International Journal of Progressive Sciences and Technologies (IJPSAT)
ISSN: 2509-0119.

Vol. 33 No. 2 July 2022, pp. 164-177

Effect Of Encapsulation Of Liquid Smoke Of Cocoa Fruit Peel (Theobroma Cacao L.) Against The Shelf Life Of Goldfish Meat (Cyprinus Carpio L.)

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Abstract – This study aims to determine the characteristics of the liquid smoke of cocoa fruit peels and the effect of encapsulants on the shelf life of carp meat. The preservative of the cocoa fruit skin liquid smoke encapsulated maltodextrin decreases the activity of microorganisms and protects the liquid smoke from being easily damaged.

The tahap I study aimed to obtain the best maltodextrin-encapsulated cocoafruit peel liquid smoke from three formulations (10%:0%; 9.5%:0.5%; 8.5%:1.5%). Tahap II is the preservation of carp meat using liquid smoked cocoa fruit peel encapsulated maltodextrin concentration of 1%. Positive control is used as a comparison, that is, traditional smoked carp meat.

The formulation of F2 (9.5%:0.5%) of cocoa fruit peel liquid smoke is encapsulated maltodextrin with a pH value of 5.76; total acid 0.036%; andantioxidant 38.86 (µg/mL) being the best formulation. Phase II research resulted ina decrease in moisture content while the pH, TPC and total phenol values increasedduring storage. The positive control water content values were low, while nilai pH,TPC and total phenol were highest compared to the entire storage treatment. Whilethe organoleptic value of liquid smoked carp meat decreases during storage.

Keywords – Carp Meat, Liquid Smoke, Leather Buah Kakao, Encapsulation,Maltodextrin.

I. INTRODUCTION

Goldfish (*Cyprinus carpio L.*) including fish that are often consumed because they are economical and contain nutrients that function to help the metabolic processe [26]. The nutritional content of goldfish, namely 80 grams of water, 16 grams of protein, 2 grams of fat and 2 grams of ash per 100 grams of ingredients, causes the activity of microorganisms to increase. This leads to the occurrence of putrefactive processes and decreased shelf life [12].

Aliquid sap is used as a preservative becauseantioxidants and organic acidsinhibit damage due to the activity of microorganisms. Liquid smoke contains 0.11%phenol, 0.038% carbonyl and acid groups that have antioxidant and antimicrobial activity [7].

Cocoa fruit peels containing27.95% lignin, 36.23% cellulose and 1.14% hemicellulose can be decomposed in a pyrolysis reactor at high temperatures that will produce liquid smoke [18]. Encapsulation is a protection so that it is not easily damaged that interferes with the activity of liquid smoke through the process of coating the core material in the form of a liquid or solids using encapsulants so thatthe core particles have the desired physicochemical properties [10].

The manufacture of encapsulation requires a maltodextrin encapsulator. Maltodextrin is used in the food industry as an emulsifier and coating of microcapsules that have high oxidation resistance and can lower emulsion viscosity [19]. This study utilized cocoa fruit peel and encapsulation of liquid smoked maltodextrin cocoa fruit peel in carp meat inhibited the growth of microorganismsand extended their shelf life.

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II. MATERIALS AND METHODS

2.1. Material

The research materials were carp (*Cyprinus carpio*) from cages on the coast of Lake Toba and cocoa fruit peel waste was obtained from community plantations in Deli Serdang, North Sumatra.

Chemicals used include buffer solutions, aqueous, iron (III) chloride (FeCl3) 5%, dichloromethane, phenols (C_6H_6OH), maltodextrin, saturated sodium carbonate (Na_2CO_3), zeolite and tissue paper. Theequipment used include pH meters and equipment, glass stirrers, cup cups, beaker glass, filter paper, measuring flasks, erlenmeyers, UV-Vis spectrophotometers (Variant 50conc), freeze drying equipment, centrifuges, analytical scales, digital scales, magnetic stirrers, cylindrical tubes, 10 ml measuring flasks, 25 ml, 50 ml and 100 ml, 1 ml and 10 ml scale pipettes, measuring cups 50 ml, beakers 50 ml, 250 ml, 500 ml and 1000 ml, hot plates, ovens and fixtures, vortex mixers and bulbs.

The liquid smoke production tools used in this study are a set of pyrolysis tools, a set of distillation tools, vacuum pumps and desiccators.

2.2. Method

2.2.1. Phase I Research

2.2.1.1. Manufacture of Liquid Smoke

Kulit cocoa fruit cleaned, separated from the pulp, chopped to asize of 2-3 cm. Ddry usinganoven up to a moisture content of 10-15%.Furthermore, the cocoa fruit peel process is put into pyrolysis temperatureof 400°C, condensed to produce grade 3 liquid smoke, tar, and charcoal. The grade 3 liquid smoke obtained was deposited one week ago at 94°C. Destilate accommodated obtained as liquid smoke grade 2. Grade2 liquid smoke is filtered using filter paper topped with active zeolite.

The filtrate obtained is grade 1 liquid smoke.

2.2.1.2. Encapsulation of Liquid Smoke

The liquid smoke of cocoa fruit peel is mixed with the encapsulantconcentration of maltodextrin with the following concentration ratio: 10% : 0% (F1) ; 9.5% : 0.5% (F2) ; 8.5% : 1.5% (F3) then homogenized for ± 30 minutes. Incentrifuse at 3000 rpm for 3 minutes (1 rpm 25 = 1/60 Hz). Theupernatan is heated on a 50°C temperature water heater for15 minutes.

2.2.1.3. Testing of Encapsulated Liquid Smoke

To find out the best condition of the three concentrations of liquid smoke of cocoa fruit peel encapsulated maltodextrin, observations of pH,total acid were carried out. Uji antioxidants are performed on the two best treatments.

a. pH

Determination of pH by calibrating the pH meter tool with a buffer solution. 5 g of the sample is homogenized with 10 ml of aquades then the electrode is inserted until the pH meter picture stops and shows a fixed number.

b. Total Acid

Total acid testing was carried out by weighing anampel of 10g put in a glass beaker and added aquadest 10 ml stirred until the fibrousa filtered with filter paper put into the measuring flask then added aquadest as much as 100 ml put into the erlemeyer added phenolphthalein 1% as much as 2-3 drops. It was then titrated withNaOH 0.01N. Titration is stopped after the appearance of a stable pink color. Total acid is calculated using the formula:

$$Total\ Asam = \frac{ml\ NaOH\ x\ N\ NaOH\ x\ BM\ Asam\ x\ FP}{2!\ Berat\ contoh\ (g) x\ 1000\ x\ va}\ x\ 100\%$$

c. Antioxidant

1. DPPH solution

The DPPH solution is prepared by weighing 4.7 mg of DPPHthen glued to 100 mL of ethanol (pa) and placed in a dark room for20 minutes.

2. Solution Blanko

Mmake a blank solution, namely by using 1 ml of DPPH solution (2.2-diphenyl-1-pyryhydrazyl) then glued up to 5 ml with ethanol (pa).

3. Ampelous S solution

Moffset a sample of 1 g is then listed in a 100 mL flask usingethanol (pa). the solution is the parent solution. Then pipette 15.6; 31.2; 62.5; 125; 250 and 500 µL to the 5 mL flask so that a concentration of 3.12 was obtained; 6.25; 12.5; 25; 50 and 100 µg/ml.

4. Determination of Aactivity ofntioxidan

The blank solution was picketed by 1 ml, the BHT standard and the sample was added with a 100mg/L DPPH solution of 1 ml.

2 ml methanol to the limit of tera. The test tube is inserted and homogenized using a vortex and then incubated 30 minutes at a temperature of 370 °C for each sample solution. Absorption measurement 3 times the test used for data analysis. IC_{50} of the standard solution and the test sample solution is calculated by plotting the values derived from the respective concentrations of the standart and the sample as the x-axis and % inhibition against DPPH as the y-axis on the regression equation. The lower IC_{50} , thehigher the antioxidant activity to dampen free radicals.

$$\%\ \text{Inhibisi} = \frac{\text{Abs Blanko} - \text{Abs Sampel}}{\text{Abs Blanko}} \text{x } 100\ \%$$

2.2.2. Phase II Research

2.2.2.1. Preservation of Carp Meat

Ikan mas discarded scales, entrails, tail and head. After that, the fish is washed with running water until clean and then *filled* using a sharpknife and then the fish meat is taken.

The carp preservation process is carried out pada carp *fillet* using liquid smoke encapsulated maltodextrin in the best condition. Carp meatsoaked in liquid smoke encapsulated maltodextrin concentration of 1% baked using an oven with a temperature of 100°C time 3 hours cooled and stored for 0 days, 2 days, 4 days, and the next 6 days inthe analysis of moisture content, pH, *total plate count* (TPC), total phenols and organoleptics. This study had a positive control as a comparison, namelytraditional smoked carp meat obtained from traditional smoked fish craftsmen or sale fish from the city of Padangsidempuan, North Sumatra. The treatment and storage duration factor in this study refers to the study[17]

2.2.2.2. Carp Meat Testing

a. Moisture Content

Water content measurements were carried out gravimetrically following the AOAC method (2005) in the journal Ali *et al*. (2014). 0.5 g of the sample was put into a porcelain dish into the oven at a temperature of 105°C which has been known to be of constant weight. The sample was dried at 105°C for 2 hoursand then weighed. The sample is re-dried and then weighed every 1 hour until a constant weight is obtained.

b. pH

The determination of pH refers to [4] by calibrating the pH meter tool with a buffer solution. 5 g of the sample is homogenized with 10 ml of aquades then the electrode is inserted until the pH meter number stops and shows a fixed number.

c. Total Plate Count

The determination of *the total plate count* refers to SNI 2332.3: 2015. Weighed 25 grams of crushed sample put in a sterilek plasty container and added 225 mL of *butterflied's phospate buffered* (BPB) solution was put into the vial, then homogenized for 2 minutes. This homogenate is a solution with a dilution of 10-1.

The mixing of the solution is taken 10 mL and put into a vial containing 90 mL of butterflied's phospate buffered so that an example with a dilution of $^{10-2}$ is obtained, then homogenized. Thendilution is carried out until dilution of 10-6. Pipetting is carried outfrom each dilution tube of 1 mL and transferred into a petri dish using a sterile pipette. Furthermore, the media to be put into a petridish as much as 5 mL and shaken until the surface to be evenly distributed, the petri dish is allowed to stand until the medium coolsand hardens. On a saucer containing agar and sample solution is put into an incubator at a temperature of 35 ºC for 48 hours with the position of the petri dish reversed. Observations were made bycounting the number of bacterial colonies present in the petri dish.The number of colonies that can be counted is those that have colonies between 25 and 250 colonies. Bila the number of virgin colonies is greater than 250 on the entire dilution then report the result as too much to count (TBUD), but if one of the dilutions hasa colony count. Calculation of the number of colonies:

$$N = \frac{\sum C}{[(1 \times n_1) + (0{,}1 \times n_2] \times d}$$

Information:

N: Number of product colonies (colonies per ml or colonies perg)

C: Number of colonies on all calculated cups

n1,n2 : The number of first and second dilution cups calculatedd : The first dilution calculated

d. Phenol

Determination of the total phenolic content using the Folin- Ciocalteu method was picketed 0.2 ml of extract, added 15.8 mL of aqueous and 1 mL of Folin-Ciocalteu reagents and then shaken. Let stand 8 minutes then add 3 mL na2CO3 10% into the mixture.Larutan is allowed to stand 1 hour at room temperature. The uptakewas measured with the U-Vis spectrophotometer at the maximum wave event. Three repetitions were performed so that the phenol levels obtained by the results could be obtained as mg of gallic acidequivalent / g of fresh samples.

e. Organoleptics

Organoleptic testing is a test carried out to determine the level of freshness of goldfish using the five senses. This test assesses several parameters, namely the color, meat, smell and texture of the meat. Organoleptic testing using *a score sheet* basedon SNI 2725.1: 2009. The test used a description test in which samples were presented to untrained panelists withquality scores of 1-9 for each sensory attribute. The condition of the fish is declared good with a score of at least 7. Organoleptic testing was carried out with 30 untrained panelists.

III. RESULTS AND DISCUSSION

3.1. Cocoa Fruit Peel Liquid Smoke

Phase I research produced liquid smoke of cocoa fruit peels. For colorquality testing is observed with the naked eye. According to [6] based on thegrade, the uses and colors of liquid smoke are divided into 3 namely:

a. Grade 1 is a clear warn, slightly sour taste neutral scent and can be used for food.
b. Grade 2 is a transparent brownish color, medium ama taste, weak smoke scent. It can be used for foods with *smoked taste* (e.g. smokedmeat, smoked fish, *barbeque* seasoning, smoked eggs).
c. Grade 3 is dark brown color, strong smoke flavor, strong smoke scent,used for rubber clumping material in place of ant acid, tanning leather,antiseptic substitute for fabric and removal of mold.

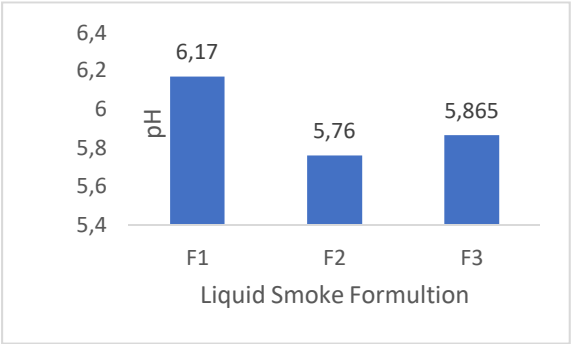
d. The liquid smoke of cocoa fruit peel grade 1, 2 and 3 in this study looked like the following:

Picture 1. Skin Liquid Smoke pH Graph

3.2. Characteristics of Encapsulated Liquid Smoke

3.2.1. pH value

PH measurement in liquid smoke aims to determine the acidity levelof liquid smoke from the pyrolysis process. The lower the pH value, the higher the quality of the liquid smoke produced, on the contrary, the higherthe pH value, the lower the quality of the liquid smoke produced [9]. The values of the degree of acidity (pH) of the liquid smoke of cocoa fruit peels of various formulations are presented in chart 2 below.

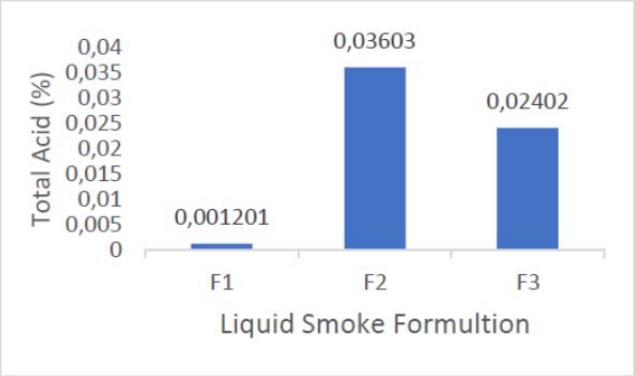


Picture 2. Skin Liquid Smoke pH Graph

According to [20] the pH of liquid smoke ranges from 2.3 to 5.7. ThepH value of liquid smoke is influenced by the content of organic acids, suchas acetic acid and propionic acid. The acidity level of the liquid smoke thatwill be used as a preservative greatly affects the quality of its preservation.Based on picture 2, it can be seen that the pH of liquid smoke F2 is 5.76 where this pH level is a pH level that is in accordance with the quality standards of liquid smoke so that the quality of F2 liquid smoke is among the best.

3.2.2. Total Acid

According to [13] acidic compounds are compounds that act as antibacterials and form flavors in salted products. High acid levels serve asan inhibitor of microbial development because they cannot develop at highacid levels. This is in line with the opinion [7] which states that the high levels of acetic acid in liquid smoke characterize that the liquid smoke produced has the potential to be a coagulant and as an antimicrobial. The total acid content contained in liquid smoke includes acetic acid, propionate,butyrate and valerate.



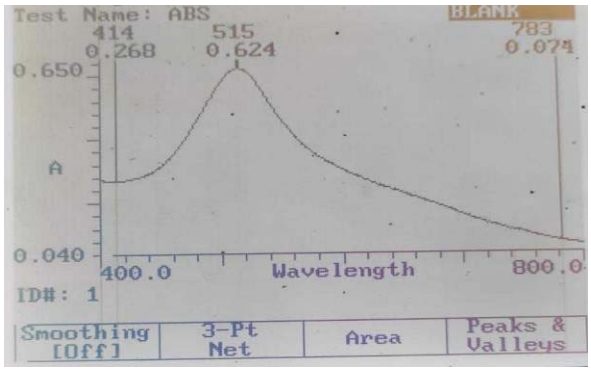
Picture 3. Total Liquid Acid Graph

According to [25] the acidity of liquid smoke from various woods varies between 4.27-11.39%. Based on the right and looking at picture 3, itcan be seen that F2 has the highest acid content, then based on the total acid,it can be said that the quality of F2 liquid smoke is the best.

3.2.3. Antioxidant Activity

DPPH Solution Absorbance Curve

The absorbance curve of a DPPH solution with a concentration of 3.12 µg/ml in methanol using a UV-Visible spectrophotometer at awavelength range of 515 nm is seen in picture 4.

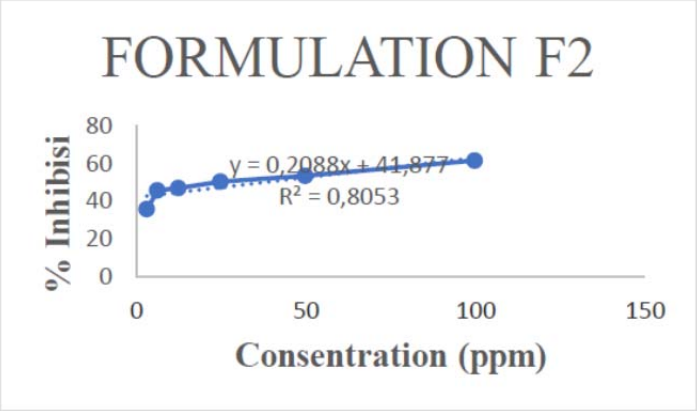


Picture 4. Absorbance Curve of DPPH Solution Of Concentration 3.12

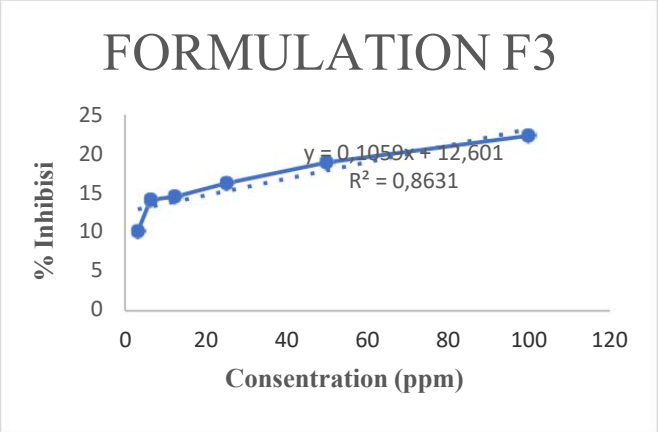
Picture 4. Absorbance Curve of DPPH Solution Of Concentration 3.12 Picture 11 shows the results of measuring the maximum absorption of DPPH solution with a concentration of 3.12 in methanol, which is 0.624 at a maximum wavelength of 515 nm where inthe p-wave event the highestand stable absorbance value is obtained.

Dpph damping calibration curve by Formula

The calibration curves of each formulation are seen in pictures 5 and6 below :



Picture 5. Kurva calibration immersion activity (%) F2



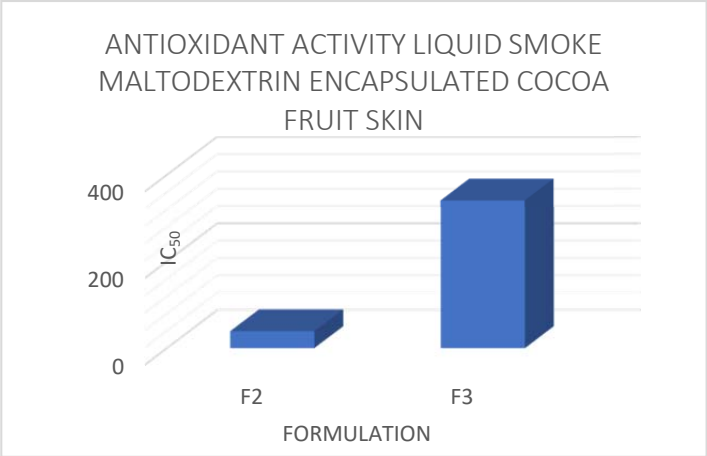
Picture 6. Kurva calibration immersion activity (%) F3

Picture 5 above is a calibration curve of DPPH immersion by a test sample that shows an increase in the percentage of immersion. The magnitude of the formulation concentration is directly proportional to thepercentage of immersion or the greater the free radicals from DPPH that can be bound by antioxidant compounds [22].

Antioxidant Activity (IC_{50}) Formula

Analysis of antioxidant activity is used to determine the process ofa material by soaking radical compounds through determining the value ofinhibite concentration (IC_{50}). inhibite concentration is the concentration needed to reduce 50% of radical compounds [15]. Diphenilpikrihydrazyl is used as a radical compound because it is a fairly stable radical compound.

Antioxidant activity indicated by an IC value of$_{50}$ (*Inhibitory Concentration* 50%) has the meaning of a formulation concentration that causes dpph absorbance to drop to half which is calculated based on the linear regression equation. Ic_{50} values were obtained from the measurement ofthe immersion plot (% immersion) with the concentration of the formulation [21].



Picture 7. Antioxidant Activity IC_{50} Liquid Smoke MaltodextrinEncapsulated Cocoa Fruit Skin

Based on picture 7 above, it can be seen that the formulation showsdifferent antioxidant activities. The F2 formulation has an IC value of$_{50}$ lower than the F3 formulation. So that the F2 formulation has a higher antioxidant activity. This is in accordance with the literature which states that the IC value of$_{50}$ is inversely proportional to antioxidant activity, where the IC value$_{of\ 50}$ the lower the antioxidant activity, the higher the antioxidant activity [11]. The F2 formulation has a very strong antioxidantactivity in the dwarf while the F3 formulation has antioxidant activity in the weak category.

3.3. Characteristics of Liquid Smoked Carp Meat

The characteristics of liquid smoked carp meat are very necessary toknow because it is related to the nutritional content, food safety and durability of smoked fish. Characteristics of liquid smoked carp meat during storage are presented in table 1, picture 8 and picture 9:

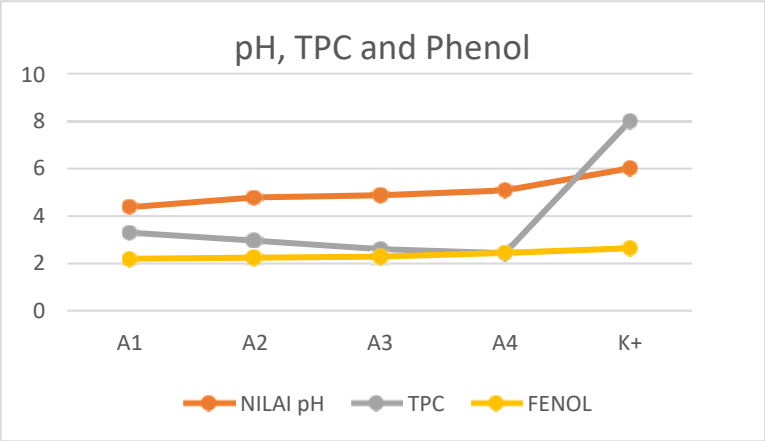
Table 1. Characteristics of Liquid Smoked Carp Meat During Storage

Treatment	Water Content	pH	TPC	Total Phenols
A1	46.36±0.703b	4.38±0.205a	$3.36x10^5$±0.103c	2.21±0.251a
A2	45.47±0.564b	4.79±0.135b	$4.29x10^5$±0.09b	2.24±0.102a
A3	43.44±0.790a	4.87±0.145bc	$4.80x10^5$±0.090a	2.29±0.043a
A4	42.33±0.828a	5.08±0.125c	$5.19x10^5$±0.090a	2.45±0.025b
K+	42.59±0.495a	6.01±0.111d	TBUD ±10 5,000d	2.64±0.050c

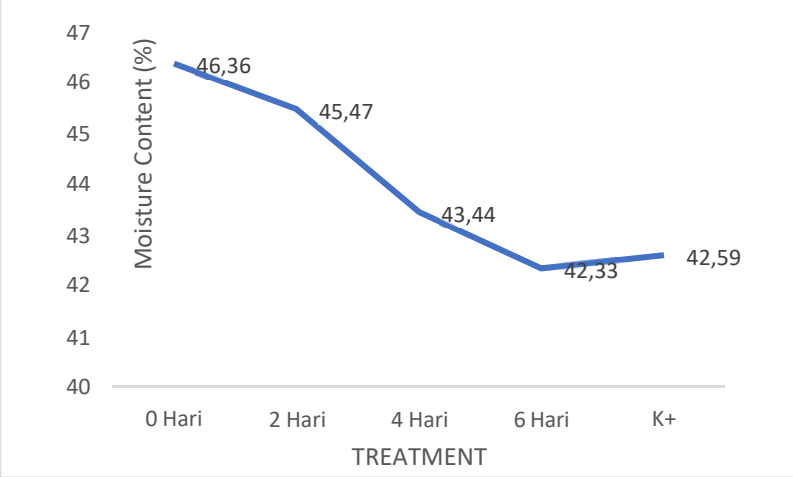
Information:

A1: 0 Days Storage A4 : 6 Days Storage TBUD: >300cfu/gA2 : 2 Days Storage K+: Positive control

A3: 4 Days Storage ± : Standard Deviation



Picture 8. pH, TPC and Phenol Values of Liquid Smoked Carp Meat



Picture 9. Water Content of Liquid Smoked Carp Meat

3.3.1. Moisture Content Value

The moisture content contained in liquid smoked carp meat canaffect the shelf life of smoked fish karena the water content is a microbialmedium for breeding [1]. Based on table 7 characteristics of liquid smokedfish meat during storage, it is known that the moisture content of carp meat decreases with increasing storage time. According to [16] the addition of the amount of encapsulantant can increase the substance in the solvent andreduce the water content thereby reducing the content of the water produced.

When compared to the Indonesian national standard for smoked fish(SNI 01-2725-2013) where the maximum moisture content (% bb) ofsmoked fish is 60%. Based on the results, the moisture content of carp meatis still within the limits of the Indonesian National Standard.

3.3.2. pH value

Based on table 1 characteristics of liquid smoked fish meat during storage above, it is known that theuse of liquid smoke memhas an influenceon the pH value of fish. According to [7] acidity has a very large role in inhibiting microbes.

Based on picture 8, it can be seen that the longer the fish storage, thepH value will increase. According to [14] the increase in pH is due to the activity of putrefactive bacteria that can produce proteolytic enzymes. Thisenzyme can break down proteins into

ammonia, trimethylamine and other volatile components so that the pH value will be naik. When the rigor mortisphase begins to end, the pH of the fish will rise slowly until it becomes alkaline. This is due to the decomposition of compounds in the fish's body due to a decrease in the strength of the peyangga. Apart from the decreasedbuffer strength, other causes cause yang to cause the pH value to rise due tothe degradation of fish proteins into ammonia compounds and their derivatives [4].

3.3.3. TPC Value

From the table of characteristics of liquid smoked carp meat duringstorage obtained the average TPC score on carp meat preserved with liquidsmoke encapsulated maltodextrin naturalizer decreases as the storage timeincreases. Based on SNI number 01–2332–3–2006 fish meat is still in thefresh category if the number of bacteria does not exceed $5x10^5$ colonies per gram.

The total bacteria in the positive control treatment were TBUD. The results showed that the positive control was not suitable for consumption. The TPC value of liquid smoked carp meat is lower than theTPC value of the positive control treatment is possible because themaltodextrin encapsulated liquid smoke has antimicrobial activity capableof inhibiting the growth of microbes. The results of measuring the TPC value of maltodextrin encapsulated carp meat during storage are presentedin picture 8.

The results of the TPC chart of carp meat based on treatment are known to decrease with the increase in storage time. It is known that the 6-day storage treatment had a lower average TPC score of goldfish compared to other treatments, which was $2.43x10^5$.

3.3.4. Phenol Value

From table 7 the characteristics of liquid smoked fish meat duringstorage obtained the highest total phenol was seen in 6-day storage liquid smoked carp meat which was 2.45 mg GAE/g while thelowest t otal phenolwas seen in 0-day storage liquid smoked carp meat which was 2.21 mg GAE/g.

Based on picture 8 it can be seen that the total phenol of liquid smoked carp meat increases as the storage time increases. The increase intotal phenols is due to a decrease in water content. Phenol is a solute compound (solute) that will be dissolved in water.

Theotal phenol of liquid smoked carp meat is lower than that of total phenol kontrol positive (traditional smoked carp). This is due to the difference in the penetration of smoke into the fish tissue and the amount of smoke attached to the surface of the fish. Traditional fumigation can produce smoke in the form of aerosols that dapat stick to the surface of theikan due to the influence of gravity. High enough temperatures can cause fish meat fat to melt and come out to the surface of fish that can adsorb smoke. Smoked aerosols attached to the surface of the fish will penetrate the fish tissue. Because of the very high concentration of smoke, the jumlah smoke that sticks and penetrates is also a lot. Meanwhile, in the fumigation of liquid smoke, the amount of smoke that penetrates the fish tissue depends on the concentration of the smoke solution and the duration of immersion or immersion of the fish into the smoke solution [5].

3.3.5. Organoleptic Value

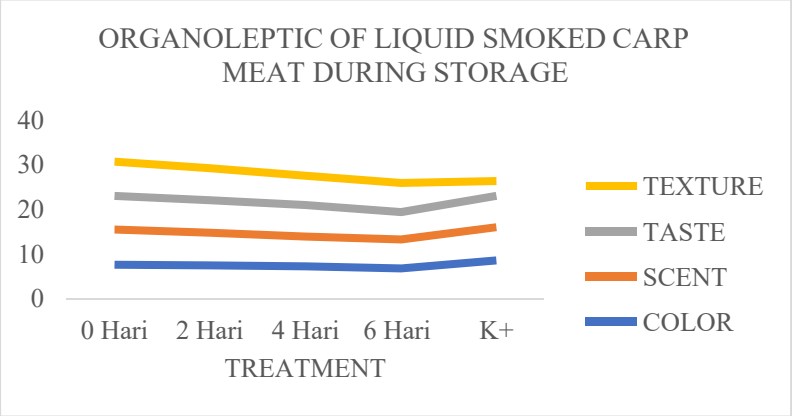
The organoleptic test used in this study is a hedonic quality test toassess the quality of liquid smoked carp meat during storage and find out the panelist's acceptability to products including color, scent, taste, texture,mold and mucus. The results of organoleptic quality testing of liquidsmoked carp meat are presented on tabel 2 and picture 10.

Table 2. Organoleptics of Liquid Smoked Carp Meat During Storage

Treatment	Color	Scent	Taste	Texture
A1	7.73±0.057 c	7.82±0.05d	7.54±0.166a	7.66±0.09d
A2	7.51±0.105bc	7.29±0.16c	7.27±0.300b	7.18±0.224c
A3	7.29±0.337b	6.76±0.02b	6.97±0.123bc	6.64±0.15b
A4	6.88±0.040a	6.47±0.00a	6.13±0.179a	6.51±0.15b
K+	8.67±0.065d	7.43±0.088c	7.01±0.101b	3.31±0.125a

Information:

A1: 0 Days Storage control A2 : 2 Days Storage A3: 4 Days Storage A4 : 6 Days Storage K+: Positive ± : Standard Deviation



Picture 10. Organoleptic Chart of Liquid Smoked Carp Meat DuringStorage

a. Color

To find out the liquid smoked carp meat, the skin of the cocoa fruit is fully encapsulated maltodextrin using the sense of sight, a color test is carried out. Based on picture 10 , the color value of smoked carp meat decreases as the storage life increases. The decrease in color valueis thought to be due to chemical reactions and microbiological work during storage as well as a decrease in the moisture content of smokedfish.

Table 2 shows that the color values of the positive control treatment are higher than other treatments due to a lot of smoke attached so that the brown color is very shiny. Liquidsmoked carp D aging has a color average with a shiny brown color (lower than the positive control fish color) due to the use of a low concentration of 1%.maltodextrin-encapsulated liquid smoke.

In general, according to the panelists, the average color of liquid smoked carp meat encapsulated maltodextrin was relatively good with an average score of 7.35 whole, clean, shiny brown color. The brown color arises due to the presence of carbonyl compounds consisting of formaldehyde, acetone, glocolate aldehydes and metiglioxals that hold interactions with amino compounds. Sesuai statement [23] which states that the preservation treatment of liquid smoked fish not only provides changes in its chemical content, but alsoin the sensory characteristics of color.

b. Scent

The scent test aims to determine the smell of smoked fish in general using the sense of smell (nose). From table 8 obtained the scent value of carp meat thatsg preserved with the highest maltodextrin encapsulated liquid smoke was 7.82 at a sprinkling duration of 0 daysand the scent value of carp meat preserved with lowest maltodextrin- encapsulated liquid smoke was 6.47 at a time of 6 days of sprinkling.

Based on picture 10, the scent value of smoked carp meat decreases as the storage takes longer. The longer the storage of liquid smoked carp meat the panelists' acceptance of the scent of carp meat asap the smaller it is. [8] states the compound that most affects the scent of smoked fish is phenol especially with a low boiling point. In general, according to the panelists, the average value of the scent of goldfish meat was encapsulated maltodextrin relatively good with an average score of 7.35 less fragrant, enough smoke, without additionalodors. Based on this, the encapsulation of liquid smoke using maltodextrin in the preservation of carp meat has an influence on the scent.

c. Taste

The taste test aims to determine the organoleptics of smokedfish in general by using the sense of taste (tongue). From the organoleptic table of smoked carp meat obtained the taste value of carpmeat preserved with the highest maltodextrin encapsulated

liquidsmoke was 7.54 at a time of 0 days of sprinkling and the taste value ofcarp meat preserved with the lowest maltodextrin encapsulated liquid smoke was 6.13 at a time of 6 days of sprinkling.

Based on picture 10, the taste value of smoked carp meat decreases as the storage life increases. According to [13] phenols, acids and carbonyls are the smoke compounds that play the most role in theformation of food properties. Phenols contribute greatly to the taste of smoked products. Phenols with low and medium boiling points such as guaicol and citronol play a big role in providing the taste and scent of smoke, while carbonyl especially aldehydes and ketones have an effect on color.

In general, according to the panelists, the average value of thetaste of goldfish meat was encapsulated maltodextrin relatively good with an average score of 7.98 delicious, less savory. Based on this, theencapsulation of liquid smoke using maltodextrin in the preservation of carp meat has an influence on taste. According to [22] lemak is thenutritional component that most affects the flavor value of smoked fish. During heating, fish meat fat will melt, adding to the palability ofthe meat due to the breaking of fat components into volatile products such as aldehydes, ketones, alcohol, acids and hydrocarbons which affect the formation of flavors.

d. Texture

The texture test aims to determine the chewiness of smoked fish in general by using the sense of touch (hand). From table 2, the highest maltodextrin-encapsulated goldfish meat texture value was 7.66 at the 0th day of sprinkling duration (A1) and the lowest maltodextrin-encapsulated liquid smoke texture value was 6.51 at the 6th day of sprinkling (A4) duration. Heating with the method of inventoriing smoked carp meat will be more durable, texture and scent will be better and digestibility will increase resulting in panelists' acceptability to the organoleptic properties of smoked fish as a whole[22].

Based on the image above during storage, the texture value ofsmoked carp meat decreases more and more as the storage life increases. According to Girard [13] phenols, acids and carbonyls arethe most pressed smoke compounds in the formation of foodproperties. Phenols have a great contribution to the texture of smokedproducts. Phenols with low and medium boiling points such as guaikoland siringol play a big role in providing the texture and scent of smoke. From the graphic image of the texture of smoked carp meat, the texture value of the positive control treatment is shown lower thanthe other treatments. The control texture value is positive 3.31 with a soft description, between the tissues begins to come off. In general, according to the panelists, the average value of the texture of smoked carp meat is relatively good with an average score of 6.92 dense, compact, between close tissues.

IV. CONCLUSION

Based on the research that has been carried out, the following conclusionscan be obtained:

1. Characteristics of cocoa fruit peel liquid smoke encapsulated best maltodextrin at a combination of 9.5% cocoa fruit peel liquid smokeconcentration: maltodextrin 0.5% (F2)
2. The moisture content value decreases while the pH, TPC and total phenol values increase during storage
3. Organoleptic liquid smoke of cocoa fruit peel encapsulated maltodextrin experiences a decrease in color, taste, scent and texture values during storage
4. The value of the liquid smoked carp meat of maltodextrin encapsulated cocoa fruit skin is better than that of the control treatment of traditional smoked carp meat

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