The Influence of Oil Raw Materials on The Quality of Finished Soap Products in The Laboratory Division at PT. Solar Wings Corps.

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Abstract. The business actors are required to generate the maximum profit possible, thus demanding workers to work productively. This cannot be denied because workers are the most essential element in running the company's wheels. PT Wings Surya is a manufacturing company that produce soap. this research activity focuses on how to check soap products using the AOCS Method, in which the AOCS (The American Oil Chemists' Society) method is a method applied to measure and analyze levels in oil so that it is known whether these levels already meet the standards to be processed into a quality product. The quality of the finished soap product can be determined and anticipated by looking at the quality of the Iodide Value, Peroxide Value, and Saponification Value of the raw oil used for the soap product. The finished product of soap at PT. Wings Surya in November based on the quality of the raw material used, it will produce a finished product of soap with good quality but not with the rancid smell caused by the raw material of the oil it self.

Keywords: AOCS Method, Oil Raw Material, Soap Product, Iodide Value

1 Introduction

In industry, business actors are required to generate the maximum profit possible, thus demanding workers to work productively [1][2]. This cannot be denied because workers are the most essential element in running the company's wheels [3]. Both field and non-field workers. Workers are required to produce as many good quality products as possible in a short period of time [4][5]. This causes problems in quality, especially in outspec products that often occur in production results so that there is a decrease in quality where the products produced do not meet the quality standards that have been determined and with the emergence of these events can affect the quality of the product so it must be rejected [6][7][8].

The product is a set of attributes, both tangible and intangible, including color, price, the good name of the factory, the good name of the store that sells (retailer), and factory services and retailer services, which are accepted by buyers to satisfy their desires [10][11]. Soap is a skin cleansing preparation made from the saponification or neutralization process of fats, oils, waxes, rosin or acids with organic or inorganic bases without causing irritation to the skin [12][13]. Quality is a direct description of a product such as performance,

reliability, ease of use, aesthetics and so on[14]. In definition strategically, quality is everything that is able to meet the desires or needs of customers Oils and fats are one of the groups belonging to the lipid group, which are organic compounds that occur in nature and are insoluble in water, but soluble in non-polar organic solvents, for example diethyl ether, chloroform, and other hydrocarbons. Oils and fats can be dissolved in the solvents mentioned above because oils and fats have the same polarity as the solvent [15][16].

AOCS (The American Oil Chemists' Society) is an international professional organization based in Urbana, Illinois USA dedicated to providing a support network for those involved with science and technology relating to fats, oils, surfactants and other related ingredients [17][18].

AOCS' mission is to provide a high standard of quality among those with a professional interest in the science and technology of fats, oils, surfactants and other related materials and to help professionals maintain an edge in their industry [19][20].

The official methods and recommended practices of the AOCS are widely used in hundreds of laboratories on six continents. The method deals with fats, oils and lipids which are important for processing and trading [21][22].

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Before the arrival of the oil, the oil must be checked and analyzed for levels, the products that have been analyzed and the results meet the specified standards will be sent to the warehouse which will then be received and stored to wait for use by the stocks section [23]. And if the results do not meet the standard, the product will be rejected, and this will increase the company's expenses for return costs [24][25]. Improper storage conditions in the presence of excessive temperatures in raw materials can be one of the factors causing damage to products that will be used as raw materials for making oil[26][27]. The research is held on PT Wings Surya Company which produce the soap.

The following is the Outspec data from the analysis of raw materials for oil taken from August 2020 to October 2020. The data is the average analysis result within a month.

Table 1. Oil Outspec Data (August 2020-October 2020)

Period	Oil Types	Parameter	Average
August	Stearine	Peroxide Value	0.288
	Refined Bleached Deodorized Palm Oil (RBDPO)	Peroxide Value	0.262
	Palm Kernel Oil (PKO)	Peroxide Value	0.189
September	Stearine	Peroxide Value	0.455
	Refined Bleached Deodorized Palm Oil (RBDPO)	Peroxide Value	0.302
	Palm Kernel Oil (PKO)	Peroxide Value	0.206
October	Stearine	Peroxide Value	0.339
	Refined Bleached Deodorized Palm Oil (RBDPO)	Peroxide Value	0.298
	Palm Kernel Oil (PKO)	Peroxide Value	0.208

Table 1 is a table that contains Outspec data carried by several types of oil from August 2020 to October 2020. The Outspec carried by several types of oil is the Outspec Peroxide Value, which can cause the oil to emit a rancid odor.

Based on the background that has been described, this research activity will focus on how to check soap products using the AOCS Method, in which the AOCS (The American Oil Chemists' Society) method is a method applied to measure and analyze levels in oil so

that it is known whether these levels already meet the standards to be processed into a quality product

2 Methods

2.1 Data Collection

The collection of data that has been collected is the data obtained in research conducted by direct observation at PT. Wings Surya during November 2020.

2.2 Standard Data for Oil Raw Materials

In the process of analyzing raw materials for oil, there is a reference standard for oil content used by PT. Wings Surya to produce good quality products. The following is the standard data for oil raw materials:

2.2.1 Stearine Oil

Fig. 1 Stearine oil standard

(a) left: stearine oil with a high peroxide value, right: stearine oil with a standard peroxide value. (b) sample description on stearine oil

2.2.2 Refined Bleached Deodorized Palm Oil (RBDPO)

Fig. 2 Standard for Refined Bleached Deodorized Palm Oil (RBDPO)

(a) left: RBDPO oil with a high peroxide value, right: RBDPO oil with a standard peroxide value. (b) sample description on RBDPO oil

2.2.3 Palm Kernel Oil (PKO)

Fig. 3 Palm Kernel Oil (PKO) oil standard

(a) left: PKO oil with high peroxide value, right: PKO oil with standard peroxide value. (b) sample description on PKO oil

Parameter of each oil type and standards shown on table 2.

Table 2. Standard oil raw materials

Oil types	Parameters	Standard
Stearine	Iodide Value (Cgl ₂ /gr)	34 – 37
	Peroxide Value (mgO ₂ /gr)	2
	Saponification Value (mgKOH/gr)	195 – 205
Refined Bleached Deodorized Palm Oil (RBDPO)	Iodide Value (Cgl ₂ /gr)	51.5 – 53
	Peroxide Value (mgO ₂ /gr)	2
	Saponification Value (mgKOH/gr)	195 – 205
Palm Kernel Oil (PKO)	Iodide Value (Cgl ₂ /gr)	17 – 20
	Peroxide Value (mgO ₂ /gr)	1
	Saponification Value (mgKOH/gr)	245 – 255

3 Results and Discussions

Identifying Sources and Root Causes of Soap Quality Problems Due to Raw Materials. The sources and root causes of problems in soap quality are determined based on the results of the analysis of raw oil materials for each parameter. The method used to identify the root of this problem is to observe and interview directly to the Sub Selection Head Laboratory of PT. Wings Surya, Mrs. Titik Marliyah who already has sufficient work experience (18 years) who has the ability to identify the sources and root causes of problems in soap quality due to raw materials shown on table 3.

Table 3. Root Causes of Soap Quality Problems Due to Raw Materials

Causes	Quality problem of Soap
Iodide Value	Too high causes the soap to not freeze (harden)
	Too low causes the soap to be too hard
Peroxide Value	Too high causes a rancid smell to the oil
	Too high causes a rancid odor in the finished product of soap
Saponification Value	Too high, the more reactions needed, so more base is needed

3.1 Data Processing

In the first data processing stage, an analysis is carried out on each type of oil raw material with the level parameters that have been determined by PT. Solar Wings. From the results of the analysis carried out, it can be seen the results of the content of the raw material of oil so that it can be determined that the oil can be used as raw material for products with good quality. Those who determine the use of the oil as raw material for the production are Mrs. Oei Meliana Wibisono as the Department Head and Mrs. Titik Marliyah as the Sub Selection Head of the company's laboratory who already has sufficient work experience (18 years) and has the ability to assess the quality of a product.

3.2 Analysis of Oil Raw Materials

Analysis of oil raw materials is carried out by laboratory analysts every time there is an arrival of oil to be used as raw material for soap products. The analysis includes: Analysis of Iodide Value, Peroxide Value, and Saponification Value.

In the analysis process, there were ups and downs in the results of the oil analysis that occurred in the November 2020 period. The following are the results of the oil analysis during the November 2020 period.

	Out Specs Less
	Out Specs More

Table 4. Analysis Results During November 2020 at PT. Solar Wings.

Analysis Date	Results								
	<i>Stearine</i>			<i>RBDPO</i>			<i>PKO</i>		
	IV	PV	SV	IV	PV	SV	IV	PV	SV
11/01/2020									
11/02/2020	33.349	0.683	200.59	51.606	0.361	199.21	17.612	0.201	245.89
		0.522			0.261				
11/03/2020	34.048	0.362	200.4	51.757	0.281	198.99	17.473	0.201	245.03
		0.402			0.281				
11/04/2020	34.621	0.281	199.46	51.623	0.241	198.23			
		0.281			0.241				
		0.321							
		0.241							
11/05/2020	34.197	0.281	198.68	51.515	0.241	197.03			
		0.281			0.281				
		0.281							
		0.241							
11/06/2020	34.188	0.361	199.51	51.742	0.241	198.72			
		0.402			0.241				
11/07/2020									
11/08/2020									
11/09/2020	34.455	0.241	202.94	52.764	0.241	200.66	17.211	0.241	245.26
		0.260						0.241	
		0.241						0.220	
11/10/2020	34.974	0.281	201.85	52.564	0.321	198.73	17.716	0.241	246.08
		0.402			0.320			0.241	
		0.402							
		0.281							
11/11/2020	34.191	0.281	201.55	52.300	0.361	199.32	17.476	0.241	247.67
		0.261						0.241	
		0.261							
		0.321							
11/12/2020	34.213	0.362	199.89	51.869	0.281	197.22	18.012	0.241	245.61
		0.281						0.281	
		0.281							
		0.241							
11/13/20	34.238	0.281	199.80	52.596	0.361	198.21	17.411	0.241	245.13
		0.442							
		0.442							
		0.321							
		0.361							
		0.361							

		0.361							
11/14-15/20									
11/16/20	34.077	0.322	201.42	52.192	0.281	197.45			
					0.321				
					0.321				
					0.402				
					0.281				
11/17/20	34.053	0.481	200.60	52.530	0.281	198.07			
		0.480			0.281				
		0.422			0.321				
					0.201				
					0.281				
11/18/20	34.225	0.321	201.82	52.250	0.281	199.04			
		0.301			0.241				
		0.301			0.364				
		0.341			0.220				
					0.241				
					0.281				
11/19/20	34.414	0.301	201.82	51.774	0.241	200.11			
		0.281							
11/20/20	34.035	0.238	201.66	52.658	0.241	199.48	17.282	0.199	245.90
		0.281			0.241			0.199	
		0.241			0.241				
11/21/20	34.465	0.301	202.94						
		0.238							
11/22/20									
11/23/20				52.986	0.341	200.32	17.886	0.241	247.35
					0.238			0.201	
11/24/20	34.154	0.281	201.98				17.698	0.221	246.03
		0.238						0.201	
								0.221	
								0.198	
11/25/20	34.592	0.238	199.85				17.344	0.199	245.98
11/26/20	34.567	0.238	199.98						
		0.238							
		0.238							
11/27/20	34.874	0.596	200.99				17.616	0.238	245.48
		0.437							
		0.476							
11/28-29/20									
11/30/20							17.899	0.241	245.45
								0.201	
Average	34.300	0.329	200.89	52.170	0.282	198.80	17.590	0.225	242.53

4 Conclusions

The conclusions that can be given in this study are as follows:

- a. The quality of the finished soap product can be determined and anticipated by looking at the quality of the Iodide Value, Peroxide Value, and Saponification Value of the raw oil used for the soap product.
- b. The finished product of soap at PT. Wings Surya in November based on the quality of the raw material used, it will produce a finished product of soap with good quality but not with the rancid smell caused by the raw material of the oil itself.

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