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Quality of Food Products Chicken Crepes

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ABSTRACT

Chicken meat is a good source of protein, because it contains complete essential amino acids. Utilization of chicken meat in the manufacture of gluten-free crepes to increase economic value and as a source of protein that can be used as a functional snack for people with gluten intolerance. The purpose of this study was to determine the best quality of gluten-free chicken crepes in terms of organoleptic values and the best treatment using chicken meat and to determine the functional groups of the best treatment crepes. This study used a completely randomized design (CRD) method consisting of 4 treatments and 4 replications, namely treatment P0 the use of chicken meat by 20%, P1 the use of chicken meat by 25%, P2 the use of chicken meat by 30%, P3 the use of chicken meat by 35%. The results showed that the use of chicken meat with different proportions had a very significant effect ($p<0.01$) on the organoleptic value (texture and color), had a significant effect ($p<0.05$) on the organoleptic value (aroma and acceptance) and did not. significantly different ($p>0.05$) on the organoleptic taste. Organoleptic characteristics with a crunchy texture to very crispy, dark yellow to bright yellow, slightly chicken-scented to chicken-scented, slightly savory to savory taste and can be accepted by consumers. The conclusion of the study was that he use of more chicken meat can improve the organoleptic quality (taste and aroma) of gluten-free chicken crepes, but decrease the organoleptic quality (texture, color and acceptance) of gluten-free chicken crepes. The best treatment of gluten-free chicken crepes was P1 with the use of chicken meat by 20%. FTIR absorption band indicates the presence of amide compounds present in chicken crepes, and has 15 kinds of amino acids consisting of 9 essential amino acids and 6 non-essential amino acids and has a saturated fatty acid (SFA) of 2.8%, monounsaturated fatty acids (MUFA) 2.27% and polyunsaturated fatty acids (PUFA) 0.79%.

Keywords: crepes, chicken meat, quality product

INTRODUCTION

In Indonesia, crepes are one of the kinds of food favoured by many people ranging from children to adults so that culinary connoisseurs always try to find this food. Crepes have two types of variants, which are wet and dry or crispy. The presentation shape is unique, i.e. by folded or rolled first. Crepes can be categorized into 2 kinds of flavours, namely sweet and salty. Crepes are usually made with a mixture of rice flour, corn starch, wheat flour, sugar, salt and water, but wheat flour naturally contains gluten protein that not everyone can consume gluten protein. Gluten is a sticky and elastic protein contained in some types of cereals or grains that are insoluble in water and elastic, but gluten can also affect health. One of them is celiac disease. Celiac disease occurs when the body's natural system reacts to gluten by attacking the lining of the small intestine. Without a healthy lining of the intestines, the body cannot absorb the necessary nutrients. Delayed growth and malnutrition can lead to adverse conditions, such as anaemia and osteoporosis. Other serious health problems include diabetes, autoimmune thyroid disease, and bowel cancer. This condition is known as "gluten intolerance". One of the appropriate ways of handling people with celiac disease is to apply a strict gluten-free diet (Benitez et al., 2011).

This requires the development of new products, to improve the quality of existing products both in terms of content and appearance (Hanifa, 2013). Development of modified crepes without wheat flour with mocaf flour, rice flour and corn flour. In this study, wheat flour was substituted for mocaf flour, rice flour and corn flour (maizena) were chosen because they were gluten-free.

Mocaf flour is cassava that has been modified with fermentation treatment, having characteristics similar to wheat so that it can be used as a substitute for wheat flour or flour mixture. According to Yustisia (2013) in addition, it is able to increase viscosity (adhesion), gelasi ability, rehydration power, and solubility so that it has a better texture than tapioca flour and ordinary cassava flour. Mocaf does not have a high protein content such as wheat flour that serves to form gluten needed in forming a dough, but the starch content of mocaf is greater than wheat flour. Rice flour functions as a binder, thickener and makes dough elastic because rice starch contains 2 components, namely amylose and amylopectin (Singh et al., 2003). Corn flour or the term cornstarch contains soluble and insoluble dietary fiber. Corn flour is a form of material processing by milling or flouring. Corn flour provides many benefits, including the presence of beta carotene (provitamin A) which can provide protection against blindness caused by cataracts by being a filter against UV rays and yellow corn flour has a carbohydrate content of 73.3 g/100 g, protein 9.2 g/100 g and fat 3.9 g/100 g (Suarni, 2009). Making crepes using mocaf flour, rice flour and corn flour will produce gluten-free crepes, but it is necessary to add protein sources to improve the nutritional quality of gluten-free crepes. One of them is a source of animal protein from chicken meat.

Chicken meat is one of the products of the farm that has several advantages that are relatively cheap, abundant, easy to obtain, and have animal protein content that can meet the nutritional needs of humans. Chicken meat is a good source of protein as it contains complete essential amino acids with good quantities (Kartika, et al., 2018). Broiler chicken meat is very good for the growth and breeding of microorganisms so as to degrade the quality of meat. The decrease in the quality of meat is indicated through discoloration, taste, aroma, and even decay so that it requires good handling and processing. One of the ways is to process it into finished products which can be processed into light foods or healthy snacks such as gluten-free crepes. Finished products such as gluten-free crepes from chicken meat have the advantage of being easy to consume, practical, healthy, and a good source of protein. The use of broiler chicken meat in the making of crepes can also be a source of animal protein.

The purpose of this study was to analyze functional snacks, namely gluten-free crepes with the addition of chicken meat to increase the economic value as a source of animal protein as a substitute for nuts and cereals, so as to meet the nutritional needs of food as snacks for people with gluten intolerance. Therefore, it is necessary to conduct research that examines the organoleptic quality of gluten-free crepes and obtains the best treatment from the use of different chicken meats.

MATERIAL AND METHOD

Location and Research

This research was conducted on on July 1th – August 30th, 2021 at the Laboratory of Animal Products Technology, Faculty of Animal Science, Brawijaya University.

Research Material

The materials of this study were crepes made from gluten-free flour (mocaf flour, rice flour and cornstarch) weighed according to ratio, eggs, milk, baking soda, steamed broiler chicken meat, knorr seasoning and salt according to proportions. Tools used in the making of crepes were digital scales, beaker glass, spoons, containers, spatulas, crepes maker, wood crepes, and plates.

Research Procedure

This research procedures are a modified procedure for making crepes Wong (2020). The making of chicken meat crepes began with the method of making 200 gram of chicken crepes dough by steaming chicken meat for 20 minutes then blended the chicken meat with addition of milk and eggs until smooth. Then, mixed the dry ingredients; mocaf flour, corn-starch, rice flour, salt, baking soda and knorr seasoning and mixed all dough. Then the dough was rested for 60 minutes. The dough crepes were spread over to circular form and cooked over on the crepes maker for 7-10 minutes with a temperature of ±135˚C.

Research Methods

The research method used was a laboratory experiment using a Complete Randomized Design (CRD) with 4 treatments and 4 replications. namely P1 the use of chicken meat by 25%, P2 the use of chicken meat by 30%, P3 the use of chicken meat by 35 %.

Research Variables

The variables observed in this study were the analysis tested, namely organoleptic analysis carried out using a panel of 5 semi-trained people with the parameters of texture, aroma, taste, color and acceptance. The organoleptic test was assessed on a texture scale with a scale of 1 to 5 (deviating texture to very crispy texture), aroma with a rating scale of 1 to 5 (a deviant aroma to very distinctive chicken aroma), taste on a rating scale of 1 to 5 (a deviant taste to very savory), color on a scale of 1 to 5 (a color that deviates to a bright yellow color) and an acceptance score on a rating scale of 1 to 5 (very unacceptable - very acceptable). The best treatment will be tested by FTIR to identify the functional groups present in the crepes, amino acid profile and fatty acid.

Data Analysis

The data were analyzed with a variety analysis (ANOVA) and continued with the Duncan Multiple Range Test if there were differences.

RESULT AND DISCUSSION

The organoleptic value of chicken crepes with the addition of different percentages of chicken meat can be seen in Table 1.

Texture

The texture value of chicken crepes with the addition of different percentages of chicken meat gave a very significant difference ($p<0.01$) on the texture of chicken crepes. The results of the texture of gluten-free chicken crepes were given a range of numbers 1-5, namely the number 1 indicates a deviant value, 2 indicates a not crunchy value, 3 indicates a slightly crunchy value, 4 indicates a crunchy value and 5 indicates a very crunchy value. The average value of the highest score of gluten-free chicken crepes texture was found in treatment P0 (the use of chicken meat was 20%) of 4.50^{b}, indicating that the texture of chicken crepes was very crispy and the lowest average score was in treatment P3 (the use of chicken meat was 35%) of 3.85^{a} indicates that the chicken crepes have a crunchy texture. The increase in the use of different percentages of chicken meat has a significant effect on the crunchy texture of chicken crepes. The more use of chicken in making gluten-free chicken crepes, the lower the texture value of the resulting crepes. One of the effects of crepes texture is the water content in chicken meat, because according to Rahmadaeni et al. (2019) the water content in fresh meat is 66.32%. In addition to the water content, the starch content in mocaf flour and rice flour used as raw material for making crepes affects the texture. Meanwhile, according to Wahyuningtyas et al. (2014) that thickness and texture will affect the water content of the product. Water will evaporate easily in thin products so that the water content is getting smaller and the opposite will happen if the texture of the product is getting thicker, and the thickness of the product is probably caused by the combination of wet starch with dry starch.

Color

The results of organoleptic tests on the color of chicken meat crepes in the treatment using different percentages of chicken meat gave a very significant effect ($p<0.01$) on the color of chicken crepes. The color results of chicken meat crepes are given a range of numbers 1-5, namely number 1 indicates a distorted color value, number 2 indicates brown color, number 3 indicates a less bright yellow color, number 4 indicates a slightly bright yellow color, and number 5 indicates a bright yellow color. It can be seen in Table 1 that the average score on the color of the chicken crepes given by the panelists was significantly different. The average color score of chicken crepes ranged from 3.85^{a} to 4.50^{b}. The highest average is found in P0 and P1 which is 4.50^{b} with treatment using chicken meat of 20% and 25% which has a slightly bright yellow color and the lowest average is found in P3 of 3.85^{a} with treatment using chicken meat of 35% has a dark yellow color. The more use of chicken meat in the manufacture of gluten-free chicken crepes, the darker the resulting color. The dark yellow color of the chicken crepes is due to the maillard reaction during the roasting process. According to Winarno (1997) in Syamilah et al. (2016) before other factors were considered, visually the color factor was exposed first and was sometimes very decisive. The color of gluten-free chicken crepes correlates with the taste and aroma of gluten-free chicken crepes. The darker the color produced on the crepes, the more savory and chicken-scented taste. maillard reaction in particular, the main reaction for the formation of meat flavor is the maillard reaction. Flavor is the overall impression (sensation) received by the human senses, especially by taste and smell when food and drinks are consumed (Rothe 1989) and (Purba, 2014), so that the maillard reaction affects the aroma and taste of crepes.

Aroma

Aroma is an odor caused by chemical stimuli that are smelled by the olfactory nerves in the nasal

cavity (Negara et al., 2016). The results of the organoleptic aroma test on chicken crepes with the use of different percentages of chicken meat had a significant effect ($p<0.05$) on the aroma of chicken crepes. The results of the aroma of chicken meat crepes are given a range of numbers 1-5, namely number 1 indicates a deviant aroma value, number 2 indicates a flour-scented, number 3 indicates slightly chicken-scented, number 4 indicates chicken-scented, and number 5 indicates very chicken-scented. It can be seen in Table 1 that the average score for the aroma of chicken crepes ranges from $3.80^{x} \pm 0.95 – 4.35^{y} \pm 0.49$. The highest average was found in P3 of $4.35^{y} \pm 0.49$ with the use of chicken meat treatment of 35% which showed gluten-free chicken crepes with chicken flavor, the lowest average was found in P0 with the use of chicken meat treatment of 20% with a value of 3.80^{x} which indicates the gluten free chicken crepes are slightly chicken flavored. The higher the use of chicken meat, the chicken-flavored crepes. In the process of roasting crepes, there is a maillard reaction which is assumed to affect the aroma of the crepes. According to Purba (2014) maillard reaction products have a contribution to aroma. Oliveira et al. (2014) added that almost half of the volatile compounds formed in food are products of the maillard reaction. The maillard reaction occurs widely, especially in food, the constituents that trigger the aroma are volatile compounds (which can be isolated from foodstuffs, usually less than 100 ppm) (Lamusu, 2018).

Flavor

Taste is a sensory test using the five senses of the tongue. Taste can be influenced by several factors such as chemical compounds, temperature, concentration and interactions with other flavor components (Siti et al., 2005); (Solikhatin et al., 2017). Taste is divided into four basic types that can be recognized by humans, namely salty, sour, sweet and bitter. Other flavors can also be combined with other flavors (Soekarto, 2012; Deglas, 2018). The results of organoleptic tests on the taste of chicken crepes on the treatment using different percentages of chicken meat gave no significant effect ($p>0.05$) on the taste of chicken crepes. The average score for the taste of chicken crepes ranges from 4.15 to 4.50. The results of the taste of chicken meat crepes are given a range of numbers 1-5, namely number 1 indicates a deviant taste value, number 2 indicates a non-savory taste, number 3 indicates a slightly savory taste, number 4 indicates a savory taste, and number 5 indicates a very savory taste. It can be seen in Table 1 that the lowest average value for the taste of chicken crepes is found in treatment P1 (the use of chicken meat is 25%) which is 4.15±0.93 which has a slightly savory taste, while the highest average value for the taste of chicken crepes is found in in the P3 treatment (the use of chicken meat by 35%) which is 4.50±0.95 has a very savory taste. The more use of meat, the more savory the resulting taste in gluten-free chicken crepes. Taste is correlated to color and aroma, the color produced from the maillard reaction produces a savory crepes taste, because according to Purba (2014) the flavor in poultry meat can be formed through certain processes such as heating, where various complex chemical reactions occur between nonvolatile precursors from fat tissue and fatty tissue. Joo and Kim (2011) stated that the main flavor of processed meat in the form of volatile and non-volatile components has a major effect on the acceptance of processed meat, especially on taste.

Acceptance

The results of the organoleptic test on the acceptance of chicken crepes are listed in Table 1. The treatment of using different percentages of chicken meat gave a significantly different effect ($p<0.05$) on the acceptance of chicken crepes. The average score of chicken crepes acceptance ranged from $3.85^{x} – 4.35^{y}$. The panelist test results on the acceptance of chicken meat crepes were given a range of numbers 1-5, namely number 1 indicates a deviant acceptance value, number 2 indicates not accepted, number 3 indicates somewhat accepted, number 4 indicates accepted, and number 5 indicates highly accepted. The highest average value for the taste of chicken crepes was found in treatment P0 (the use of chicken meat was 20%) which was $4.35^{y} \pm 0.49$ (accepted), while the lowest average value for the taste of chicken crepes was in treatment P3 (the use of chicken meat). chicken by 35%) which is $3.85^{x} \pm 0.59$ (somewhat acceptable).

Best Treatment

The best treatment in this study was to calculate the effectiveness index on the physical and organoleptic aspects of gluten-free chicken crepes. The use of different percentages of chicken meat produced gluten-free chicken crepes, the best treatment was P0 with the use of chicken meat of 20% with the highest Nh value of 0.92 based on the effectiveness index test. The calculation results in determining the best treatment obtained from the ranking results. The importance of the role of variables on the quality of gluten-free chicken crepes products and the weight of each variable obtained from the opinion of the panelists.

Table 1. Average organoleptic value of gluten-free chicken crepes

Treatment of Using Chicken	Texture	Color	Taste	Aroma	Acceptance
20%	$4.75^{d} \pm 0.44$	$4.50^{b} \pm 0.61$	4.30 ± 0.86	$3.80^{x} \pm 0.95$	$4.35^{y} \pm 0.49$
25%	$4.45^{c} \pm 0.60$	$4.50^{b} \pm 0.51$	4.15 ± 0.93	$4.05^{y} \pm 0.60$	$4.20^{y} \pm 0.41$
30%	$3.95^{b} \pm 0.69$	$3.95^{a} \pm 0.76$	4.44 ± 0.75	$4.25^{y} \pm 0.44$	$4.05^{x} \pm 0.51$
35%	$3.80^{a} \pm 0.83$	$3.85^{a} \pm 1.04$	4.50 ± 0.95	4.35^{y} v 0.49	$3.85^{x} \pm 0.59$

[a,b,c] Supersciprt in the same column showed a very significant difference ($p<0.01$)
[x,y,z] Supersciprt in the same column show a significant difference ($p<0.05$)

Functional Group Identification

The FTIR test was carried out to determine the chemical functional groups in chicken crepes from the best treatment. The results of the FTIR test can be seen in Figure 1. The groups that are read by the FTIR spectra in Figure 5 are O-H, N-H, C-H (sp3), and C-N bonds. Zone 1 which is at a wavelength (according to Appendix 25) only shows 1 absorption band, namely in the 3321 cm^{-1} region which shows a wide absorption (OH stretching group) or NH stretching, this spectra indicates the number of OH groups in the crepes which easily absorbs steam water in the crepes storage atmosphere so that hydrogen bonds are formed between the OH groups of crepes and water molecules so that the crepes are hydrated and hygroscopic. Zone 2 has an absorption band in the 2925 cm^{-1} region which shows the CH (sp3) group which indicates a shift in the presence of fat which allows the fat in the crepes to spread in the cavity left by the evaporating water so that the interaction between protein-protein molecules and starch-starch molecules which was originally so strong and formed a crunchy texture on the crepes, with the presence of fat, the interaction will be reduced by the presence of fat in the cavities of the crepes, a condition suspected to allow the crepes structure to weaken. According to Sinanoglou et al. (2018). the weak absorption band in the 2950-2850 cm^{-1} region is related to methyl and methylene asymmetric and symmetrical stretching of the carbonyl group group and the triglyceride ester bond. These bands are the most significant in roasting chicken meat in crepes dough. Zone 4 has an absorption band in the region of 1745 cm^{-1} which indicates the C=O group. Zone 5 has sharp absorption (N-H bending amide group), varied absorption (N-H group) and variable absorption (O-H bending group) which has an absorption band in the region of 1651 cm^{-1}. This band is correlated with the adopted protein with -sheet and the strong water absorption will significantly overlap with the amide I band (Herrero et al., 2017). Strong water absorption indicates high water content from chicken meat and milk which affects protein structure. The absorption band of amide I characterizing the secondary structure of the protein located in the region 1648 to 1658 cm-1 and 1620 to 1640 cm^{-1} is related to the protein structure of -helix and -sheet respectively (Yu, 2007). Another absorption band can be identified in 1543 cm^{-1} which is a curved compound wave of amino acid (NH) groups with protein CN stretching. The 1543 cm^{-1} peak represents the stretching of the C=O band and cutting the band from the CH2 group. The weak absorbance band at 1454-1409 cm^{-1} is related to the CH bend of the methylene alkyl chain of the lipid moiety, as well as to the asymmetric CH and symmetrical stretch vibrations of the protein moiety, respectively. According to Herrero et al. (2017) the band that appears in the 1400 to 1200 cm^{-1} region can be attributed to aliphatic CH2 and CH3 bending vibrations. Moreira et al. (2018) and Rashid et al. (2021) proved that the absorption band is 1458 cm^{-1} due to CH bending and stretching of methylene (CH2) and methyl (CH3) groups present in meat fat. According to Rashid et al. (2021) the functional groups in roasted chicken are protein, triglycerides, fatty acids and carbohydrates with absorption bands of 3300 cm^{-1}, 2967 cm^{-1}, 1639 cm^{-1}, 1546 cm^{-1}, and 1453 cm^{-1}. The absorption bands in the 1240 and 1081 cm^{-1} regions contain symmetrical and asymmetric P=O that contribute to phospholipids and nucleic acids. The 1080 cm^{-1} absorption band contributes as a part of carbohydrates and glycogen derived from meat (Sinanoglou et al. 2018). The absorption in the fingerprint <1000 cm^{-1} area is thought to be carbohydrates derived from the raw materials of mocaf flour, rice flour and cornstarch used in making crepes. According to Cao et al. (2020) the peak of about 995 cm^{-1} refers to the C-OH vibration of starch associated with hydrogen bonding interactions between starch and water.

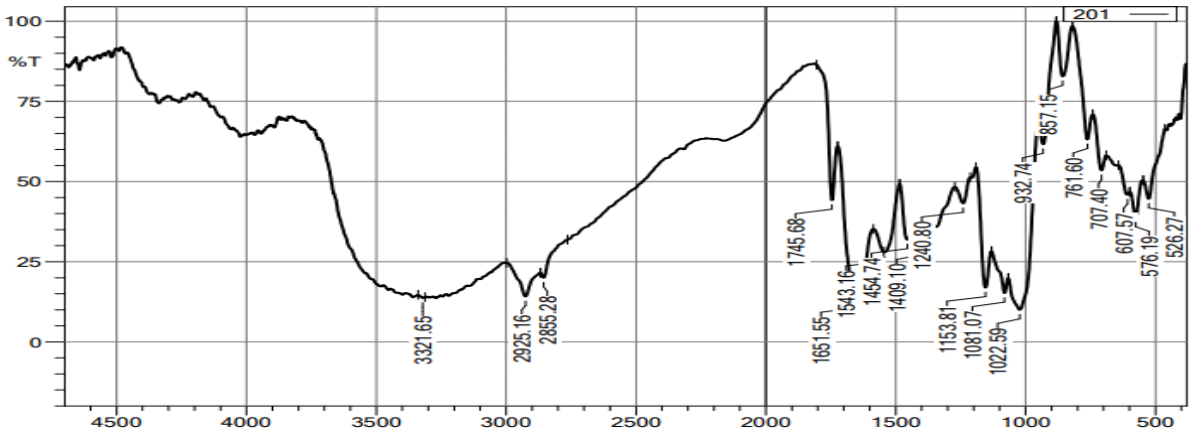

Figure 1. FTIR spectra of the best treatment of chicken crepes

The high temperature +135°C in the gelatinization process of crepes dough destroys the constant matrix so that there are several groups of starch (amylose and mailopectin) in mocaf flour, rice flour and cornstarch. This is explained by Zaragoza et al. (2010) that the decrease in starch content (amylose and amylopectin) occurred due to autoclave heating at 121°C which caused -1,4 linear glycosidic bonds in amylose and -1,6 branching bonds in amylopectin. In addition to the starch gelatinization process, the high temperature causes no functional groups to appear from the chemical content of the raw materials for making chicken crepes such as chicken meat, milk and eggs. Winarno (2004) states that heating at a temperature of 80-100°C can damage protein and lose disulfide, 100-150°C causes lysine decomposition, serine and threonine loss and isopeptide formation.

The groups that make up protein compounds, namely amino acids, have an amine/amide group arrangement, carboxylic acids, side chains and peptide bonds. In the sample there are amide groups, alcohols and peptide bonds but the presence of carboxylic acid groups cannot be ascertained. The overall compound in the best treatment of chicken crepes is an amide compound. The loss of a water molecule between a carboxylic acid and an amine forms an amide. Amides are peptides formed from the carboxyl group of an amino acid with the amino group of other amino acids (Sugiyono, 2004). The amino acid content is thought to come from the composition of chicken meat, milk and eggs used in making crepes. Chicken meat is a good source of protein, because it contains complete essential amino acids and in good ratios (Winedar et al., 2006).

Amino Acid Profile

Amino acid analysis to determine the amount of amino acid content and types of amino acids in chicken crepes from the best treatment. The characteristics of the amino acid profile of chicken crepes from the best treatment can be seen in Table 2. The results of amino acid testing on chicken crepes from the best treatment with the use of 20% chicken meat showed 15 types of amino acids consisting of 8 types of essential amino acids and 7 types of non-essential amino acids. The essential amino acids found in chicken crepes are histidine, arginine, threonine, valine, isoleucine, leucine, phenylalanine, and lysine, while the non-essential amino acids are aspartic acid, glutamic acid, serine, glycine, alanine, proline and tyrosine. Based on the type, there are 2 (two) types of amino acids, namely essential amino acids and non-essential amino acids. Non-essential amino acids are amino acids that can be produced in the body or called endogenous amino acids, while essential amino acids are amino acids that cannot be produced by the body and can only be obtained by consuming foods that contain protein (Winarno, 2008). According to Selcuk et al. (2010) amino acids consist of 20 kinds which include 8 essential amino acids for adults consisting of lysine, leucine, isoleucine, methionine, valine, phenylalanine and tryptophan, 2 essential amino acids for children consisting of arganine and histidine, 10 kinds of amino acids. Non-essential amino acids consist of aspartic acid, glutamic acid, alanine, asparagine, cysteine, glycine, proline, tyrosine, serine and glutamine.

Based on Table 2, it is known that the highest amino acid content in chicken crepes from the best treatment was L-glutamic acid with a value of 33055.46 mg/kg. Glutamic acid is a non-essential amino acid. According to Schweigertn et al. (2010) high glutamic acid is due to deamination between the amino acids glutamine and asparagine which forms glutamic acid thereby increasing glutamic

acid levels in chicken crepes. Glutamic acid is a non-essential amino acid that supports brain function, facilitates learning and strengthens memory. Glutamic acid is also useful to help increase muscle mass (enlarge muscles) (Winarno, 2008). Glutamic acid can be produced by the human body. Glutamic acid has glutamate ions that can stimulate several types of nerves that exist in the human tongue. This property can be utilized by the flavoring industry because the salt derived from glutamic acid (monosodium glutamate) is very well known as a food flavoring. The lowest amino acid content in chicken crepes is the amino acid L-histidine worth 7778.5 mg/kg, which is an essential amino acid. The highest content of essential amino acids is leucine worth 20566.15 mg/kg. Leucine is the most abundant amino acid contained in food sources of protein. The higher the levels of essential amino acids in a food, the better the quality of the protein in the food. Leucine is an amino acid that belongs to the ketogenic amino acid group, namely amino acids that can produce ketone compounds in the liver (Mandila & Hidajati, 2013). According to Jacob et al. (2012) Leucine is an amino acid that belongs to the essential amino acid group. This amino acid is an amino acid that is needed to ensure growth, therefore this amino acid is needed by children and infants in their growth period. The need for leucine for growth is 14 mg of amino acids/kg body weight daily. Leucine also plays a role in stimulating the formation of excessive insulin by the pancreas (Purwaningsih, 2012).

Table 2. Amino Acid Profile of Chicken Crepes from the Best Treatment

No	Amino Acid Profile	Amino Acid Content of Chicken crepes (mg/kg)
1	L-Serine	14285.75
2	L- Glutamic Acid	33055.46
3	L-Phenylalanine	14009.50
4	L-Isoleucine	10488.27
5	L-Valine	12268.20
6	L-Alanine	11932.14
7	L-Arginine	16993.67
8	Glycine	10869.75
9	L-Lysine	14056.37
10	L- Aspartic Acid	17770.95
11	L-Leucine	20566.15
12	L-Tyrosine	9113.92
13	L-Proline	10703.72
14	L-Threonine	12930.72
15	L-Histidine	7778.50

Fatty Acid

Analysis of fatty acids in chicken crepes from the best treatment to determine the amount of fatty acids contained. The fatty acid content of chicken crepes from the best treatment can be seen in Table 3. Fatty acid content can be distinguished based on the amount of C (carbon), the presence or absence of double bonds, the number of double bonds and the location of the double bonds. Based on their chemical structure, fatty acids are divided into 2 structures, namely saturated fatty acids and unsaturated fatty acids. Saturated fatty acids (SFA) are fatty acids that do not have double bonds, while unsaturated fatty acids (unsaturated fatty acids) are fatty acids that have double bonds which are divided into Monounsaturated Fatty Acids (MUFA) or unsaturated fatty acids, single bonds which have 1 (one) double bond, and Polyunsaturated fatty acid (PUFA) or polyunsaturated fatty acids with 2 (two) double bonds or more double bonds.

Based on Table 3, it is known that the crepes using 20% chicken meat have a saturated fatty acid (SFA) content of 2.8%, a monounsaturated fatty acid (MUFA) content of 2.27% and a polyunsaturated fatty acid content of 0.79%. The presence of fatty acids in chicken crepes comes from the raw ingredients of chicken meat and UHT milk in the crepes dough. According to Morales-Barrera et al. (2013) fat in chicken breast contains 33.5% saturated fat, 30.5% unsaturated and 32% polyunsaturated fatty acids, and according to research results Legowo et al. (2006) the fatty acid content of cow's milk is as follows: Caproic (63.44 mg/100g), Caprylic (2.23 mg/100g), Capric (73.40 mg/100g), and Lauric (130.44 mg/100g), the detection results of fatty acids in milk will vary depending on feed consumption, metabolic rate of triglycerides in the mammary glands and the method used in the study.

According to WHO, fat is needed by the body about 20-35% with a limitation of saturated fat <10%, MUFA 15-20% and PUFA 6-11% of the total energy needed. This shows that crepes with the use of 20% chicken meat still do not meet the needs of unsaturated fatty acids in the body. The low value of the content of unsaturated fatty acids is due to the heating process in making crepes. The heating process in making chicken crepes reduces the quality of unsaturated fatty acids so that it can cause oxidation of crepes. According to Gumilar et al. (2009) changes in fatty acid composition can be caused by the influence of temperature and the length of storage time. The oxidation process causes the unsaturated fatty acids in chicken crepes

to become saturated fatty acids. The presence of saturated fatty acids causes crepes to become rancid quickly. According to Sebecic and Beutelspacher (2005) states that oxidation is a breakdown of fats and results in the formation of compounds and this condition is called rancid. Processed food products that are rancid can experience discoloration and loss of nutrition due to the oxidation of unsaturated fatty acids (PUFA) which has an impact on the quality of crepes. According to McClement and Decker (2000) the factors that affect oxidation, namely the amount and type of oxygen, lipid structure, presence of antioxidant compounds and peroxides, storage temperature and the nature of packaging materials.

Table 3. Fatty acid content of chicken crepes from the best treatment

No.	Fatty Acid	Fatty Acid (%)
1	Saturated fatty acid (SFA)	2.8
2	Monounsaturated fatty acid (MUFA)	2.27
3	Polyunsaturated fatty acid (PUFA)	0.79

CONCLUSION

The conclusion of the study was that he use of more chicken meat can improve the organoleptic quality (taste and aroma) of gluten-free chicken crepes, but decrease the organoleptic quality (texture, color and acceptance) of gluten-free chicken crepes. The best treatment of gluten-free chicken crepes was P1 with the use of chicken meat by 20%. Chicken crepes have 15 kinds of amino acids consisting of 9 essential amino acids and 6 non-essential amino acids, and have saturated fatty acids (SFA) 2.8%, monounsaturated fatty acids (MUFA) 2.27%, and polyunsaturated unsaturated fatty acids (PUFA) 0.79%. The FTIR test showed that the chemical bonding compounds in the chicken crepes from the best treatment were amide compounds.

CONFLICT OF INTEREST

The authors whose names are listed have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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