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CALCULATION MANAGEMENT OF PALM KERNEL LOSSES ON FIBER CYCLONE AT PT. HUTA BAYU MARSADA

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ABSTRACT

This research was conducted at PT. Huta Bayu Marsada especially on fiber cyclone units. To produce palm kernel products with good quality, the processing process is carried out as efficiently as possible, one of which is by preventing core losses. The problem in this study is to find out the total percentage of losses and the amount of palm kernel losses to the incoming feed on Fiber Cyclone at PT. Huta Bayu Marsada. Sampling was carried out for 6 (six) days from the fiber cyclone unit and analysis was carried out in the laboratory for 4 (four) components, namely fiber, intact core, broken core, and core + shell. Samples were taken as much as + 1000 grams at 13.00 WIB - 15.00 WIB. The sample is cyclone fiber waste and analysis of core losses from cyclone fiber is carried out in the factory laboratory. The results of the study showed losses of palm kernel on fiber cyclone at PT. Huta bayu marsada for 6 consecutive days is 0.835%; 0.823 %; 0.785 %; 0.732 %; 0.862% and 0.894% which are still in accordance with the standards at this factory, namely ≤ 1.02%. The difference in the results of the sample components is due to the different sample sizes. Factors affecting palm kernel losses in the Fiber Cyclone process are caused by fruit maturity, harvest phase and air velocity on the specific gravity of the sample. The largest number of palm kernel losses occurred on the sixth day of 518.4668 kg, this was influenced by the total % LossesThe largest number of palm kernel losses occurred on the sixth day of 518.4668 kg, this was influenced by the total % Losses. The amount of palm kernel loss to incoming feed is getting bigger because of its thin and flat shape which makes it easy to lift up and causes losses to increase.

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1. INTRODUCTION

PT Huta Bayu Marsada is a business engaged in the plantation business and processing of palm oil plantation products on Jalan Besar Nagrori Bahal Batu, Huta Bayu Raja District, Simalungun Regency, North Sumatra Province. This factory processes Fresh Fruit Bunches (FFB) into Crude Palm Oil (CPO) and palm kernel (kernel), while the fibers and shells are used as fuel.

The fibers are separated by using a fiber cyclone, which is a tool equipped with a blower to suck up dry fiber or fibers as a tool to adjust the rate of feeding for suctioning. The fiber cyclone in the palm oil processing plant functions to suck fiber from the depericarper based on the weight of the two types of material to be separated. The heavier seeds will go into the nut polishing drum to clean the remaining fiber still attached to the seeds, then the clean seeds are collected and dried in the nut silo or kernel storage.

Losses is an analysis carried out to determine the level of oil loss in the production process. The high losses of palm kernel in fiber cyclones are caused by ripe fruit, bait that is still wet or cake is still lumpy and the performance of the press tool is not optimal. In order to produce palm kernel products with good quality, processing 2 is carried out as efficiently as possible, one of which is to prevent the percentage of total core losses as much as possible in the fiber cyclone so that it conforms to the standard quality losses determined by the company. The percentage of total core losses is the number of intact seeds, broken seeds and seeds plus shells in the process of separating the nuts from the fiber in the fiber cyclone. The number of core losses is the number of nuts that are included in the incoming feed every 2 hours of the fiber cyclone process.

Cyclones which do not comply with the standard should be separated from the fiber core. To produce palm kernel products with good quality, the processing process is carried out as efficiently as possible, one of which is by preventing core losses. Standard losses on fiber cyclone are less than 1.02% of the quality

specified by the company. Therefore this research is focused on "Calculation of Palm Kernel Losses on Fiber Cyclone".

The purpose of the problem in this study is to find out the total percentage of losses and the amount of palm kernel losses to the incoming feed on Fiber Cyclone at PT. Huta Bayu Marsada.

In order to be more focused on the purpose of the problem, this research is limited by:

1. This research was conducted at PT. Huta Bayu Marsada.
2. Observations specifically on the processing of palm oil cyclone fiber.
3. Component observations are only on fiber, intact core, broken core and core + shell.

2. METHODS

In this study data collection was obtained directly from observations in the field, in this case at palm oil mills, especially in the fiber cyclone unit at PT. Huta Bayu Marsada.

Sampling was carried out for 6 (six) days from the fiber cyclone unit and analysis was carried out in the laboratory for 4 (four) components, namely fiber, intact core, broken core, and core + shell.

This analysis is carried out for the input and output of the fiber cyclone. Next, the calculation of the total core losses in the fiber cyclone is carried out to then calculate the number of core losses from the first to the sixth day of the sample.

Samples were taken as much as + 1000 grams at 13.00 WIB - 15.00 WIB. The sample is cyclone fiber dregs and analysis of core losses from cyclone fiber is carried out in the Huta Bayu Marsada Palm Oil Mill laboratory. The steps for solving this problem can be seen in Figure 1.

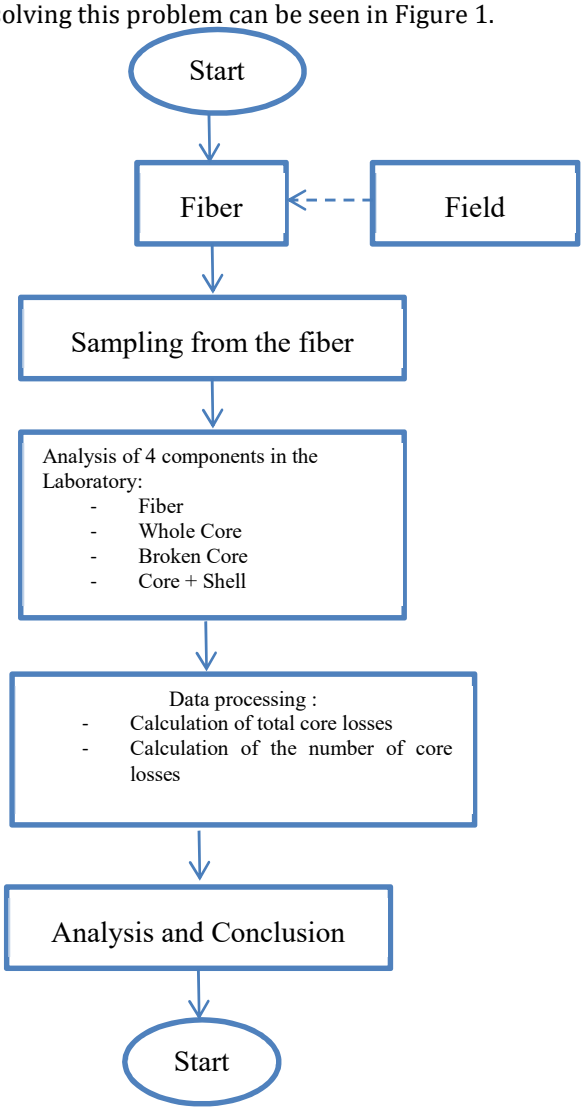

Figure 1. Troubleshooting Steps

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3. RESULT AND DISCUSSION

Specification

Process specification data on the Blower are as follows:

power :75HP/55kW
Electromotor rotation : 1480rpm
Fan spin : 2900rpm
Voltage : 380V
Current : 100 A
Cyclone diameter : 1800mm

Table 1. Input Observation Data on Fiber Cyclone Component

No.	Sample	*Fiber*		Whole Core		Broken Core		Core + Shell	
	(grams)	(grams)	(%)	(grams)	(%)	(grams)	(%)	(grams)	(%)
1.	1000.36	989.8	98.94	2.98	0.29	2.43	0.24	4.72	0.47
Incoming Feed Amount						30,000 Kg/Hour			

Table 2. Output Observation Data on Fiber Cyclone

No.	Entry Feed	Sample (W1)	Component			
			Fiber	Whole Core (W2)	Broken Core (W3)	Core + Shell (W4)
	(Kg/Hour)	(grams)	(grams)	(grams)	(grams)	(grams)
1	29981,22	1000.17	991.79	1.54	2.72	4,12
2	29967,12	1000.33	992.07	1.83	2.67	3.76
3	29895,41	1000.26	992.38	1.71	2.60	3.57
4	29976.90	1000.07	992.72	1.32	2,11	3.92
5	29899.81	1000.19	991.54	1.79	2.43	4,43
6	28997.03	1000.22	991.25	1.43	2.57	4.97

Calculation of Total Core losses in Fiber Cyclone

Example of calculating Cyclone Fiber Core Total Losses for the first day of data:

Sample Weight (W1) = 1000.17 grams
Whole Core Weight (W2) = 1.54 grams
Crushed Core Weight (W3) = 2.72 grams
Core + Shell Weight (W4) = 4.12 grams

Resolution:

a. Intact Core Percentage $=\frac{W2}{W1}X100\%$
$=\frac{1{,}54\ gram}{1000{,}17\ gram}x100\% = 0{,}153\%$

b. Percentage of Nuclear Rupture $=\frac{W3}{W1}x100\%$
$=\frac{2{,}72\ gram}{1000{,}17\ gram}x100\% = 0{,}271\%$

c. Percentage of Core + Shell $=\frac{W4}{W1}x100\%$
$=\frac{4{,}12\ gram}{1000{,}17\ gram}x100\% = 0{,}411\%$

d. Percentage of Total Core Losses = (% intact core) + (% broken core) + (% core + shell)
= 0.153% +0.271%+0.411%
= 0.835%

With the same calculation method, the percentage of total core losses for the second, third, fourth, fifth and sixth days can be calculated.

Calculation of Total Core Losses in Fiber Cyclone

Example of calculating the Amount of Ciclone Fiber Core Losses for the first day of data:

Time (t) = 2 Hours
Entry Feed = 29981.22 kg/hour
% Total Core Losses = 0.835 %

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So, the calculation of the number of core losses can be calculated by:

Number of core losses $= \frac{t\ x\ umpan\ masuk}{100\%}\ x\ \%\ total\ losses\ inti$

$= \frac{2\ jam\ x\ 29981{,}22\ Kg/Jam}{100\%}\ x\ 0{,}835\%$

= 500.6863 Kg

With the same calculation method, the number of core losses for the second, third, fourth, fifth and sixth days can be calculated. The results of calculating the percentage of core losses and the number of core losses from the first day to the sixth day can be seen in table 3.

Table 3. Tabulation of Calculation of Total Core Losses and Total Core Losses

No	Entry Feed (Kg/Hour)	Sample (W1) (grams)	Component *Fiber* (grams)	Whole Core (W2) (grams)	Broken Core (W3) (grams)	Core + Shell (W4) (grams)	Whole Core (%)	Broken Core (%)	Core + Shell (%)	Total Core *Losses* (%)	Amount *Losses* Core (Kg)
1	29981,22	1000.17	992.32	1.54	2.72	4,12	0.153	0.271	0.411	0.835	500,6863
2	29967,12	1000.33	992.91	1.83	2.67	3.76	0.182	0.266	0.375	0.823	493.2587
3	29895,41	1000.26	993.36	1.71	2.60	3.57	0.170	0.259	0.356	0.785	469.3579
4	29976.90	1000.07	993.52	1.32	2,11	3.92	0.131	0.210	0.391	0.732	438.8618
5	29899.81	1000.19	992.54	1.79	2.43	4,43	0.178	0.242	0.442	0.862	515.4727
6	28997.03	1000.22	993.25	1.43	2.57	4.97	0.142	0.256	0.496	0.894	518.4668

In the palm oil processing industry, there is a tool used to separate the palm kernel from the dregs (fiber) which is done using air called a fiber cyclone. The working principle of the fiber cyclone itself is based on the specific gravity (BJ), namely the small specific gravity, namely the pulp (fiber) is sucked by the blower and enters the cyclone fiber which is then used as boiler fuel, while those with a larger specific gravity namely palm kernels, dropped into the Polishing Drum, but in the fiber cyclone that is sucked in by the blower not all of the dregs (fiber) but there is still the core that is sucked in which is referred to as losses of palm kernel in the dregs (fiber).

Losses palm kernel on fiber cyclone at PT. Huta bayu marsada for 6 consecutive days is 0.835%; 0.823 %; 0.785 %; 0.732 %; 0.862% and 0.894% which are still in accordance with the standards at PT. Huta bayu marsada by ≤ 1.02%. The difference in the results of the sample components is due to the different sample sizes.

Losses that occur in the process still meet the standards set by the Factory. Factors that affect palm kernel losses in the Fiber Cyclone process are caused by fruit maturity, harvest phase and air velocity on specific gravity (BJ) in the sample. So the results of the largest number of palm kernel losses occurred on the sixth day of 518.4668 kg, this was influenced by the total % Losses. The amount of palm kernel loss to incoming feed is getting bigger because of its thin and flat shape which makes it easy to lift up and causes losses to increase.

4. CONCLUSION

Losses palm kernel on fiber cyclone at PT. Huta bayu marsada for 6 consecutive days is 0.835%; 0.823 %; 0.785 %; 0.732 %; 0.862% and 0.894% which are still in accordance with the standards at PT. Huta bayu marsada by ≤ 1.02%. The difference in the results of the sample components is due to the different sample sizes. Based on the data and discussion obtained, it can be concluded that from the calculation results obtained, it can be seen that the total % of palm kernel loss in the Cyclone Fiber is the largest at 0.894% and the largest amount of palm kernel loss to incoming feed on the Cyclone Fiber is 518.4668 kg. The result of the largest number of palm kernel losses occurred on the sixth day of 518.4668 kg. This was due to the greater the total % loss, the greater the amount of palm kernel loss to incoming feed.

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