Lard in Pork Meatball: A Simple Method to Preparing, Extracting and Analyzing

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Abstract: Meatballs are foods that are often consumed in Indonesia, especially in Medan. The Industry products in Indonesia needs to be processed in a laboratory whether using lard or not, for example pork meatballs. Solvent-based extraction method requires a relatively long time and a large cost. In this study, the maceration coupling electrosynthesis method was developed to extract lard in pork meatballs. The first treatment is sample collection and preparation. In the extraction process, we have varied of the maceration time at 30, 60, 90, 120, and 180 minutes and the temperature at 50^0C. The physical properties of the extracted fat were analyzed using the parameters of iodine number, refractive index, melting point, acid number and optimum results obtained at t = 120 minutes and T = 50^0C respectively: 71, 1,462, 38^0C, and 2,524. The optimal amount of lard is developed using UV spectroscopy at 270 nm and produces 46% lard. This method is easy to use so it is easily applied to laboratory examinations.

1 INTRODUCTION

The most basic human needs and part of the basic rights of every citizen in Indonesia is called food (Hidayat & Siradj, 2015). At present, consumers are increasingly selective in consuming food (Burlian, 2013). Food must always be sufficient, safe, quality, nutritious, diverse at an affordable price, and not contrary to the religion, beliefs and culture of the people (Razali, 2017). Therefore, food safety is very necessary to prevent food from the possibility of biological, chemical and other contaminants that can interfere, harm and endanger health (Hidayat & Siradj, 2015). In this case, the need for analytical methods (preparing, extracting, ang analyzing) that provide protection for those who produce and consume these foods (Gustiani, 2009). The mixing unwanted ingredients in a particular product is deliberately called adulteration (Yanty et al., 2018). In addition to food safety factors, the halal factor of a food product must also be a concern of the community (Hidayat & Siradj, 2015). One of the halal concepts is that food must not contain lard. The presence of lard components causes these foods to be unclean for consumption (Hilda & Si, 2014). For this reason, the government is responsible for organizing halal product guarantees (JPH). Microbial total is one of the parameters in the analysis of beef sausage mixed with lard in the framework of testing the halal of processed food products based on microbiological analysis (Taufik et al., 2019).

Lard products needed by consumers are important to know, because there are indications of mixing lard (lard) with other fats such as chicken fat, so for that consumers need to be protected. Likewise, the presence of a component of lard is often used to replace beef fat which has the same function, so it needs to be tested for chemical content (Burlian, 2013).

One of the livestock commodities that has the potential as a mixture of fresh meat is pork. This is because pigs have the characteristics and ability to have fast growth, good ration efficiency (75-80%), high percentage of carcasses (65-80%) and high

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number of children per birth (litter size) (Satriavi et al., 2013). Lard is a basic ingredient of food that is commonly used as cooking oil or as a complement to dishes such as beef fat, goat fat and butter (Hilda & Si, 2014). The relatively cheaper price of pork is often used as a mixture sold under the Halal label (Susanto & Wardoyo, 2014). This is done for profit reasons without regard to consumer rights (Taufik et al., 2019).

In an analysis, chemists can provide direction of examination that corroborates the assumptions of substances contained in a compound (Lenski, 2010) including the process of investigation and analysis (Sisco et al., 2018). The composition contained in lard has been analyzed using the Chromatography and FTIR methods. Pork fat spectra have differences with other animal fats (Erwanto et al., 2018). Identification of pork forgery in processed meat products so far can only be detected based on its DNA. This is so that it requires a fairly expensive cost, research on forgery of pork into processed meat products, especially meatballs, has been done using SDS-PAGE. The result is detected protein fractions with certain molecular weights (Susanto & Wardoyo, 2014).

Meatballs are one of the foods that are very popular with the community because of its distinctive flavor made from beef, but meatballs are often reported because they are indicated using a mixture of pork in its processing (Guntarti & Prativi, 2017). There is an indication that the meatball food needs to be developed research on analyzing the content of lard to get more accurate results. The method of analyzing lard in food products such as meatballs containing lard is the physical properties of lard, qualitative analysis and quantitative analysis.

(Hilda & Si, 2014) has reported about lard analyzed using Gas Chromatography (GC). Qualitative data were developed by producing fractions of pork fat, namely: Caprylic Acid C_8: 0 0%, Capric Acid C_{10}: 0 0.07%, Lauric Acid C_{12}: 0 0.3%, Myristic Acid C_{14}: 0 1.20%, Acid Palmitoleic C16: 1 1.60%, Palmitic Acid C16: 0 7.22%, Margaric Acid C_{17}: 0 0.2%.

(Taufik et al., 2019) has reported pork fat (lard) in pork nugget material using UV spectroscopy (λ max = 270 nm) with extraction time of 12 hours.

The Completely Randomized Design (CRD) method was used in This Research. This work aims to application of the simple method to preparing, extracting and analyzing of Lard in pork meatball.

2 METHOD

2.1 Collecting, Preparation and Extraction

Sample collection is done by purposive sampling. Samples was collected at Padang Bulan Area, Medan. Samples were cleaned, cut into small pieces, mashed then dried for 2 hours (weighed @ 25 g).,.

Extraction using maceration couplingelectrosynthetic coupling with n-hexane solvent according to the research time variable and temperature of 50^0C, filtered with flannel cloth, centrifuged at 3000 rpm for 20 minutes, passed through filter paper containing anhydrous Na_2SO_4 to bind water molecules, dried, repeated for each treatment. The electrodes used are Aluminum at the cathode and anode. Voltage = 22 EV (Taufik et al., 2017). The maceration time was varied at 30, 60, 90, 120, and 180 minutes.

2.2 Physical Properties Analysis

The Parameter of Physical propertise was analysid were iodine number, refractive index, melting point, and acid number.

2.3 Spectrofotometry UV

UV spectroscopy used Beckman DU640 UV / Vis was developed to analysed or pork meatball. Optimum wavelength was selected in the range 200 - 400 nm. The concentration of the lard standard at 5, 10, 15, 20, 25%. The equation of the straight line was determined. 1 ml of extracted fat was mixed with 10 ml of distilled water, put into 2 ml of cuvette, absorbance and concentration were measured, repeated for each treatment variable.

3 RESULT

3.1 Collecting and Preparation

Preparation of the sample is done first, namely sampling from the Padang Bulan Area Medan. The 1100 gram meatball sample was cleaned, cut into pieces and then dried for 2 hours then divided into 200 grams into chamber. the process of collecting samples is done in clean conditions so that the purity of the samples obtained will be high.

Pork meatballs are prepared to obtain a substance that will be analyzed in the laboratory. Requirements

in chemical analysis must be fulfilled before the meatballs are tested, The size of pork meatballs used in research must have a smooth size and homogeneity so that the extraction process is faster. Pork meatballs were mashed using pestle and lump. After smoothing the meatball sample was dried for 2 hours to reduce the water content in the meatball so that the final mass preparation of 1100 gram sample was obtained. The sampling technique must be done properly because it can describe the conditions that are representative or represent the entirety of the material to be analyzed. The sampling was the initial stage carried out in conducting analysis. The sample must be represent the entire material to be analyzed. This stage must be considered: sampling point, distance between sampling and homogeneity of by products (Ci et al., 2015).

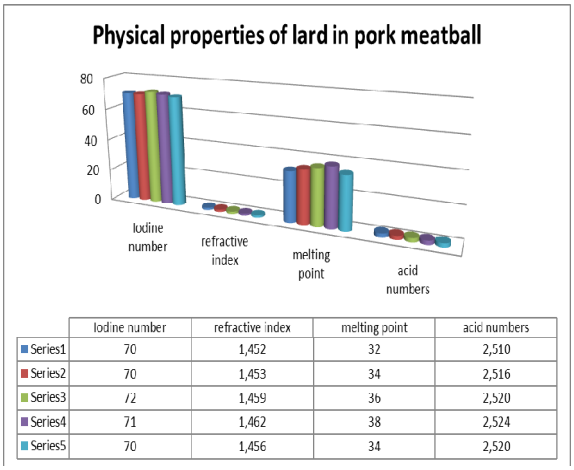
3.2 Extraction

The extraction process was carried out on the pork meatball sample by using maceration coupling electrosynthetic extraction, where in the electrocystesis the observed variables are heating at 50^0C, mixing n-hexane solvent and extraction time used 30, 60, 90, 120, 150 minutes. The process of electrosynthesis has additional variations, namely the current strength used by 1.1 volts, and using aluminum bars. In electrolysis a chemical reaction occurs with the transfer of solution electrons to the electrode (oxidation process), whereas at the cathode electron flow will occur from the cathode to the solution (reduction process). (Taufik et al., 2019) was extracted lard with an extraction time of 12 hours, so that macroscopic electrosynthesis can reduce maceration time.

Maceration is the simple way to extraction of lard. This method used was maceration coupling electrosynthetic. Electrosynthesis techniques and conventional synthesis methods, have the same variables as temperature, solvent, pH, reactant concentration, mixing method and time. But the difference, if in electrosynthesis has additional variables, namely electrical and physical variables such as electrodes (Prabawati et al., 2019).

3.3 Analysis of Lard

The parameter of the physical properties was obtained were iodine number, refractive index, melting point, and acid number. The result can be seen at Figure 3.1 below:



	Iodine number	refractive index	melting point	acid numbers
Series1	70	1,452	32	2,510
Series2	70	1,453	34	2,516
Series3	72	1,459	36	2,520
Series4	71	1,462	38	2,524
Series5	70	1,456	34	2,520

Figure 1: The physical properties of lard in meatball.

Figure 1 shows the value of iodine number, refractive index, melting point, and acid number of lard in pork meatball. The value obtained was get results that were almost the same as the standard lard is the from the value obtained from reference (Hilda & Si, 2014).

3.4 Spectrofotometry UV

UV spectroscopy using DU640 UV / Vis type using a wavelength of 200-400 nm. The standard lard solution is made in concentrations of 5, 10, 15, 20, 25%. This instrument produces light from the spectrum of the lard sample measured by a certain wavelength by measuring the intensity of the light transmitted or absorbed. This tool measures relative light energy if the energy obtained from the sample is transmitted, reflected or emitted as a function of the wavelength. In this research, UV-Vis (Ultra Violet-Visible) spectrophotometer was chosen from many instruments commonly used in analyzing lard in animals. Spectrophotometers are commonly used because of their ability to analyze so many chemical compounds and their practicality in terms of sample preparation when compared with several methods of analysis. The concentration of the solution analyzed will be proportional to the amount of light absorbed by the substance contained in the solution. The optimum wavelength is obtained at 270 nm with the absorbance value obtained in Figure 2:

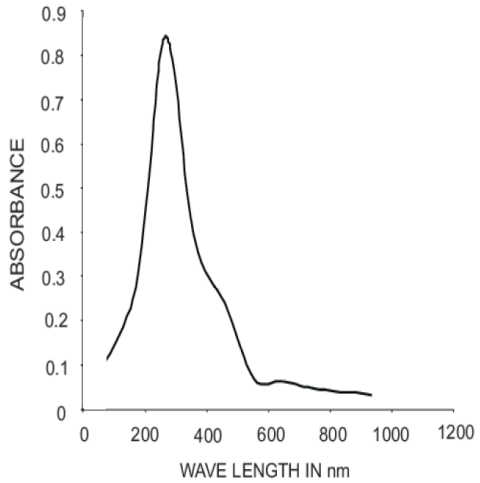


Figure 2: The spectrum of UV.

Based on the picture above, it can be seen that the optimal wavelength obtained is 270 nm. at this wavelength the optimum absorption of standard lard occurs. The concentration or lard in pork meatball can be seen at Figure 3 above:

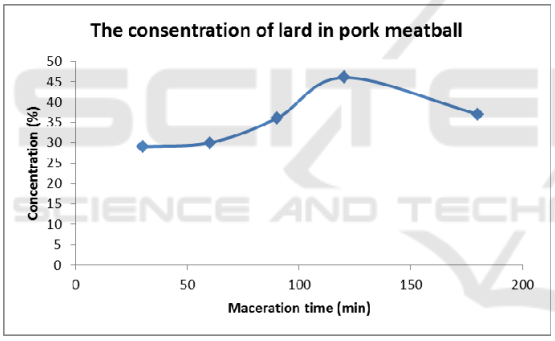


Figure 3: The concentration of lard in pork meatball.

Based on the measurement of the lardt concentration in meatballs where the longer maceration time the higher the concentration of lard in the pork meatball. In this work, the maceration process using n-hexane solvent, the concentration of lard produced at the optimal conditions was 46%. The method in this work was the simple method to optimally about the use of UV spectroscopy in the analysis of lard in the simple laboratory.

Industrial food products that are increasingly circulating in Indonesia, especially in Medan, require very simple and easy methods to be carried out simply in an effort to investigate and analyze whether or not they contain pork fat (for example pork meatball). however, in research problems that exist in a simple laboratory can be easily resolved in the examination of industrial food products in the context of increasing halal products in Indonesia.

4 CONCLUSION

A simple method to preparing, extracting and analyzing of lard in pork meatball can be developed used simple method. Extracting method used maceration coupling electrosynthesis at 120 minute. Lard in Pork meatball can be analize qualitatively and quantitatively in a laboratory. The Investigation was begins with collection, preparation, and extraction. Maceration extraction is developed at temperature 50^0C. Iodine number, index bias, melting point, acid numbers respectively 73, 1.462, 38^0C, and 2.524. UV Spectroscopy was developed at an optimal wavelength (270 nm). however, the optimal process was obtained at maceration = 120 minutes and the resulting lard content was 46%.

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