



Acceptability Crispy Cheese Tuile with Main Ingredients Canna Starch Flour and Mung Bean Flour

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ABSTRACT

Crispy cheese tuile is one of the cookies that comes from France. The main ingredient for making these cookies is wheat flour. Canna starch flour comes from canna tubers which are easy to cultivate intensively but their utilization is not maximized. Canna starch flour has the potential as a source of carbohydrates and high quality starch. Mung bean flour comes from mung bean seeds which is a food plant that is easy to cultivate and has high protein. Canna starch flour and mung bean flour can be developed into pastry products to replace wheat flour whose ingredients must be imported. The purpose of this study was to obtain a recipe for crispy cheese tuile, to know the sensory analysis of crispy cheese tuile with the main ingredients of canna starch and mung bean flour. and knowing consumer acceptance of crispy cheese tuile products with the main ingredients of canna starch and mung bean flour. This study used RAL (Completely Randomized Design). The instrument used is a questionnaire in the form of a checklist. The panelists in the study were 30 untrained panelists of the three formulas for crispy cheese tuile with code 169 (80% canna starch: 20% mung bean flour), code 507 (50% canna starch: 50% mung bean flour), and code 307 (20% canna starch: 80 % green bean flour). Based on sensory analysis, the most preferred recipe formula is code 169. The highest level of preference for the color, taste, aroma, texture, and overall category is for products with code 169. The results of the acceptability analysis, codes 169 and 307 are in the very acceptable category and code 507 accepted.

ARTICLE INFO

Article History:

Received 01 September 2022

Revised 03 October 2022

Accepted 18 October 2022

Available online 01 Nov 2022

Keywords:

*Acceptance,
Ganyong Starch Flour,
Mung Bean Flour,
Crispy Cheese Tuile*

1. INTRODUCTION

Indonesia is a country that has many staple foods that need to be socialized as dishes that can be enjoyed by the public. Food insecurity has the potential to occur in Indonesia if you only rely on one staple food. Rice is a staple food consumed by nearly 95% of Indonesia's population. Apart from rice, wheat flour is also a staple food that is popular with the community, as can be seen from the many processed foods made from wheat flour. Wheat flour comes from wheat, while Indonesia is not a wheat producing country which results in high imports of wheat flour. According to data from the Central Bureau of Statistics for 2019, wheat flour imports reached 34,467 tons (Santi, 2021).

It is necessary to carry out food diversification by utilizing other local resources, one of which is canna tuber. Ganyong tubers can be grown in all regions but are still not optimally used for the reason that they don't last long for storage. After harvesting canna tubers should be consumed immediately. Therefore, to increase the shelf life canna be made into flour. Utilization of canna tubers as flour is not maximized. Ganyong root crops have potential as a source of carbohydrates and are a source of high quality starch. In addition, canna plants are easily cultivated intensively in all types of soil and shelter. The physiochemical properties of canna starch flour are similar to wheat flour because it can absorb large amounts of water so that when it is made into cookies it will become crunchy.

Canna flour also has 3 physiochemical properties that are similar to wheat flour, namely having a high starch content of 53.41%. The similarities between canna flour and wheat flour are that they are able to absorb large amounts of water and undergo gelatinization during heating so as to increase the mass of the product (Widjaja, 2004).

Canna starch flour does not contain gluten and low protein flour contains 6-8% gluten, making the texture of the resulting food more crunchy, brittle, and easily broken (Risma, 2021). Low protein flour is often processed into a variety of crunchy textured dishes such as cookies and biscuits. Canna starch flour in the manufacture of crispy cheese tuile is expected to make crispy cheese tuile crispy and sturdy but not hard according to research conducted (Istiqomah et al., (2019) The main components of canna starch flour are amylose and amylopectin. Where the higher amylose content causes the product to be harder/sturdier (Haryadi, 2006). The amylose content of canna starch is 24% (Santoso et al., 2015), while the amylose content of wheat flour is 25% (Muchtadi, 2011).

Canna starch flour is processed through an extraction process to separate the starch from the existing fiber. First, the tubers are shredded using a machine to reduce the size so that it makes it easier during the canna starch extraction process. Then the result of grated canna tubers that are still fresh is filtered and washed with water repeatedly (3-4 times) so that pure white starch is obtained from the part that settles at the bottom of the sink. After obtaining grated and washed then pressing is done to separate the starch. The liquid obtained is left for a few moments and then the pat is separated. The starch obtained is then dried. The result is then sieved and packaged (Hidayat et al., 2008). The process of making ganyong starch is a little more difficult than canna flour.

Canna starch flour has low protein, which is 1 gram per 100 grams (Margono et al., 1993) therefore it requires the addition of ingredients as a source of protein, for example green beans. Green beans are a type of legume that is easy to find and has a high protein content. According to (Rukmana, 2000) 100 grams of green beans contain 22 grams of protein. The fat possessed by green beans (1.2 g/100g) is lower than soybeans (15.6 g/100g). The low fat content makes foods that use green beans not go rancid easily (Khomsan, 2006). Mung bean production is 12,075 tonnes in 2021 (Public Relations of the Directorate General of Food

Crops, 2021) and is a food plant that is easy to cultivate. In addition, green beans are used as a flavoring in making crispy cheese tuile to make it more interesting and varied.

Utilization of canna starch and mung bean flour to make crispy cheese tuile or better known as almond crispy cheese. Crispy cheese tuile is a pastry originating from France which is made from a mixture of flour, sugar, egg whites and margarine and then shaped into round and thin shapes to produce a crunchy texture.

Crispy cheese tuile chosen because these cookies are quite popular and in demand by the public because in general consumers like crunchy food with good taste (Kusuma et al., 2017). These cookies were first sold in Surabaya, but now there are lots of souvenir shops selling them in almost all regions in Indonesia, including many being sold in marketplaces. The replacement of wheat flour with canna starch flour and mung bean flour is expected to increase the selling value and become gluten-free cookies with high nutrition.

This research will be conducted to determine the acceptability and organoleptic properties of crispy cheese tuile from canna starch flour and mung bean flour so that the use of wheat flour in the manufacture of crispy cheese tuile can be replaced and can be accepted by society.

3. METHOD

3.1. Research design

This study used an experimental method using a completely randomized design (CRD). The experimental research method is one of the methods in quantitative research. The experimental method is a research method used to find the effect of certain treatments on others under controlled conditions (Sugiyono, 2011). The use of a completely randomized design (CRD) in this study was to determine the treatment to be tried and to determine product acceptability based on sensory assessment aspects, namely: color, taste, texture, aroma, and overall. The independent variable in this study is the use of the main ingredients of canna starch flour and mung bean flour in the manufacture of crispy cheese tuile with a percentage of 80%:20%, 50%:50%, and 20%:80% The dependent variable in this study is the acceptability of crispy Cheese tuile with the main ingredients of canna starch and mung bean flour based on aspects of color, taste, aroma, texture.

In this study, there were 3 different types of treatment and 2 repetitions to determine consumer acceptance, each treatment was given a code, namely: code 169 (crispy cheese tuile with 80% canna starch : 20% mung bean flour), code 507 (crispy cheese tuile with 50% canna starch : 50% mung bean flour), and code 307 (crispy cheese tuile with 20% canna starch : 80% mung bean flour). Organoleptic tests were carried out to determine consumer acceptance of crispy cheese tuile consisting of 5 Likert scales with indicators of color, taste, texture and aroma. The hedonic test was carried out to determine the level of liking with a score of 1 = really dislike, 2 = dislike, 3 = somewhat like, 4 = like, and 5 = really like. Data processing is done with Microsoft Excel.

3.2. Participant

The participants involved in this study were untrained panelists to analyze consumer acceptance of 30 people, namely residents around the research house at JL. Pupan Pondok Pinang, Kebayoran Lama, South Jakarta.

3.3. Population and Sample

3.3.1. Population

The population to be studied in this study is the crispy cheese tuile recipe formula with the main ingredients of canna starch and mung bean flour.

3.3.2. Sample

The sample object in this study is crispy cheese tuile with the main ingredients of canna starch and mung bean flour with code 169 (crispy cheese tuile with 80% canna starch : 20% mung bean flour), code 507 (crispy cheese tuile with 50% canna starch : 50% mung bean flour), and code 307 (crispy cheese tuile with starch ganyong 20% : 80% mung bean flour).

4. RESULTS AND DISCUSSION

4.1. Basic Prescription Formulations

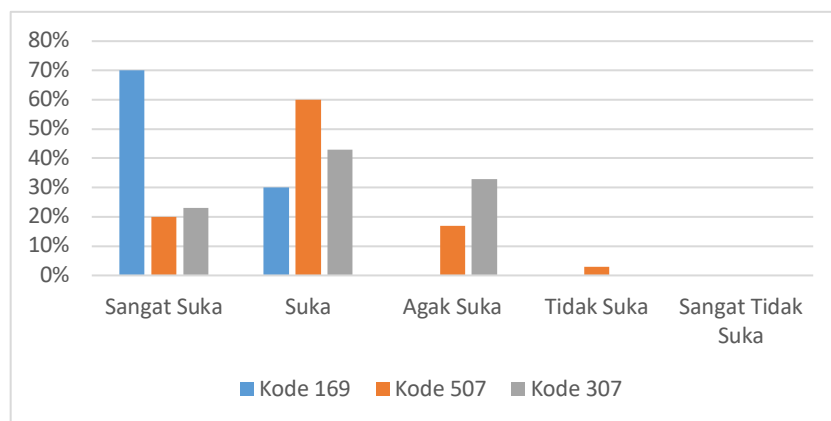
The basic recipe that has been deduced from the 10 recipes available in print and electronic media was then tested with the addition of canna starch and mung bean flour as the main ingredients to replace wheat flour.

Table 1. Crispy Cheese Tuile Basic Recipe.

Ingredient	Dosage (%)
Low Protein Wheat Flour	30%
Egg whites	21.5%
butter	21.5%
Fine granulated sugar	17.1%
vanilla	0.9%
Salt	0.4%

Researchers conducted the first experiment by substituting 80% canna starch flour and 20% wheat flour, the resulting crispy cheese tuile was brittle and easily soggy. Finally, add mung bean flour to the crispy cheese tuile dough so that an experiment is carried out with the formula 80% canna starch flour: 20% mung bean flour, 50% canna starch flour: 50% mung bean flour, and 20% canna starch flour: 80% green bean flour.

4.2. Sensory Test Results



Picture 1. Sensory Graph By Color.

The results of the code 169 data tabulation containing 80% canna starch flour and 20% mung bean flour are the most preferred products based on the color indicator 70% of the

panelists really like it, 30% of the panelists like it. In code 507 with a content of 50% canna starch and 50% mung bean flour, 20% of the panelists said they really liked it, 60% liked it, 17% rather liked it, and 3% didn't like it. While for products with code 307, 23% of the panelists said they really liked it, 43% of the panelists liked it, and 33% of the panelists quite liked it.

The color of crispy cheese tuile that has the highest average value, which is 4.8, is the formula with code 169. Products with codes 507 and 307 have the same average value, namely 4. Consumers often judge the outer appearance of a product first. Brightly colored foods provide more appeal to consumers (Nugraheni, 2012). The degree of whiteness in canna starch flour is 77.02% (Richana Nur, 2019) which makes the panelist prefer because the color is brighter. Products with more mung bean flour formula greatly affect the color of the crispy cheese tuile because more and more mung bean flour mixture can make the color of the cookies darker (Irmæ et al., 2018).

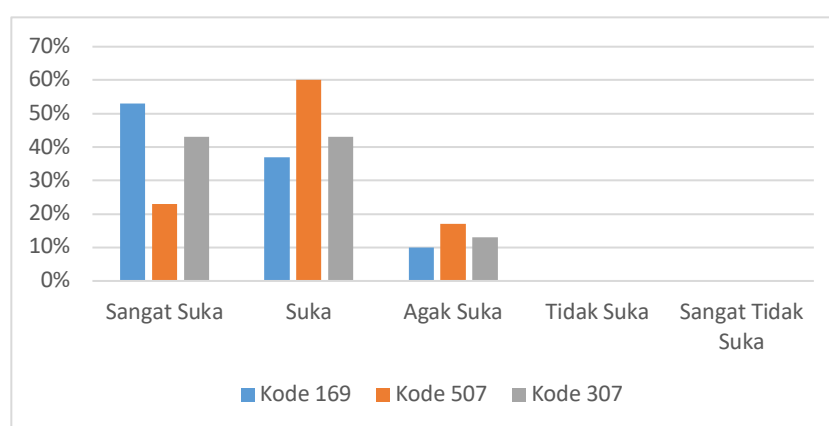


Figure 2.Sensory Graph Based on Taste.

The results of data tabulation based on taste indicators, code 169 containing 80% canna starch flour and 20% mung bean flour as much as 53% of the panelists really liked it, 37% of the panelists liked it, and 10% of the panelists said they rather liked it. In code 507 with 50% canna starch flour and 50% mung bean flour, 23% of the panelists said they really liked it, 60% liked it, and 17% quite liked it. While for products with code 307, 43% of the panelists said they really liked it, 43% of the panelists liked it, and 13% of the panelists quite liked it.

Based on the taste of crispy cheese tuile, the product that has the highest average value is code 169 with an average of 4.5. While code 507 has an average of 4.1 and 307 has an average of 4.4. Code 169 is preferred because canna starch does not have a specific taste (Harmayani et al., 2012) the taste produced by crispy cheese tuile with the main ingredients of canna starch and mung bean flour comes from sugar, butter and mung bean flour. The combination of protein and carbohydrates in green bean flour gives cookies a sweet, savory and distinctive taste (Pradyana et al., 2021).

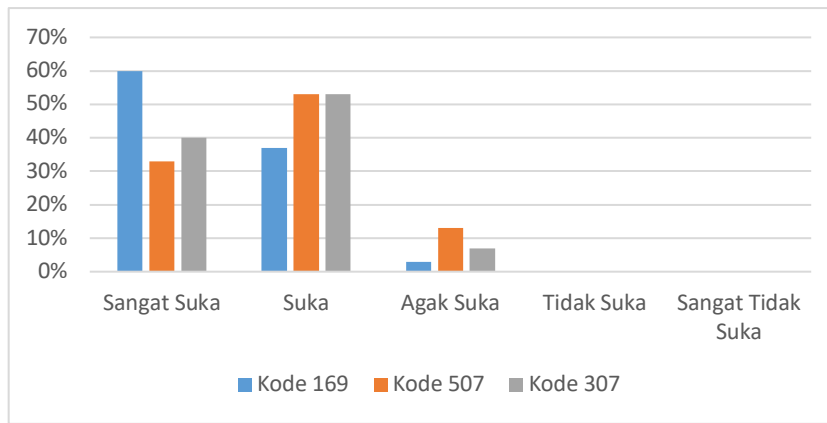


Figure 3.Sensory Chart Based on Aroma.

The results of the data tabulation based on the aroma indicator, code 169 containing 80% canna starch flour and 20% mung bean flour as much as 60% of the panelists really liked it, 37% of the panelists liked it, and 3% of the panelists said they liked it somewhat. In code 507 with 50% canna starch flour and 50% mung bean flour, 33% of the panelists said they really liked it, 53% liked it, and 13% quite liked it. While for products with code 307, 40% of panelists said they really liked it, 53% of panelists liked it, and 7% of panelists quite liked it.

Aroma also affects consumer preferences for a product. Before the panelists taste the product, the aroma of crispy cheese tuile will be smelled first and will arouse appetite. The highest average value based on aroma is product code 169 with an average of 4.7. Products with codes 507 and 307 have the same mean value of 4.3. Code 169 is preferred because canna starch does not have a specific aroma, which is different from green beans because it contains lipoxygenase enzymes which give rise to a distinctive aroma in cookies (Komah, 2013). Lipoxygenase activity gives rise to a beany flavor which causes an unpleasant odor (Irmæ et al., 2018).

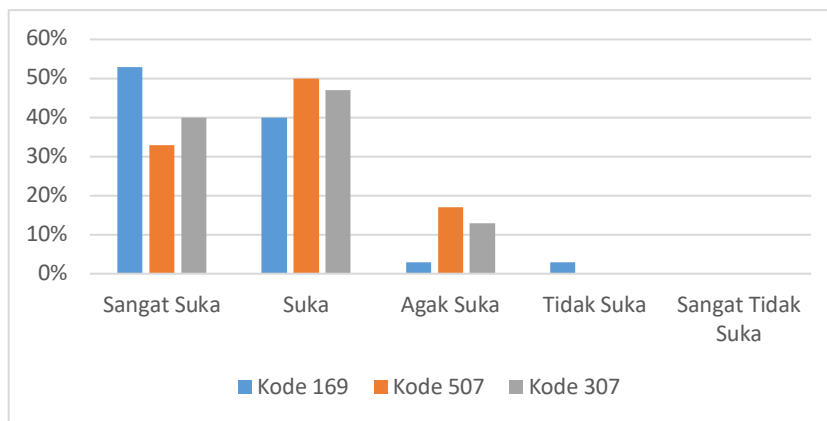


Figure 4.Sensory Graphics Based on Texture.

The results of data tabulation based on texture, code 169 with 80% canna starch flour and 20% mung bean flour as much as 53% panelists really like it, 40% panelists like it, 3% panelists rather like it, and 3% panelists don't like it. Code 507 as many as 33% of the panelists really like it, 50% of the panelists like it, and 17% of the panelists kinda like it. As many as 40% of the panelists like the product with code 307, 47% of the panelists like it, 13% of the panelists like it somewhat.

Recipe formulas that use canna starch flour at most code 169 have an average of 4.5. Codes 507 and 307 have the same mean value of 4.2. Canna starch flour has a more brittle texture,

the decrease in hardness may be influenced by the high amylose content of canna starch so that the water binding capacity becomes small (Harmayani et al., 2012). Meanwhile, the high protein and fiber content in green beans can affect the hardness of the product (Irmay et al., 2018).

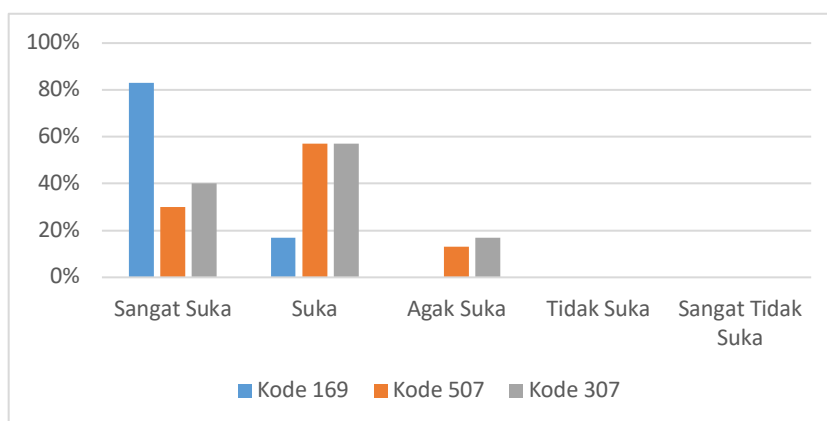


Figure 5. Sensory Graph By Overall.

The results of the overall data tabulation, code 169 with 80% canna starch flour and 20% mung bean flour as many as 83% of panelists said they really liked it, 17% of panelists liked it. Product code 507 with 50% canna starch flour and 50% mung bean flour as much as 30% of the panelists really like it, 57% of the panelists like it, and 13% of the panelists rather like it. Products with code 307 with 20% canna starch flour and 80% mung bean flour as many as 40% of panelists really like it, 57% of panelists like it, and 3% of panelists quite like it.

Of the 3 recipe formulas for crispy cheese tuile with the main ingredients canna starch and mung bean flour overall the most preferred is code 169 with an average value of 4.8. Code 507 has an average value of 4.3 and code 307 has an average value of 4.4.

4.3. Product Acceptability

Table 2. Product Acceptability Category.

Product Code	Score	Acceptance Category
Code 169	698	very welcome
Code 507	628	accepted
Code 307	643	accepted

The product with code 169, namely 80% canna starch flour and mung bean flour, has the highest score among the three samples, namely 698, the score is at 630-750, which means that the product with code 169 is very acceptable. based on the results obtained from the total score of 5 hedonic test categories from a total of 30 untrained panelists.

Products with code 507, namely 50% canna starch flour and 50% mung bean flour, have a score of 628, which is between 510-630, which means that products with code 507 are accepted based on the hedonic test results of a total of 30 untrained panelists.

Next, the product with code 307, namely 20% canna starch flour and 80% mung bean flour, has a score of 643, which is between 630-750, which means that the product with code 307 is very acceptable based on the hedonic test results from a total of 30 untrained panelists.

5. CONCLUSION

The ingredients used in the formula for the recipe for making crispy cheese tuile are canna starch flour, mung bean flour, egg whites, powdered sugar, butter, vanilla paste, salt, and cheese. Based on sensory analysis, the highest preference for color, taste, aroma, and texture categories is for products with code 169. The results of the acceptability analysis, products with codes 169 and 307 fall into the very acceptable category. While products with code 507 and code 307 are included in the accepted category.

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