

Topic: Energy Efficiency of Production of Bioethanol from Cassava

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ABSTRACT

In regard to Thai energy development, the development of biofuels is planned as a target. The review of production process, focus is to analyze the energy consumption and the efficiency through bioethanol production process using cassava as raw material. Assessment on its efficiency and possibilities for the efficiency improvement is analysis on process. In this study, Energy Analysis in order to measure an energy efficiency is found the Net Energy Ratio (NER) is equal to 1.26. The result shows positively gained and sufficiency for the production perspective to produce bioethanol.

CO₂ is a by-product of bioethanol is emitted from the distillation system and generated from the use of carbon emission factor through the production process. Based on such information, a using of GEMIS tools to calculate the quantified CO₂ from the raw material preparation, liquefaction, fermentation, distillation and denaturized processes is performed. CO₂ is generated from the fermentation process at 112 Ton/day. CO₂ emission from the production process is analyzed by using of GEMIS software is 79.63 g CO₂ per MJ of bioethanol. It is resulted to 282.88 Ton CO₂ equivalent is released from the production process. Therefore, the Total CO₂ generated from the whole production process of 150,000 Liter of bioethanol per day is equaled to 394.88 T CO₂ per day.

The efficiency of Factory A in bioethanol production is 65.6 % compared to the theoretical bioethanol production that can be produced from the same quantity and quality of cassava feedstocks. The opportunity to improve an efficiency of bioethanol production process can be reached to 34.4% in order to get the same quantity of bioethanol as yield of the production based on the theoretical stoichiometric yield. In this regard, in the suggestion, there are opportunities to improve the production process efficiency, improve the energy management system by implementation of ISO 50001 Energy management system, and to improve the carbon emission reduction by implementation of ISO 14040 Life cycle assessment and ISO 14064 Greenhouses gases management including an application of clean Development Mechanisms scheme.

Keywords: Bioethanol, cassava, ISO14064, ISO14040, ISO50001

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my advisors Dr. Boonrod Sajjakulnukit, Prof. Dr. Mirko Barz and Dipl.-Ing. Werner Siemers for their patience, motivation, enthusiasm, and valuable suggestions.

Besides my advisor, I would like to sincerely thank the rest of my thesis committee: Assoc. Prof. Dr. Chumnong Sorapipatana, Assoc. Prof. Dr. Navadol Laosiripojana, Assoc. Prof. Dr. Klanarong Sriroth, Dr. Teerapatr Srinorakutara, for their comments, and hard questions. Having their professionally and expertise recommendations is much highly appreciated and has been very valuable to me.

My sincere thanks to the bioethanol company that provided the information and to my JGSEE friends; Tassamon Suppamit, Jintaluk Kidhen, Orathai Chaisinboon and the 22nd batch colleagues for their encouragement.

Last, but not the least, I would like to thank my family, especially my beloved son, Mr. Napat Ussawajaruwan, for giving me inspiration throughout my life.

CONTENTS

CHAPTER	TITLE	PAGE
	ABSTRACT	i
	ACKNOWLEDGEMENT	ii
	CONTENTS	iii
	LIST OF TABLES	v
	LIST OF FIGURES	vi
1	INTRODUCTION	1
	1.1. Rational	1
	1.2. Objective of the study	9
	1.3. Literature review	9
	1.4. Expectation of the study	19
2	THEORIES	20
	2.1 Bioenergy	20
	2.2 Ethanol properties and quality characteristics	20
	2.3 Ethanol as a fuel and its properties as bioethanol	21
	2.4 Feedstocks for bioethanol production	23
	2.5 Bioethanol production process and technology	24
	2.6 Energy definition and efficiency measurement	25
	2.7 Method for preparing process flow chart	28
	2.8 Energy efficiency of bioethanol production process	29
3	METHODOLOGY	31
	3.1 Data Collection	31
	3.2 Data analysis	33
	3.3 Process boundary of the study	34
	3.4 Ethanol Production Process	35
	3.5 Information to be used in this study	35
	3.6 GEMIS - Global Emissions Model for Integrated Systems	36

CONTENTS (Cont')

CHAPTER	TITLE	PAGE
4	RESULTS AND DISCUSSION	39
	4.1 General	39
	4.2 Process flowchart of bioethanol production	40
	4.3 Mass flow rate of the process	41
	4.4 Feedstock quality characteristics	42
	4.5 Process Description	43
	4.6 Inventory analysis of the production process	48
	4.7 Material analysis	52
	4.8 By- products from Bioethanol production	54
	4.9 Energy Analysis	55
	4.10 Net Energy Ration	58
	4.11 CO ₂ emission	59
	4.12 Suggestion	61
5	CONCLUSION	68
	REFERENCES	69
	APPENDIXES	72

LIST OF TABLES

TABLES	TITLE	PAGE
1.1	Demand and supply of cassava in 2008-2011	6
1.2	List of existing ethanol plant and operations	7
1.3	Quality of production of ethanol as fuel in Thailand	9
2.1	Some properties of fuel	22
2.2	Ethanol ratio from each type of feedstock	27
4.1	Mass flow rate of the process line	41
4.2	Required dried cassava chips and quality characteristics	42
4.3.	Process Quality Characteristic of Mash Slurry	44
4.4.	Process quality characteristic of Liquefied slurry	47
4.5	Inventory analysis of cassava preparation process	49
4.6	Inventory analysis of fermentation process	50
4.7	Inventory analysis of distillation process	51
4.8	Inventory analysis of product blending and storage process	52
4.9	Steam generated from biomass boiler	56
4.10	Energy consumption in ethanol production process	57
4.11	Energy consumption in biomass boiler	57
4.12	Total energy consumption in ethanol production process	58
4.13	Energy ratio compared with the other studies	59
4.14	Carbon equivalent resulted by GEMIS	60
4.15	Carbon equivalent of bioethanol production (excluded fermentation)	60
4.16	Total Carbon equivalent of bioethanol production	61

LIST OF FIGURES

FIGURE	TITLE	PAGE
1.1	Ethanol Supply Chain	4
1.2	Cassava plantation area in Thailand	5
2.1	Production flowchart of ethanol	24
2.2	Process Flow Chart	28
3.1	Bioethanol production system boundary	34
3.2	Bioethanol process units	35
3.3	GEMIS	38
4.1	Bioethanol production process flowchart	40
4.2	Liquefaction process	44
4.3	Saccharification process	45
4.4	Fermentation process	45
4.5	Steam utilized in the process	55
4.6	Electricity from PEA	56