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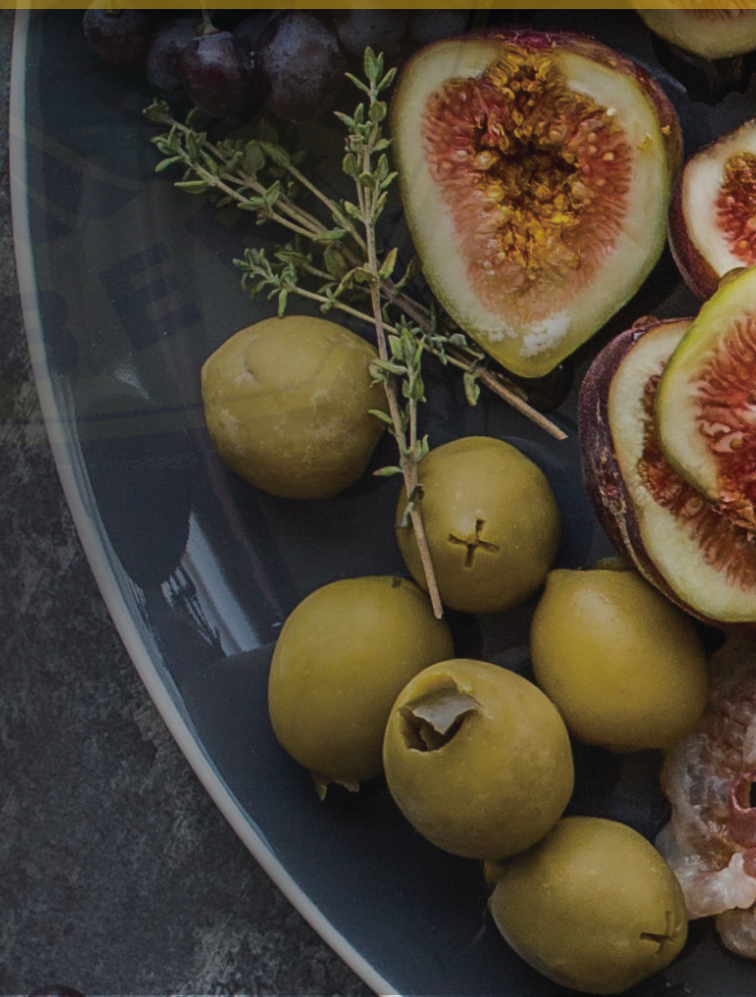
The Food Ingredient Asia Conference

PROCEEDINGS

14 - 16 October, 2020

"on Food Science, Nutrition and Health"



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BRIEF CONTENTS

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FOREWORD

This book contains the proceedings of the 6th Food Ingredient Asia Conference (FiAC) 2020, which was organized by the Indonesian Association of Food Technologists (IAFT, Perhimpunan Ahli Teknologi Pangan Indonesia/PATPI), Southeast Asian Food and Agricultural Science and Technology (SEAFAST) Center, and Department of Food Science and Technology, IPB University - Indonesia. This seminar has received strong supports from IPB University, the Federation of Institutes of Food Science and Technology of ASEAN (FIFSTA), and PT Indofood Sukses Makmur, Tbk.

The conference program includes oral presentations organized in three areas, such as Food Science, Nutrition, and Health, besides several plenary talks. The 6th FiAC accepted 30 full papers through a double-blind paper review, which was performed by the Program Committee, whose members are carefully selected in the areas of food science and technology. Based on this, a full paper acceptance ratio of 36% was obtained. This strict acceptance ratio indicates our intention to maintain a high-quality publication, and it is expected to be stricter in the following years. All papers presented at this conference will be available at the SCITEPRESS Digital Library.

We would like to express our gratitude to all participants (technical and plenary sessions) and convey our thanks to the Program Committee. We do hope to meet you again at 7th FiAC 2022, and the details of which will be available at http://patpi.or.id/ or https://seafast.ipb.ac.id/.

Bogor, September 20th, 2021

Editor
Dr.-Ing. Azis Boing Sitanggang

CONTENTS

PAPERS

FULL PAPERS

PAPERS

Ethnobotany Production of Coconut Oil using Wet and Dry Methods

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Keywords: Blondo, Coconut Oil, Density, Medium Chain Fatty Acid.

Abstract: Ethnobotany mentioned that coconut oil have been a part of traditional medicine from ancient times and was used as oilment in all kinds of illness. Athletes, body builders and dieting person used coconut oil. That is because coconut oil contains less calories than other oils, and is easily converted in to energy and no lead to accumulation of fat in the heart and arteries. Beside that, coconut oil can be boost energy and endurance to enhances the performance of athletes. The material for making oil is mature coconut fruit was obtained from the Agropolitan market at Senduro Lumajang Regency. This study determined the ethnobotany production of coconut oil use wet and dry method. Wet method was conducted by extraction of coconut milk then cooking the milk to evaporate the water so the oil was extracted from coconut protein cake (was called "blondo"). Dry method was conducted by drying the grated coconut until less than 5% (3.37%) of water content, then pressure dried coconut using hydraulic press (39-427 bar). The results showed that ripe mature coconut produced the higher oil yield. Producing coconut oil used wet method have to use stainless steel or cast iron frying pan. Characteristics of coconut oil were i.eclear colour, typical coconut aroma. Producing of coconut oil used wet method can result 15.77%w/w of yield, 11.67% w/w of protein cake (*blondo*), 0.06% of water content and 0.9195g/cm^3 of oil density. While producing of coconut oil used dry method can result 21.56% w/w of oil yield, 33.24% w/w of bagasse cake, 0.04% of water content and 0.9191 g/cm^3 of oil density.

1 INTRODUCTION

Ethnobotany studies show that coconut oil has many uses. Coconut oil not only as vegetable oil, but also for the world of medicine such as massage oil, hair fertility oil, oil consumed to smooth the birth process, skin moisturizing oil etc. Coconut oil is composed of medium chain fatty acids (MCFA). The medium chain in coconut oil is good for the body's health for the digestive system.

Ethnobotany study of the coconut oil production process of the ancestors also used two methods, namely the wet method and the dry method. The wet method of coconut oil production is the manufacture of coconut oil from the extraction of the coconut milk, while the dry method if the oil is extracted from dry coconut is good without the process of refining, bleaching and deodorizing.

Coconut oil production business claims without the use of RBD (Refined Bleached Deodorized) are advantages that must be communicated and introduced properly. Conventionally, coconut oil production is done by drying the coconut meat and pressing it using thick, strong and sturdy wooden blocks.

Ketaren (2012) explains that the oil production process can be done using the wet or dry method. The wet method of making coconut oil is done by extracting coconut milk and heating it until the water evaporates and the oil and "blondo" cake remain. The method of making dry coconut oil is done by drying the coconut flesh in the sun and pressing it mechanically.

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Ethnobotany Production of Coconut Oil using Wet and Dry Methods.
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Rumah Kelapa NHP is a household unit that produces coconut oil. The business unit is located in Lumajang Regency, East Java Province, which produces coconut oil using wet and dry methods. This study aims to determined ethnobotany of coconut oil production using wet and dry methods to contribute to the proper processing of coconut oil for the NHP home industry.

2 METHOD

2.1 Materials

The tools used to produce coconut oil include a coconut peeler, a coconut grater, a coconut milk press (spinner), a drying rack, a heating pan, a pressing device (WIPRO), and microfiber filters. The tools for analysis include a 10 ml pycnometer (IWAKI), an analytic digital scale (Ohaus), and a caliper. The main ingredient for this research is coconut fruit obtained from the Agropolitan market "Seroja", Lumajang Regency. Old coconut trees are harvested at the age of 13 months from the flowering period (Muis, 2016). Complementary /auxiliary materials, namely clean water.

2.2 Research Stages

2.2.1 Raw Material Preparation

The coconut fruit is peeled and grated and stirred until evenly distributed. Grated coconut is divided into two parts, one part for the wet extraction process and one part for the dry extraction process and setting the stove for the wet method. The dry method of extraction process conditions is carried out using a hydraulic press with a pressure of 39-427 bar.

2.2.2 Coconut Oil Extraction by Wet Method

Wet coconut oil extraction is carried out by adding water in a ratio of 1: 3, technically 1 part grated coconut is extracted with 1 part water then filtered and repeated three times. The filtering process produces coconut milk and coconut dregs. Coconut milk was heated using the optimum stove fire until the water evaporates and oil and “blondo” cake are formed.

2.2.3 Dry Coconut Oil Extraction

The production of coconut oil using the dry method is carried out by shredding fresh old coconut, then reducing the size by grating it and then drying it in the sun until it is dry (about 5% moisture content). Furthermore, pressing is carried out using a hydraulic press at a pressure of 39-427 bar with each press using 200g of dry grated coconut. The results of the dry extraction method are coconut oil and coconut dregs cake.

2.2.4 Experimental Design

This study used a one-factor completely randomized design (CRD) method, namely the extraction method (wet and dry). Data were analyzed using descriptive methods presented with an error bar.

2.2.5 Parameter Analysis

Analysis of physical properties parameters include yield, moisture content and specific gravity (Ketaren, 2012).

3 RESULT AND DISCUSSION

3.1 Ethnobotany Coconut Oil Extraction Process by Wet and Dry Method

Ethnobotany study reported that coconut oil extraction process used wet and dry methods. Wet coconut oil extraction (Figure 1) requires heating that can use a “tomang”, a gas stove or an electric stove. Wet-dry coconut oil extraction requires both traditional and semi-modern conventional presses (Figure 2).

Figure 1: Processing of coconut oil wet with heating “tomang” (Narasilia.com, 2020).

The extraction of ethnobotany coconut oil by wet method was carried out by squeezing the coconut milk. Then it is heated with optimal stove flame, which takes about 45-55 minutes). Ethnobotany coconut oil extraction by dry method was carried out by shredding the coconut meat then drying it using sunlight. If the grated coconut is dry then it is continued by pressing it using both

traditional tools (wood press) and semi-modern conventional ones (hydraulic press).

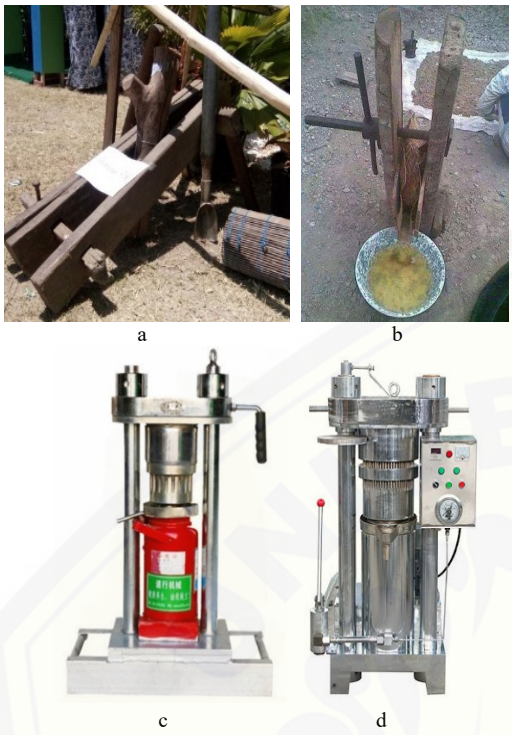

Figure 2: Ethnobotany coconut oil press (peuneurah pliek u in Acehnese regional language) (a, b) and pressurized hydraulic press (c, d) (id.aliexpress.com, 2020).

Processing of coconut oil with the wet heating method produces blondo, while the processing of coconut oil using the dry method by pressing produces cake / dry pulp.

3.2 The Yield of Coconut Oil

The calculation of the yield of coconut oil from the extraction using the dry method and the wet method is based on the ratio of the amount of oil obtained divided by the weight of fresh raw materials (grated old coconut meat). Rahadian (2013) reported that the oil content in old coconut meat was 35%.

The yield of coconut oil and cake produced from these two methods can be seen in Table 1.

Table 1: The yield of coconut oil and cake produced using wet and dry methods.

Coconut oil	′ield of oil (% w/w)	Weight of *cake* "blondo" / "bungkil"
Wet method	15.77 ± 0.59	11.58 ± 0.47
Dry method	21.56 ± 0.39	33.24± 0.02

The yield of coconut oil using the wet heating method was 15.77% and from Blondo 11.58%. The dry method produces more oil yields than the wet method. The dry extraction process depends on the tool used, such as the amount of pressure and the use of the tool. The amount of pressure on the hydraulic press used is 39-427 bar with coconut oil starting to come out at a pressure of 70 bar.

Karauw & Santoso (2014) reported that the dry method extraction process is more effective than the wet method. The level of effectiveness can reach 70%. This study resulted in a higher level of effectiveness that was 73%. The extraction of coconut oil using the wet heating method resulted in lower yields than the dry method. This is presumably because in the wet method the critical point occurs in pressing the coconut milk. If coconut milk is not optimally squeezed, it can reduce the yield. In addition, the critical point is also the oil involved in the "blondo" cake. Therefore it is necessary to separate the oil from "blondo" using a spinner.

3.3 Coconut Oil Water Content

Water content is an important parameter of oil quality in order to minimize the risk of rancidity. The water content of the coconut oil obtained was compared with the moisture content of commercial coconut oil (Table 2).

Table 2: Water content of ethnobotany coconut oil and commercial coconut oil.

Coconut oil	Water content (%)	Specific Gravity
Commercial "Barco"	0.05 ± 0.03	0.9214 ± 0.0005
Commercial "Dorang"	0.03 ± 0.02	0.9187 ± 0.0006
VCO (*virgin coconut oil*)	0.09 ± 0.04	0.9196 ± 0.0001
Wet method	0.11 ± 0.02	0.9191 ± 0.0001
Dry method	0.04 ± 0.01	0.9195 ± 0.0002

The water content of the wet method is higher than the dry method. The water content of coconut oil can be reduced by heating the oil longer when heating the stove. However, you have to be careful because it can cause further damage to the oil due to excess heat (burning). The coconut oil quality standard states that the water content of coconut oil ranges from 0.1-0.5%.

3.4 Specific Gravity

The specific gravity of the oil was determined using a 10 ml pycnometer which was converted to the specific gravity of pure water at 20°C. The principle of this method is based on determining the mass of

the liquid and determining the space occupied by this liquid with a volume measured container (pycnometer) (Ahmad et. Al, 2014). The density of ethnobotany coconut oil with the wet extraction method was higher (0.9195) than the ethnobotany coconut oil with the dry extraction method. (0.9191). According to SNI 3741-1995, the maximum density for coconut oil is 0.921.

Herlina et al., (2017) reported that the specific gravity of coconut oil that has been used for frying RBC (banana chip ripe) is 0.9193. Sani et al. (2010) reported that the density of materials is affected by viscosity, mass of substances and dissolved solids. Density is related (directly proportional) to viscosity. The greater the viscosity of a substance, the greater its density. Coconut oil which has high dissolved solids can affect specific gravity. This results in higher friction between particles so that the viscosity is also higher (Sani et al., 2010).

4 CONCLUSIONS

The production of coconut oil using the dry method produces more yields. The wet method yielded a yield of 15.77% w / w, cake "blondo" of 11.67%, a moisture content of 0.06%, and an oil specific gravity of 0.9195. The dry method with hydraulic pressing works at a pressure of 39-427 bar with an oil yield of 21.56% w / w, cake "coconut dregs cake of 33.24% w / w, water content of 0.04% and a specific gravity of 0.9191.

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