

## ABSTRAK

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Program Studi : Magister Teknik Industri  
Judul : Penerapan *Six Sigma* Untuk Mencapai Kadar Asam Lemak Bebas Optimal *Crude Palm Oil* Di PT. Perkebunan Nusantara IV PKS BAH JAMBI.

Penelitian ini bertujuan mengevaluasi dan meningkatkan mutu *Crude Palm Oil* (CPO) melalui pengendalian kadar Asam Lemak Bebas (ALB) di PT Perkebunan Nusantara IV PKS Bah Jambi menggunakan metode *Six Sigma*. Pendekatan DMAIC diterapkan pada data mutu produksi Oktober 2025. Hasil pengukuran menunjukkan rata-rata ALB sebesar 3,34%, melebihi standar SNI 2901:2021, dengan tingkat sigma di bawah dua yang mengindikasikan kapabilitas proses rendah. Analisis regresi, *fishbone*, dan FMEA mengidentifikasi waktu restan TBS sebagai faktor dominan. Upaya perbaikan difokuskan pada pengendalian waktu tunggu dan penguatan pengendalian proses sterilisasi.

**Kata kunci:** *Six Sigma*, Asam Lemak Bebas, *Crude Palm Oil*, waktu restan TBS, pengendalian mutu.

## ABSTRACT

*Name: Wirda Novarika AK  
Study Program: Magister Industrial Engineering  
Title: Implementation of Six Sigma to Achieve Optimal Free Fatty Acid Levels in Crude Palm Oil at PT. Perkebunan Nusantara IV PKS BAH JAMBI.*

*This study aims to evaluate and improve Crude Palm Oil (CPO) quality by controlling Free Fatty Acid (FFA) levels at PT Perkebunan Nusantara IV PKS Bah Jambi using the Six Sigma method. The DMAIC approach was applied to production quality data from October 2025. The results indicate an average FFA level of 3.34%, exceeding the SNI 2901:2021 standard, with a sigma level below two, reflecting low process capability. Regression analysis, fishbone diagram, and FMEA identified Fresh Fruit Bunch resting time as the dominant factor. Improvement efforts focus on controlling waiting time and strengthening sterilization process control.*

**Keywords:** *Six Sigma, Free Fatty Acid, Crude Palm Oil, FFB resting time, quality control.*