

Study of Characteristics of White Corn Birdlime *Dodol* in Term of Flour and Packaging

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Abstract

Indonesia has so many traditional foods processed from corn which is a specific menu of wealth to be preserved, one of which is processed Dodol. Dodol which has been known to the public is a raw material Dodol sticky rice, sweet corn and other varieties of fruit. Dodol white corn birdlime still rarely found in the market. Nutritional content of corn grain sticky rice is no less than other corn such as levels of protein, crude fiber, fat, and carbohydrates, especially high amylopectin so characteristic Dodol produced more sticky and chewy. This study aims to investigate the characteristics of sticky white corn Dodol seen from a comparison of corn flour and glutinous rice flour as well as the use of some packaging materials. The most appropriate to produce corn Dodol most good. From the research it can be concluded that the characteristics of birdlime white corn Dodol obtained are the water content ranged from 14.03% - 17.05%, protein levels ranged between 2.51% - 4.10%, carbohydrate levels ranged between 64.73% - 71.64%, fat content ranged from 8.81% - 12.14%, ash content ranged from 1.91% - 2.47%, pH ranges between 7.02% - 7.52%, while the organoleptic assessment result (3.00% - 4.73%) with criteria rather dislike to normal. Packaging materials used in birdlime white corn Dodol is banana leaves, corn husks, and plastic. Characteristics Dodol of birdlime white corn is best in terms of the packaging material in this research is to use plastic packaging materials with a moisture content of 14.03%, 4.10% protein content, carbohydrate content of 71.64%, 12.14% fat content, ash content of 2.48%, pH of 7.52, while on the organoleptic assessment, among others: the color with a value of 4.40, the aroma of 4.47, 4.73 flavor, texture 4.27%, the highest in the overall acceptance of plastic with a value 4.53. From the results of this study suggested further research needs to be done about birdlime Dodol white corn and storage of packaging materials and to determine the shelf life thus increase the selling Dodol of birdlime white corn in the market.

Keyword: Birdlime; characteristic; *dodol*; packaging

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1. Introduction

Corn is a pretty important requirement for human life and is a commodity food crops in Indonesia a potential second after rice. It is used not only as a food ingredient that is consumed directly but also as fodder and raw materials industry [1]. Aside from being a source of carbohydrates, corn is also an excellent source of protein, fiber, essential fatty acids, isoflavones, minerals (Ca, Mg, K, Na, P, Ca and Fe), anthocyanin, beta-carotene (provitamin A), the composition of the essential amino acids, and more. Corn as an ingredient in food will be more attractive to consumers, particularly those concerned with healthy food, at affordable prices for all walks of life. Various traditional foods processed from corn, making it a prospective local food diversification. A touch of food technology will enhance the status of corn-based traditional food of inferior being superior. This begins from the selection of materials, sanitation awake, stages of processing standard that can prevent damage to functional food compound. Furthermore, the product needs to be packaged in such a way to promote traditional food with a specific, unique, and follow the products that are currently popular, has a value of competitiveness in the market

share and can be kept in quite a long time. Indonesia has so much diversity of corn-based traditional food which is a wealth of specific menu that needs to be preserved. Corn can be processed into corn on the cob, roasted corn, corn, corn juice milk, corn fritters, ice cream and other snacks that don't need a long time in storage [2]. Whereas dried corn chips, and are usually made of flour. The utilization of maize in the form of flour more perspective, because it can be used for various processed products which cannot be made from wheat [2].

In addition to the above, processed corn which is a highly nutritious foodstuff, processed into refined one which is already known, namely Dodol. Dodol that had known a lunkhead is made of sticky rice, sweet corn, and various kinds of fruit. White corn birdlime Dodol still rarely found in the market. Dodol is made from white corn flour or corn birdlime glutinous mixed sugar and coconut milk. The nutrition content of maize seeds birdlimes no less than any other, except corn amylose. Coarse fiber, protein, fat, and carbohydrates in corn seed birdlime quite sufficient to be developed as a food ingredient. Glutinous corn or cereals which constitute the birdlime containing amylopectin high. so characteristic Dodol generated more sticky and chewy. Views from raw Dodol, that the dominant major components are carbohydrates in addition to fiber, protein, and fat. Therefore the white corn birdlime Dodol has the potential to be developed in a high Research objective: To know the characteristics of the white corn birdlime Dodol comparison of corn flour and glutinous flour as well as the use of some food packaging. To determine the comparative amount of glutinous flour and adding corn flour that is most appropriate to produce the best corn Dodol. The benefits of the research: Know the comparison the amount of flour is most appropriate, as well as packing materials in determining the characteristics of white corn birdlime Dodol. From the results of this study could be useful for the community a great deal about the making of white corn birdlime Dodol with good characteristics.

2. Material and Methods

Research methods This study a randomized complete design (RCD) consisting of two factors and 3 times repeats consisting of: Factor 1: comparison of Glutinous Flour and corn flour (H1:75% glutinous flour : corn flour 25%, H2:50% glutinous Flour: corn flour 50%, H3:25% glutinous Flour: corn flour 75%, H4:100% corn flour 50%). Factor 2 is Packaging (L1: Banana leaf, L2: Corn skin, L3: Plastic). From the treatment, combination treatment is 36.

Stages of research are as follows: the preparation of All the necessary materials and tools to be used and prepared and weigh. the process of ripening after all materials and tools were prepared, heat the coconut milk, brown sugar, granulated sugar, pandan leaves, and vanilla until sugar melts. Input flour already melted with coconut milk. Stir continuously until mixture is not sticky or Kalis. Cooking takes time during 3-4 hours with a temperature of 60 0C. Cooling once cooked, Dodol already so in store in containers or molds are clean and allowed a day. Packing after cold lunkhead printed packaging materials are packed in the past with shapes and sizes according to taste. And stored in a clean place. Lunkhead corn. Ready to be analyzed. Figure out the effects of each treatment then carried out observations objectively (moisture content, protein, ash levels, the levels of carbohydrates, fat content, pH, and the Save) and observations of subjectively (aroma, taste, the texture, color, and overall admissions). Data processing and data analysis conducted after the data is collected, tabulated, and analysis with your table variety, if obtainable influence real treatment or a very real test with the smallest real difference test [3]. for the data that are obtained subjectively when there is an analysis of the influence of variety fingerprints obtained a real treatment or a very real test followed by the Duncan.

3. Results and Discussion

The results of the research on the substitution of corn flour and Glutinous Flour as well as Packaging Materials against the resulting Lunkhead, characteristics of Objective testing (moisture content, the levels of carbohydrates, Protein, fat content, levels, levels pH, and save) and observations of subjectively (Aroma, taste, texture, color and Overall Admissions):

Objective observation

Moisture content

Based on the results of the analysis prints range median value – average moisture content that glutinous flour substitutes and flour corn showed no effect on real ($P>0.05$), packaging material treatment showed no effect on real ($P>0.05$), as well as interaction between the two so that the treatment has no effect on real ($P>0.05$). Lunkhead moisture can be seen in Table 1.

Moisture content ranges from Lunkhead 14.03%-17.05%. The highest water levels obtained at the treatment comparison of corn flour and glutinous flour 0%: 100% and the packaging material is banana leaves (L1) with a value of 17.05%, while the lowest moisture content obtained at treatment comparison of glutinous flour and flour corn 50%: 50% and the packaging material is plastic (L3) 14.03% value. Foodstuffs that have a relatively high moisture content will likely damage faster than food that has a lower moisture content [4] water content in foodstuffs also serves in terms of determining the level of acceptance, power, and freshness of the product is durable. Most of the changes the chemistry and biochemistry of foodstuffs derived from the media of water in such materials [5]. The results of the measurement of the water content of the resulting ranges between lunkhead 14.03%-17.05%. That range was still on The range was still in the range of food storage stability, wet spring that encouraged i.e. 20% based on SNI 01-2986-1992 Department of an industry.

Table 1
The influence of the substitution of glutinous flour and corn flour as well as of packaging materials against moisture Dodol (%)

s	packaging			average
	Banana leaf	Corn skin	Plastic	
75%:25%	16.32	15.31	15.40	15.68
50%:50%	14.15	15.06	14.03	14.41a
25%:75%	15.36	14.56	15.73	15.22ab
0%:100%	17.05	16.84	16.31	16.73b
average	15.72	15.44	15.37	

Description: the same letters in addition to the average value on the same row or column shows the difference that it is not real ($P>0.05$)

The levels of the Protein

Based on the results of the analysis prints range indicates that the substitution of glutinous flour and cornstarch has no effect on real ($P>0.05$) against the protein from Lunkhead, materials used in packaging Lunkhead has no effect real ($P>0.05$) against protein Lunkhead, and there is no interaction between the two so that the treatment has no effect on real ($P>0.05$). Lunkhead protein can be seen in Table 2.

Protein levels in the lunkhead ranged between 2.51%-4.10%. The highest protein levels were obtained at the treatment comparison of glutinous flour and corn flour 0%: 100% plastic packaging and materials (L3) with a value that is of 4.10%, while the lowest protein levels obtained at treatment comparisons of sticky rice and flour corn flour 75%: 25% of packaging materials and the banana leaf (L1) with a value that is of 2.51%. It can be said that in comparison of glutinous flour and corn flour treatment 0%: 100% with plastic packaging materials experienced an increase, while decreases in the treatment of 75%: 25% of packaging material with banana leaves. The high protein content will also determine the quality of the food itself because proteins contain nitrogen (N) that are not owned by fat or carbohydrates [5]. If seen from the requirement of SNI to lunkhead i.e. protein content of at least 3%, then the protein content in the lunkhead meets the requirements.

Table 2
The influence of the substitution of glutinous flour and corn flour as well as of packaging materials against protein content Dodol (%)

Comparison of glutinous starch and corn flour	packaging			average
	Banana leaf	Corn skin	Plastic	
75%:25%	2.51	2.78	2.91	2.73a
50%:50%	3.23	3.39	3.35	3.32b
25%:75%	3.29	3.31	3.47	3.36b
0%:100%	3.57	3.67	4.10	3.78c
average	3.15a	3.29ab	3.46b	

The levels of Carbohydrates

Based on the results of the analysis prints range indicates that the substitution of glutinous flour and cornstarch has no effect on real ($P>0.05$) against the level of carbohydrates of Dodol, materials used in the packaging, not Dodol the real effect ($P>0.05$) on the level of carbohydrate Lunkhead. And there is no interaction between the two so that the treatment has no effect on real ($P>0.05$).

Table 3
The influence of the substitution of glutinous flour and cornstarch packaging material as well as against levels of carbohydrate Dodol (%).

Comparison of glutinous starch and	packaging			average
	Banana leaf	Corn skin	Plastic	
75%:25%	70.45	69.82	69.61	69.96b
50%:50%	71.09	69.36	71.64	70.70b
25%:75%	70.59	70.17	69.00	69.92b
0%:100%	69.88	64.74	66.22	66.95a
average	70.50	68.52	69.12	

Description: the same letters in addition to the average value on the same row or column shows the difference that it is not real ($P>0.05$)

Carbohydrate levels (Table 3) with ranged between lunkhead 64.74%-71.64%. The highest CARB levels obtained at treatment comparison of glutinous flour and corn flour 50%: 50% and plastic packaging materials (L3) with a value of 71.64%, while the lowest CARB levels obtained at treatment comparison of flour sticky rice and corn flour 0%: 100% corn skin packaging and materials with a value of 64.74%. Thus treatment comparison of glutinous flour and corn flour and packaging materials do not significantly affect the levels of carbohydrates.

The fat content

Based on the results of the analysis prints range indicates that the substitution of glutinous flour and cornstarch has no effect on real ($P>0.05$) against the fat content of the Lunkhead, materials used in packaging do not affect real Lunkhead ($P>0.05$) of fat levels. And there is no interaction between the two so that the treatment has no effect on real ($P>0.05$). Fat content can be viewed in Table 4.

Table 4

The influence of the substitution of glutinous flour and corn flour as well as packaging materials against lunkhead fat content (%)

Comparison of glutinous starch and corn flour	packaging			average
	Banana leaf	Corn skin	Plastic	
75%:25%	8.82	10.10	10.10	9.67a
50%:50%	9.47	10.14	8.94	9.52a
25%:75%	8.50	9.91	9.29	9.23a
0%:100%	10.11	12.15	10.95	11.07b
average	9.23a	10.58b	8.07ab	

Description: the same letters in addition to the average value on the same row or column shows the difference that it is not real ($P>0.05$)

Lunkhead fat levels ranged from 8.81%-12.14%. The highest fat content obtained at treatment comparison of glutinous flour and corn flour 0%: 100% skin packaging materials and corn (L2) with a value of 12.14%, while the lowest fat content obtained at treatment comparisons of sticky rice and flour corn flour 25%: 75% of packaging materials and the banana leaf (L1) with value 8.50%. The fat content in the lunkhead of use of coconut milk in the making of Dodol. The use of coconut milk in the making of Dodol in addition to dissolving the glutinous rice flour and sugar also has an important role to produce fat so lunkhead has taste delicious and the texture of the Kalis.

The results of the analysis showed that a variety of prints, there is no real difference against the resulting lunkhead fat levels for the entire treatment. This is because any treatment being given the same amount of coconut milk that is 200 ml each treatment so that fat levels did not differ markedly at each treatment. This is in accordance with the opinion of the [6], that more and more coconut milk is added then the quality of the lunkhead making good, i.e. the tastier and the more gentle. If seen from the requirement of SNI to Lunkhead namely fat content of at least 3%, then the fat content in the lunkhead meets the requirements.

The Ash Levels

Based on the results of the analysis prints range indicates that the substitution of glutinous flour and cornstarch has no effect on real ($P>0.05$) against the ash levels of Dodol, materials used in packaging

Lunkhead has no effect on real ($P>0.05$) against the ash levels of Dodol. And there is no interaction between this two treatment so as not to effect real ($P>0.05$). The ash levels can be seen in Table 5.

Table 5

The influence of the substitution of glutinous flour and corn flour as well as packaging materials against the ash levels Dodol (%)

Comparison of glutinous starch and	packaging			average
	Banana leaf	Corn skin	Plastic	
75%:25%	1.91	1.98	1.98	1.96a
50%:50%	1.94	2.07	2.03	2.01a
25%:75%	2.26	2.06	2.16	2.16a
0%:100%	2.41	2.48	2.44	2.44a
average	2.13 a	2.15a	2.15a	

Description: the same letters in addition to the average value on the same row or column shows the difference that it is not real ($P>0.05$)

Ash levels lunkhead ranged from 1.91%-2.48%. The highest levels of ash obtained at treatment comparison of glutinous flour and corn flour 0%: 100% skin packaging materials and corn (L2) with a value of 2.48%, while the lowest levels of ash obtained at treatment comparisons of sticky rice and flour corn flour 75%: 25% of packaging materials and the banana leaf (L1) with a value of 1.91%. Ash levels decline in corn caused by his old lunkhead factor ripening associated with the addition of glutinous rice flour. According to [7], that the gelatinization starch occurs because of ripening in the presence of water. On the composition of coconut milk corn lunkhead given for each treatment is the same, so that with the addition of glutinous rice flour, then gelatin will be a long process. With long cooking then the content of the various ash will be lost. According to [8], that in a small cooking can affect calcium on food whereas iron dissolves easily in water.

The pH levels

Based on the results of the analysis prints range indicates that the substitution of glutinous flour and cornstarch has no effect on real ($P>0.05$) against the pH levels of the Lunkhead, packaging that is used on a real had no effect ($P>0.05$) against pH levels of Dodol. And there is no interaction between the two so that the treatment has no effect on real ($P>0.05$). Lunkhead pH levels can be seen in Table 6.

Table 6

The influence of the substitution of glutinous flour and corn flour as well as packaging materials against lunkhead pH levels (%)

Comparison of glutinous starch and corn	packaging			average
	Banana leaf	Corn skin	Plastic	
75%:25%	7.44	7.42	7.52	7.46c
50%:50%	7.23	7.25	7.26	7.25b
25%:75%	7.13	7.13	7.17	7.14ab
0%:100%	7.10	7.02	7.05	7.06a
average	7.23a	7.21a	7.25a	

Description: the same letters in addition to the average value on the same row or column shows the difference that it is not real ($P>0.05$)

Lunkhead pH levels ranged from 7.02%-7.52%. The highest pH levels obtained at treatment comparison of glutinous flour and corn flour 75%: 25% and plastic packaging materials (L3) with a value of 7.52%, while the lowest pH levels obtained at treatment comparison of glutinous flour and corn flour 0% : 100% skin packaging materials and corn (L2) with the value amounting to 7.02%. The measurement of the value of the degree of acidity (pH) will be conducted to find out the levels of acidity and the freedom of a food. So by knowing the pH of the material will be biased to determine the microbiological life in the processed lunkhead. In General, microorganisms can grow in a pH value of the foodstuff in the range 6.0 – 8.0. But some microorganisms in certain foodstuffs such as yeasts and lactic acid bacteria can grow well in the range of pH value of 3.0 – 6.0 and is often referred to as *Asidofil* [9].

The time Save

The purpose of this corn lunkhead storage is to know the shelf life of Dodol corn. Dodol corn that is experiencing storage, looks change, among others, the growth of mold and change the smell of rancid. Overall data from these changes as we get time storage, presented in Table 8 below.

Table 7

Table Age Save Lunkhead Stored at room temperature

Treatment	Day-to	Mold growth	The smell of rancid
H1L1	7-14	positive	positive
H1L2	14-17	positive	positive
H1L3	21-30	positive	positive
H2L1	7-18	positive	positive
H2L2	15-19	positive	positive
H2L3	22-29	positive	positive
H3L1	7-12	positive	positive
H3L2	13-16	positive	positive
H3L3	19-25	positive	positive
H4L1	7-10	positive	positive
H4L2	11-16	positive	positive
H4L3	12-20	positive	positive

Table 8

Age Save Lunkhead Stored On Cold Temperatures

Treatment	Day-to	Mold growth	The smell of rancid
H1L1	1-4	Negative	Negative
H1L2	1-4	Negative	Negative
H1L3	1-4	Negative	Positive
H2L1	1-4	Negative	Negative
H2L2	1-4	Negative	Negative Positive
H2L3	1-4	Negative	Negative
H3L1	1-4	Negative	Negative
H3L2	1-4	Negative	Positive
H3L3	1-4	Negative	Negative
H4L1	1-4	Negative	Negative
H4L2	1-4	Negative	Positive
H4L3	1-4	Negative	Negative

Chemical changes, physical and microbiology which occurs on corn lunkhead allegedly caused the occurrence of the transfer of water vapor between lunkhead with the surrounding environment. According to [10], several factors influencing the movement of water vapor contained in food into the air around it is the moisture content of food constituents, composition, temperature, and humidity. Storage is done at room temperature that ranges between 26-28 ° C and the cold temperature in the range (-10 c)-(-20 c) in addition, the storage environment conditions contributing to the growth of mold. Mold that grows on this can be caused by a lunkhead presence of mold contamination, which can occur when the production process, packaging, or the time of storage. Some sources that allegedly can cause mold contamination in food products are constituents, unhygienic production equipment, the environmental conditions of the place of production, packaging, people who participate in the production process and is dead spots on buildings [9]. With increasing days of storage is done which means the level of increasing Rancidity. In theory, indeed a product can experience increased Rancidity lunkhead caused by

hydrolysis of fats that would produce a variety of non-volatile fatty acids which have smelled like the rancid smell.

Based on the above views that a longer shelf life at room temperature there is treatment comparison of glutinous flour and corn flour 25%: 75%, while the lowest found in glutinous flour and comparison of the treatment of corn flour 0%: 100%. Meanwhile, for storage at cold temperatures, it looks that at all treatment comparison glutinous flour and cornmeal are not much different, just that on the packaging that uses a plastic smell rancid scent. And the texture was a bit hard on the packaging that uses lunkhead banana leaves and corn skin.

Subjective Observation

Color

Based on the results of the analysis prints range indicates that the substitution of glutinous flour and corn flour different unreal ($P>0.05$) against the colors of the Lunkhead, materials used in packaging different Lunkhead unreal ($P>0.05$) against color Dodol. And there is no interaction between the two so that the different treatment is not real ($P>0.05$). Favorite color on the lunkhead score ranged between 4.00 – 4.40 with the usual criteria – a bit like. From the Table 9, can be seen that level of fondness the highest obtainable panelists on glutinous flour and comparison of treatment of corn flour 75%: 25% and comparison of glutinous flour and corn flour 50%: 50% of the packaging material and the banana leaf (L1) with a score of 4.40 (usual – rather like) while the lowest score obtained at the treatment comparison of glutinous flour and corn flour 25%: 75% of packaging materials and the banana leaf (L1), corn (L2), plastic (L3) with a score of 4.00 (okay – a bit like). The overall difference in color lunkhead has no noticeable difference, this is because the treatment of the four has the same color of brown sugar that is the same number of red sugar on each treatment. According to [5] the color factors appear visually first and sometimes very decisive. Acceptance of the overall color there is no difference of a factor varies depending on the material nature, and social aspects.

Scent

Based on the results of the analysis prints range shows that the substitution of glutinous flour and corn flour different unreal ($P>0.05$) against the scent of Dodol, packaging materials that are used on different Lunkhead unreal ($P>0.05$) against Dodol aroma. And there is no interaction between the two so that the different treatment is not real ($P>0.05$). Dodol aroma fondness on score ranges between 3.00 – 4.73 criteria somewhat dislikes. From Table 9 can be seen that the highest obtainable level of fondness panelist on glutinous flour and comparison of treatment of corn flour 50%: 50% and packaging materials plastic (L3) with a score of 4.73 assessment (somewhat dislike-regular) while the lowest score obtained on all treatment comparison of glutinous flour and corn flour and packaging materials in banana leaves (L1), the assessment with a score of 3.00 (somewhat dislike-usual).

Texture

Based on the results of the analysis prints range indicates that the substitution of glutinous flour and corn flour different unreal ($P>0.05$) against the texture of the Lunkhead, materials used in packaging different Lunkhead unreal ($P>0.05$) against the texture of Dodol. And there is no interaction between the two so that the different treatment is not real ($P>0.05$). Score a fondness of texture on a lunkhead ranges between 3.26 – 4.26 criteria somewhat do not like plain-4.7 from the table can be seen that the highest obtainable level of fondness panelist on glutinous flour and comparison of treatment of corn flour 75%:

75% and page MAS in banana leaves (L1), corn (L2), plastic (L3) the assessment with a score of 4.26 (somewhat dislike-regular) while the lowest score obtained at the treatment comparison of glutinous flour and corn flour 0%: 100% and all packaging materials assessment with a score of 3.26 (somewhat don't like the regular). Overall treatment effect on texture and influence between the treatment only have a slight difference. The texture of food is determined by the moisture content in foodstuffs [5].

A sense

Based on the results of the analysis prints range indicates that the substitution of glutinous flour and corn flour different unreal ($P>0.05$) for a taste of Dodol, packaging materials that are used on different unreal ($P>0.05$) against a sense of Dodol. And there is no interaction between the two so that the different treatment is not real ($P>0.05$). Lunkhead sense of fondness on score ranges between 4.06-4.73 ordinary criteria – a bit like. From Table 9 can be seen that the highest obtainable level of fondness panelist on glutinous flour and comparison of treatment of corn flour 0%: 100% packaging material and leaves bananas (L1) with a score of 4.73 assessment (okay-a bit like) while the lowest score obtained at the treatment comparison of glutinous flour and corn flour 75%: 25% and all packaging materials assessment with a score of 4.06 (okay-a bit like). The taste of a material according to [5] determined also by the water content in the material.

The overall Acceptance

Based on the results of the analysis prints range indicates that the substitution of glutinous flour and corn flour different unreal ($P>0.05$) against the overall acceptance of the processed materials, packaging Lunkhead used on Dodol different unreal ($P>0.05$) against the overall acceptance of Dodol. And there is no interaction between the two so that the different treatment is not real ($P>0.05$). Score overall acceptance of favorite lunkhead ranged between 3.86-4.53 criteria somewhat do not like plain. From Table 9 can be seen that the highest obtainable level of fondness panelist on glutinous flour and comparison of treatment of corn flour 50%: 50% and plastic packaging materials (L3) with a score of 4.53 assessment (somewhat dislike-regular) while the lowest score obtained at the treatment comparison of glutinous flour and corn flour 0%: 100% and all packaging materials assessment with a score of 3.86 (somewhat dislike-usual). The overall reception of the lunkhead allegedly affected by the reception of color, aroma, texture, and flavor.

Table 9

The average acceptance rate panelists against the color, Aroma, texture, flavor, and Overall Acceptance of Dodol (%)

Treatment	Color	Scent	Texture	A sense	The overall Acceptance
H1L1	4.40a	3.00a	4.27d	4.07a	4.27ab
H1L2	4.33a	4.47bcd	4.27d	4.07a	4.27ab
H1L3	4.33a	4.67cd	4.27d	4.07a	4.40ab
H2L1	4.40a	3.00a	4.20d	4.33ab	4.40ab
H2L2	4.33a	4.47bcd	4.07cd	4.60ab	4.47b
H2L3	4.33a	4.73d	4.00bcd	4.53ab	4.53b
H3L1	4.00a	3.00a	3.53abc	4.33ab	4.33ab
H3L2	4.00a	4.40bc	3.40ab	4.47ab	4.33ab
H3L3	4.00a	4.47bcd	3.40ab	4.60ab	4.27ab
H4L1	4.13a	3.00a	3.27a	4.73b	3.87a
H4L2	4.13a	4.20b	3.27a	4.67b	3.87a
H4L4	4.13a	4.33b	3.27a	4.67b	3.87a

4. Conclusion

The study can be summed up the characteristics of Dodol as follows: white corn flour substitution Lunkhead birdlime is semi-wet food made of glutinous flour substitution with corn flour and packaging materials. Dodol substitution of cornstarch that results from this research have characteristics: moisture content ranged from 14.03%-17.05%, levels ranged between 2.51% protein-4.10%, carbohydrate levels ranged from 64.73%-71.64%, fat levels ranged from 8.81%-12.14%, ash levels ranged from 1.91%-2.47%, pH levels ranged from 7.02%-7.52%, while from the assessment results obtained organoleptic (3.00%-4.73%) with the criteria a bit dislike to ordinary.

Packaging material used in the lunkhead corn is banana leaves, bark, corn plastic. Characteristics of the packaging material in this study are: the highest water levels i.e. the banana leaf (L1) with a value of 17.05% and the lowest plastic (L3) with a value of 14.03%, the highest levels of protein on plastic packaging (L3) with a value of 4.10% and low banana leaf (L1) with a value of 2.51%, the highest levels of carbohydrates namely plastic (L3) with a value of 71.64% and the lowest maize skins (L2) 64.73% value, i.e. the highest fat content maize skins (L2) with a value of 12.14% and the lowest in banana leaves (L1) with value 8.50%, the highest levels of gray skin that is corn (L2) with a value of 2.48% and the lowest in banana leaves (L1) with a value of 1.91%, the highest pH levels i.e. plastic (L3) with a value of 7.52% and the lowest maize skins (L2) with a value of 7.02%. Whereas the assessment of the organoleptic include: highest colours found in banana leaves (L1) with a value of 4.40% and lowest on the treatment of 25%: 75% for all packaging materials with a value of 4.00%, the highest on the plastic aroma (L3) with a value of 4.47% and the lowest on the banana leaf (L1) with a value of 3.00%, the highest on a banana leaf (L1) with a value of 4.73 per cent and the lowest at the treatment of 75%: 25% for all packaging materials with a value of 4.07%, the highest on the texture treatment 75%: 25% for all packing material with a value of 4.27% and the lowest at the treatment 0%: 100% for all packaging materials with a value of 3.27%, the highest overall acceptance on plastic (L3) with a value of 4.53% and the lowest at the treatment 0%: 100% for all your packaging with a value of 3.87%.

From this research could be recommended that: the results of this study recommended further research needs to be done about the Dodol corn as well as packaging and storage material for knowing the time savings from lunkhead corn thereby increasing the value of corn in the market selling lunkhead

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