

**The Fiber Fraction of Oil Palm Trunk
Treated by Ligninase Termostable
Produced from Thermophilic Bacteria**

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Map of Indonesia



Background of Research

- ❖ Indonesia is 2nd country after Malaysia produced oil palm in the world
- ❖ The main biomass of oil palm industry are : OPF, OPT, PPF, PKC and POME – as sources as animal feeding
- ❖ OPT is only available after oil palms are felled for replanting at an age of about 25 years.
- ❖ OPT are high fibrous materials which need further processing for better utilization in ruminant animals (lignin, cellulose and hemicellulose)



Background of Research

- ❖ The OPT : lignin, cellulose, hemicellulose – complex structure difficult to attack by MO
- ❖ As animal feeding : OPT- 3 limiting Factors (Lignin protects of cellulose, hemicellulose: Low palatability: low protein content)
- ❖ Lignin is indigestible by animal enzymes, but some fungi and bacteria are able to secrete ligninases which can biodegrade of the polymer

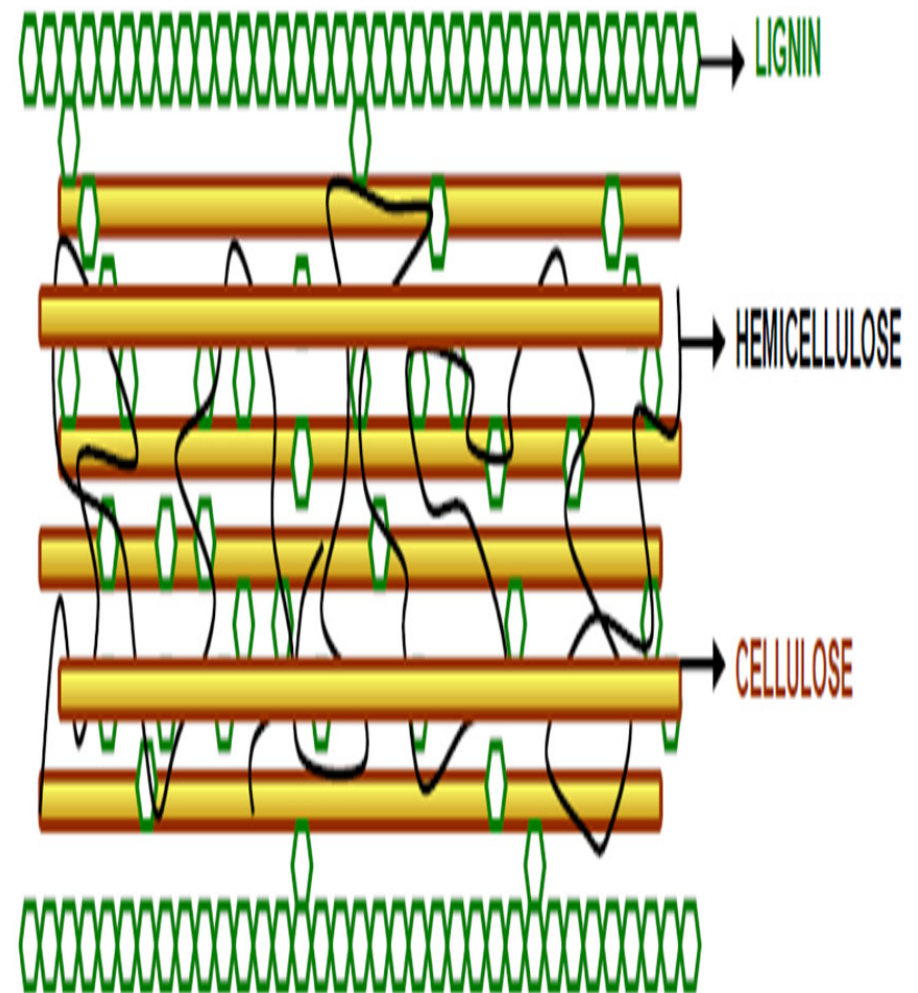
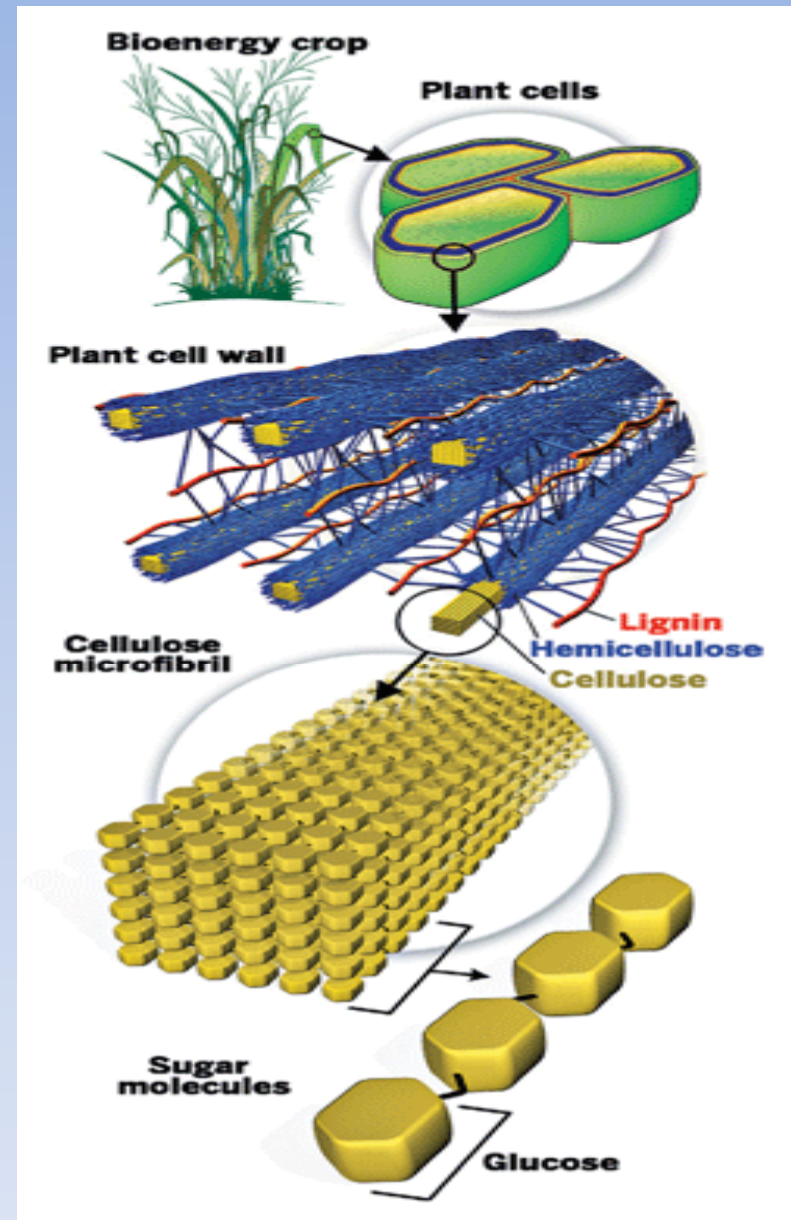


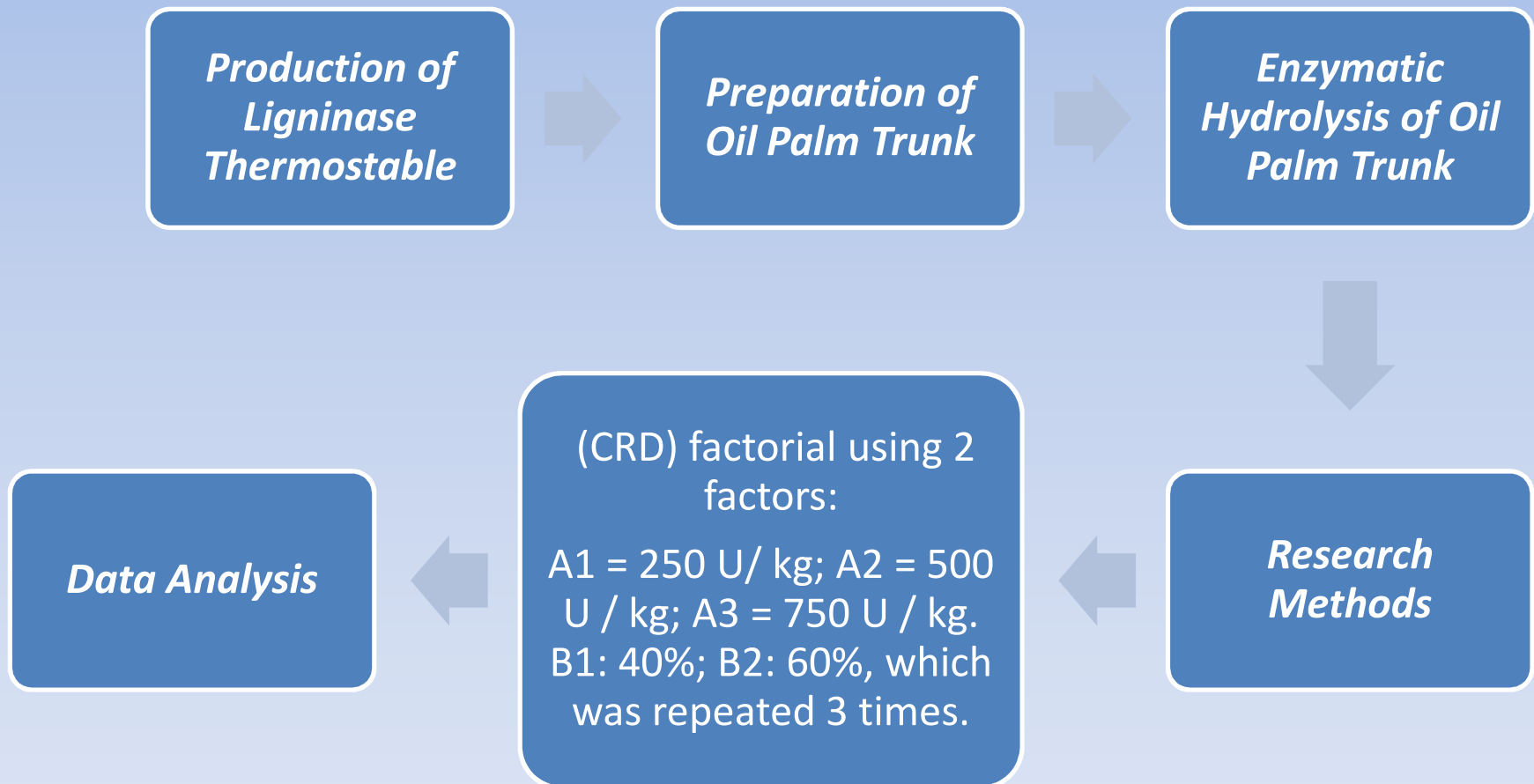
Fig. 1 Representation of lignocellulose structure showing cellulose, hemicellulose and lignin fractions.

Purpose of Research

- To find out interaction between oil palm trunk concentrations and ligninase doses to increase the fiber fractions of oil palm trunk before using as animal feeding
- To get the future treatment of how to increase the palm oil trunk quality



Method of Research



Research finding

Table 1. Average ADF products hydrolysis of oil palm trunks (%)

A [Ligninase (U/kg)]	B [oil palm trunk (%)]		Average
	B1	B2	
A1	64.00 ^a	64.16 ^a	64.08 ^a
A2	62.31 ^b	64.44 ^a	63.38 ^a
A3	60.75 ^c	61.54 ^{bc}	61.15 ^b
Average	62.35 ^b	63.38 ^a	

Table 2. Average NDF products hydrolysis of oil palm trunks (%)

A [Ligninase (U/kg)]	B [oil palm trunk (%)]		Average
	B1	B2	
A1	80.97 ^b	77.18 ^c	79.07 ^b
A2	81.58 ^a	81.80 ^a	81.69 ^a
A3	76.68 ^d	76.76 ^d	76.72 ^c
Average	79.74 ^a	78.58 ^b	

Research finding

Table 3. Average ADF products hydrolysis of oil palm trunks (%)

A[Ligninase (U/kg)]	B[oil palm trunk (%)]		Average
	B1	B2	
A1	16.98 ^b	13.02 ^d	15.00 ^b
A2	19.27 ^a	17.36 ^b	18.32 ^a
A3	15.93 ^c	15.21 ^c	15.57 ^b
Average	17.39 ^a	15.20 ^a	

Table 4. Average NDF products hydrolysis of oil palm trunks (%)

A [Ligninase (U/kg)]	B [oil palm trunk (%)]		Average
	B1	B2	
A1	56.41 ^b	55.38 ^{bc}	64.08 ^a
A2	54.13 ^c	58.07 ^a	63.38 ^a
A3	54.06 ^c	52.43 ^d	61.15 ^b
Average	54.87 ^a	55.29 ^a	

Research finding

Table 5. Average ADF products hydrolysis of oil palm trunks (%)

A [Ligninase (U/kg)]	B [oil palm trunk (%)]		Average
	B1	B2	
A1	7.31 ^b	7.23 ^{bc}	7.27 ^a
A2	7.09 ^c	5.60 ^e	6.35 ^c
A3	6.07 ^d	7.67 ^a	6.87 ^b
Average	6.82 ^a	6.83 ^a	

Conclusion

- The treated of OPT with ligninase can be degraded the lignocellulose and hemicellulose linkage and make the availability of cellulose and hemisellulose as energy sources by ruminantia such as cow, buffalo, sheep and goat. The optimum concentration of oil palm trunks was 60% (v/w) and 750 U/kg of ligninase thermostable that improved of the fiber fractions quality to easily digested by animal.

Acknowledgement

- Ministry of Research, Technology and Higher Education of the Republic of Indonesia for funding this research
- Student and technician laboratorium of Industrial and Feed Technology who has supported the implementation of this research.

Thank You for your attention