laboratory of Analysis and Processing of Agricultural Products, Department of Agricultural Technology, Faculty of Agriculture, Jambi University.

Completely Randomized Design (CRD) which was arranged in a factorial pattern consisting of the type of standing pouch packaging and storage time.

Making Red Chili Puree (Renate, 2009). The red chili used is local curly red chili which has been washed and then blanched at 80°C for 3 min. After draining, the chili is crushed using a blender with a ratio of water and red chili which is 2:3 with additional ingredients of sodium benzoate, citric acid, and natrium chloride of 0,1%, 1% and 2.5% respectively. The result of crushing chili is called puree. Then the chili puree was heated at a temperature of 80°C for 3 min and then filled into a standing pouch plastic packaging of 150 g each, then the puree was stored at room temperature for observation and analysis with storage times of 0 until 24 days. Data obtained was analyzed statistically with ANOVA using a variance of 5% and 1%. If it is significantly different, it is continued with the DNMRT test at the 5% level.

3 Result and Discussion

Moisture Content

The results of the analysis of variance showed that the combination of various types of standing pouch packaging and storage time had no significant effect on the moisture content of red chili puree. Moisture content of red chili puree can be seen at Table 1.

Moisture content is the water content of a material and is expressed in percent (%). The water content of red chili puree during storage has stable during the storage period. Based on the Table 2, the range value of moisture content on all types of packaging and storage time of red chili puree were 82–84%. The average value for the moisture content of chili puree is in the treatment of aluminium foil full window standing pouch packaging, which is 85.52%. According to Gould in Renate (2009), the puree water content of the finished product ranges from 76–92%. This shows that the quality of red chili puree using various variants of standing pouch packaging shows the best water content value. Storage time of 16 days was better moisture content for all kind of standing pouch packaging, however aluminium foil full window standing pouch packaging was better due tue the quality of red chili puree. Microbial activity in foodstuffs can also cause changes in water content in food products and microbes produce H2O or water vapor as a metabolic product. High water content in food is a good medium for the growth and activity of microorganisms [7].

Table 1. Moisture Content of Red Chili Puree using Standing Pouch Packaging during Storage

Standing Pouch Packaging	Moisture content on the Storage days (%)						
	0	4	8	12	16	20	24
Plastic transparant	83,55	83,55	83,69	83,00	84,78	84,72	83,72
Aluminium foil full window	83,55	83,55	83,36	83,32	85,52	83,73	83,18
Aluminium Combination	83,55	83,55	83,09	82,18	84,34	84,24	82,83
Plastic window	83,55	83,55	84,53	83,17	85,44	84,71	81,26
Paper kraft window	83,55	83,55	83,37	82,76	84,26	84,44	83,78

Table 2. pH Value of Red Chili Puree using Standing Pouch Packaging during Storage

Standing Pouch Packaging	pH on the Storage days						
	0	4	8	12	16	20	24
Plastic transparent	3,80 ^a	3,82 ^a	3,81 ^a	3,78 ^a	3,87 ^a	4,13 ^a	3,40 ^a
Aluminum foil full window	3,80 ^a	3,84 ^a	3,85 ^a	3,82 ^a	3,91 ^a	4,01 ^a	3,79 ^b
Aluminium Combination	3,80 ^a	3,85 ^a	3,86 ^a	3,83 ^a	3,61 ^a	3,78 ^b	3,76 ^b
Plastic window	3,80 ^a	3,87 ^a	3,92 ^a	3,80 ^a	3,88 ^a	3,87 ^b	3,77 ^b
Paper kraft window	3,80 ^a	3,88 ^a	3,94 ^a	3,70 ^a	3,98 ^a	3,85 ^b	3,74 ^b

PH Value

The combination of standing pouch packaging and storage time had no significant effect on the pH of red chili puree. However, storage time has a significant effect on the pH of red chili puree, which can be seen in Table 2.

The effect of pH is one of the important indicators in the principle of food preservation. This is because pH is related to microbial survival, with the lower the pH, the food will be more durable because spoilage microbes cannot live. Based on the level of acidity, food products are often grouped into acidic food if ($\text{pH} < 4$) and low acid food if (> 5).

If we look at the effect of packaging on the pH of chili puree, it shows that treatment using various variants of standing pouch shows a decrease in pH. The decrease in pH was due to the degradation of carbohydrate compounds during storage into organic acids. The increased acid content causes the pH to decrease. This is in line with the results of research from Sulistyaningrum et al., (2015). The longer the storage, the metabolic reactions caused by the activity of microorganisms that break down sucrose into organic acids will occur.

Total Soluble Solid

The results of the analysis of variance showed that the combination of standing pouch packaging and storage time had no significant effect on the total soluble solids of red chili puree. The effect of standing pouch packaging type and storage time on total dissolved solids can be seen in Table 3.

Total Soluble Solid shows the amount of dissolved materials in the solution. The components contained in chili are water-soluble components, including glucose, sucrose, fructose and water-soluble pectin/protein. Based on the results in Table 4 shows that the total soluble solids value of red chili puree during storage ranged from 7.11 to 8.00. According to Gould in Renate puree has a total dissolved solids ranging from 8–24%. Total solids are components of materials (proteins, fats, carbohydrates, minerals, color pigments, vitamins, etc.) that accumulate [5]. Total solids is the dissolved solids in the form of Ions or compounds in water, so that the total solids are influenced by compounds that are soluble in water and the water content of the material. During storage, the water content of red chili puree did not change significantly so that the total dissolved solids did not change significantly during storage. According to Imran, the total solids of chili sauce during storage is influenced by the water content of red chili sauce [8]. The total

Table 3. Total Soluble Solid of Red Chili Puree using Standing Pouch Packaging during Storage

Standing Pouch Packaging	Total Soluble Solids on the Storage days (%brix)						
	0	4	8	12	16	20	24
Plastic transparent	8,7 ^a	8,5 ^a	8,1 ^a	8,1 ^b	7,5 ^a	7,05 ^a	7,8 ^a
Aluminum foil full window	8,7 ^a	8,6 ^a	8,4 ^a	8,8 ^b	8,7 ^b	8,9 ^b	8,9 ^b
Aluminium Combination	8,7 ^a	8,5 ^a	7,9 ^a	8,9 ^b	8,9 ^b	8,1 ^b	8,8 ^b
Plastic window	8,7 ^a	8,4 ^a	8,3 ^a	8,7 ^b	8,6 ^b	8,2 ^b	8,4 ^b
Paper kraft window	8,7 ^a	8,7 ^a	8,8 ^a	9,2 ^a	8,9 ^b	8,9 ^b	9,0 ^c

soluble solids of red chili puree during storage is influenced by the content of soluble compounds such as simple sugars, which occur due to the breaking of long chains of carbohydrate compounds into soluble sugar compounds.

Vitamin C

The results of the analysis of variance showed that the combination of standing pouch packaging and storage time had no significant effect on red chili puree vitamin C. However, storage time has a significant effect on vitamin C puree of red chili, which can be seen in Tabel 4.

Based on the data in Table 4. The highest average vitamin C content was in the mixed type of standing pouch packaging during 6 weeks of storage, which was 105.60 mg. The lowest level of vitamin C was obtained in the treatment of standing pouch aluminum foil packaging for 6 weeks of storage at 77.44 mg.

It can be seen that the average value of standing pouch packaging with various variants in the vitamin C level test ranges from 132.00 to 144.82. The decrease in the value of the packaging has no significant effect on vitamin C. Based on the data in the table, the storage time of red chili puree has a significant effect on vitamin C with the

Table 4. Vitamin C of Red Chili Puree using Standing Pouch Packaging during Storage

Standing Pouch Packaging	Vitamin C content on the Storage days (mg/100g)						
	0	4	8	12	16	20	24
Plastic transparant	450,26 ^a (A)	450,26 ^a (B)	252,34 ^a (C)	48,92 ^a (D)	80,63 ^a (D)	91,16 ^a (D)	76,90 ^a (D)
Aluminum foil full window	450,26 ^a (A)	450,26 ^a (B)	251,63 ^a (C)	31,59 ^a (E)	111,96 ^b (D)	122,74 ^b (D)	133,20 ^b (D)
Aluminium Combination	450,26 ^a (A)	450,26 ^a (B)	263,81 ^a (C)	132,96 ^b (D)	83,68 ^a (E)	115,40 ^b (D)	101,29 ^b (D)
Plastic window	450,26 ^a (A)	450,26 ^a (B)	198,9 ^a (C)	62,92 ^a (D)	70 ^a (D)	59,67 ^a (D)	73,67 ^a (D)
Paper kraft window	450,26 ^a (A)	450,26 ^a (B)	159,55 ^a (C)	115,09 ^b (E)	84,16 ^a (D)	73,80 ^a (D)	59,40 ^a (D)

average value obtained at 0 weeks, which is 183.04, while at 6 weeks, it is 89.76. The longer the storage, the value of the vitamin C content in chili puree decreases.

Factors that cause damage to vitamin C are storage time which results in the oxidation of vitamin C and changes in oxygen concentration. Similarly, the length of storage will affect the value of vitamin C, the longer the storage, the value of vitamin C will decrease. The decrease in vitamin C occurs in the washing process during sorting and heating during blanching, so that when stored at a certain time vitamin C will continue to decrease.

During storage, the content of vitamin C in red chili puree decreased continuously until it became damaged. This is caused by the process of respiration and oxidation of vitamin C to L- dehydroascorbic acid and undergoes further changes to L-diketogulonic acid which does not have vitamin C activity. The content of vitamin C in chili Big red decreased up to 15% if stored at 4 °C for 20 days. The decrease in vitamin C levels is fastest at room temperature, this is because at room temperature environmental conditions cannot be controlled such as the presence of heat and oxygen so that the fruit ripening process runs perfectly.

Color

The results of the analysis of variance showed that the combination of standing pouch packaging and storage time had a significant effect on the brightness level (L^*) and the degree of hue in the puree color. Red chili pepper. The effect of standing pouch packaging and storage time can be seen in Table 5. The brightness level (L^*) of red chili puree during storage decreased. Based on the type of packaging used, standing pouch with aluminum foil packaging type got a very high brightness level (L^*) from the others, namely 32.15. While the value with a low brightness level (L^*) is in the standing pouch packaging with the type of paper packaging.

The longer the storage, the lower the brightness level (L^*) of red chili puree, at the brightness level (L^*) 0 weeks of storage is 32.89 after 6 weeks of storage the brightness level (L^*) has decreased to 30.26.

The degree of Hue is a color characteristic based on the light reflected by the object. The value of the degree of Hue puree of red chili using different types of standing pouch packaging increased and decreased. The types of packaging that experienced an increase tended to be stable from the initial storage of 0 weeks to 6 weeks in the mixed standing pouch packaging type with values ranging from 50.91 to 57.72 with a description of the resulting color, namely yellow red (YR). While the highest value based on storage time is in the ordinary standing pouch packaging type with a value of 58.04 with a description of the resulting color, namely yellow red (YR).

4 Conclusion

Research conducted that:

1. The various types of standing pouch packaging can be used for red chili puree during storage.
2. Standing pouch packaging of red chili puree affected the quality of product mainly moisture content, pH, Total soluble solids, vitamin C and the color of puree.

Table 5. Color of Red Chili Puree using Standing Pouch Packaging during Storage

Standing Pouch Packaging	Color	Color on the Storage days (%)						
		0	4	8	12	16	20	24
	L	44,5	44,5	43,2	42,4	41,6	41,2	40,9
Plastic transparant	a*	+ 21,1	+ 21,1	+ 18,3	+ 15,7	+ 15,9	+ 14,6	+ 15,1
	b*	+ 26,5	+ 26,5	+ 24,9	+ 23,8	+ 22,9	+ 22,5	+ 22,6
Aluminum foil full window	L	44,5	44,5	43,9	42,5	42,0	42,7	42,5
	a* b*	+ 21,1	+ 21,1	+ 19,0	+ 18,5	+ 19,4	+ 19,2	+ 19,3
		+ 26,5	+ 26,5	+ 26,2	+ 24,9	+ 24,3	+ 24,2	+ 24,8
Aluminium Combination	L	44,5	44,5	43,9	43,2	42,3	43,2	41,4
	a* b*	+ 21,1	+ 21,1	+ 19,7	+ 15,0	+ 19,6	+ 19,5	+ 17,6
		+ 26,5	+ 26,5	+ 26,0	+ 22,4	+ 24,7	+ 24,7	+ 23,4
	L	44,5	44,5	43,2	42,0	40,9	42,1	41,0
Plastic window	a*	+ 21,1	+ 21,1	+ 19,3	+ 15,8	+ 15,7	+ 15,3	+ 15,1
	b*	+ 26,5	+ 26,5	+ 25,4	+ 23,8	+ 22,8	+ 23,3	+ 22,9
Paper kraft window	L	44,5	44,5	43,1	42,7	40,9	41,6	41,30
	a* b*	+ 21,1	+ 21,1	+ 19,0	+ 16,4	+ 16,0	+ 14,8	+ 15,5
		+ 26,5	+ 26,5	+ 25,4	+ 24,6	+ 22,7	+ 23,0	+ 23,3

3. Standing pouch of Aluminium foil full window storage was the best packaging for 16 days because of the quality of red chili puree for moisture content of 85,52%, pH of 3,91, total soluble soild of 8,7 oBrix, vitamin C of 111,96 mg/100g and light red yellow color.

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