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ENGINEERING & TECHNOLOGY DEVELOPMENT
UBL ICETD
2013

The Second International Conference on Engineering and Technology Development

2nd ICETD 2013

27, 28, 29 August 2013, Bandar Lampung, Indonesia

PROCEEDINGS

In Cooperations With :

APTIKOM

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

SURYA INSTITUTE

Hosted by :
Faculty of Engineering and Faculty of Computer Science,
Bandar Lampung University (UBL), Indonesia

2nd ICETD 2013

The Second International Conference On Engineering And Technology Development

28 -30 January 2013
Bandar Lampung University (UBL)
Lampung, Indonesia

PROCEEDINGS

Organized by:

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PREFACE

The Activities of the International Conference is in line and very appropriate with the vision and mission of Bandar Lampung University (UBL) to promote training and education as well as research in these areas.

On behalf of the Second International Conference on Engineering and Technology Development (2nd ICETD 2013) organizing committee, we are very pleased with the very good response especially from the keynote speaker and from the participans. It is noteworthy to point out that about 80 technical papers were received for this conference.

The participants of the conference come from many well known universities, among others : University Kebangsaan Malaysia – Malaysia, APTIKOM – Indonesia, Institut Teknologi sepuluh November – Indonesia, Surya Institute – Indonesia, International Islamic University – Malaysia, STMIK Mitra Lampung – lampung, Bandung Institut of Technology – Bandung, Lecture of The Malahayati University, B2TP – BPPT Researcher – lampung, Starch Technology Center – Lampung, Universitas Islam Indonesia – Indonesia, Politeknik Negeri Malang – Malang,University of Kitakyushu – Japan, Gadjah Mada University – Indonesia, Universitas Malahayati – Lampung, Lampung University – lampung, Starch Technology Center – Lampung, Universitas Riau – Riau, Hasanuddin University – Indonesia, Diponegoro University – Indonesia, King Abdulaziz University – Saudi Arabia, Parahyangan Catholic University – Indonesia , National Taiwan University– Taiwan, Surakarta Christian University – Indonesia, Sugijapranata Catholic University – Indonesia, Semarang University – Indonesia, University of Brawijaya – Indonesia, PPKIA Tarakanita Rahmawati – Indonesia, Kyushu University, Fukuoka – Japan, Science and Technology Beijing – China, Institut Teknologi Sepuluh Nopember – Surabaya, Researcher of Starch Technology Center, Universitas Muhammadiyah Metro – Metro, National University of Malaysia – Malaysia.

I would like to express my deepest gratitude to the International Advisory Board members, sponsor and also to all keynote speakers and all participants. I am also gratefull to all organizing committee and all of the reviewers who contribute to the high standard of the conference. Also I would like to express my deepest gratitude to the Rector of Bandar Lampung University (UBL) who give us endless support to these activities, so that the conference can be administrated on time

Bandar Lampung, 29 August 2013-08-26

Mustofa Usman, Ph.D
2nd ICETD Chairman

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Speaker

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THE ESTIMATION OF BIOETHANOL YIELD FROM SOME CASSAVA VARIETY

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Abstract- *In this research was examined several variety of cassava which were , UJ-3, Kaserstaat, Caspro, and Malang 6 as the raw materials of bioethanol. The result of the fermentation that the bioethanol content along 72 hours of fermentation process showed different concentration of green energy bioethnol between UJ-3 , Kaserstaat, Malang -6 and Caspro respectively. There are many variety of cassava which are able to use as the raw materials of Green Energy Bioethanol. One litre of Green Energy Bioethanol usualy needs 6 kg until 7 kg of cassava as the raw materials. The Total Sugar content of cassava, will influence the amount of cassava as the raw material for bioethanol . Sacharification process is one step of Bioethanol production will continue by fermentation process along 72 hours.The higest starch content of cassava lines got the highest concentration green energy bioethanol. The lowest starch content of cassava lines got the lowest concentration of green energy bioethanol. In this research showed that the first grade and the second grade in producing bioethanol are Kaserstaat and Caspro respectively. There are different concentration of bioethanol in each cassava lines along 72 hours of inoculation.*

Key Words *: Bioethanol, Malang 6, UJ-3, Kaserstaat., Caspro. Cassava.*

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1.Introduction

Cassava, sweet potato, potato, corn, cane and another starchy plant are able to be the raw materials of Bioethanol. But the master plant of Bioenergy National program decided that cassava and cane as the raw materials which total area up to 3 million hectare nowadays in Indonesia. Cane usually used as raw materials for bioethanol in Thailand, Brazil, India, and Corn used as raw materials of bioethanol in the United States of America.

. The Total Sugar content of cassava, will influence the amount of cassava as the raw material for bioethanol . Sacharification process is one step of Bioethanol production will continue by fermentation process along 72 hours. The final step is distillation which is produce technical grade 95 % to 96 % (v/v) Bioethanol. Dehidration process will get Fuel grade of Bioethanol.99.8% (v/v) which can be used as gasoline for internal combustion enginee as the Ministry of Research and Technology launched in 17 th of January, 2005

Cassava is easy to be damaged by bacteria and some other microorganisms such as fungus, that make bad condition (deteroriation) of cassava about two or three days after harvesting. The Root colour change become blue and yellowish. The starch content was decrease. This problem can be solved by making cassava flour, cassava starch, dry chips, dry solid, sawut etc. This way would increase manpower need and suitable with the master plan

of The National Bioenergy programm that increasing the job availability and reducing the jobless.

There are some lines of cassava with high starch content but which one is the best for bioethanol raw material is we don't know yet. This research will answer which one is the best for raw materials..

The objection of this research are : 1) Analysis the concentration of bioethanol production for several cassava variety.2) To estimate bioethanol yield and analysis the scale of priority for several high starch and low srach cassava lines as the raw materials.

2.Materials and Method

This research was conducted by some cassava lines that are :, Kaserstaat (UJ-5), Malang 6, UJ-3 and Caspro were used as raw materials in the production trials. Somogy's method was used to analysis the Total Sugar of each lines respectively. There is 0.238 gr Alpha Amilase, 0.475 gr Beta amylase used in saccharification process before fermentation process which used nutrient : 0.99 gr Urea, 0.17 gr NPK, and 0.20 gr NH4-NH4 HPO4 respectivelly. Total sugar content was 15 %to 20 % at the beginning of fermentation. The bioethanol concentration examined on the age 0 hours and 72 hours of inoculation respectively.

3.Result and Discussion

The result of analysis of water content, starch content , cassava roots production and the mean concentration of bioethanol yield from several cassava lines showed in table 1.

Table 1. The result of analysis of Water content, Starch content and Root production of several cassava lines.

No	Cassava Variety	Water content %	Starch content %	Production of fresh root (ton/ha)	Mean Concentration of bioethanol (%), in 72 hour innoculation
1	Malang-6	54,77	16,75	19,8	9.33
2	Caspro	55,94	16,75	28,7	7.90
3	Kaserstat	61,85	26,8	30,0	9.40
4	UJ3	60,25	27,7	25,0	11.83

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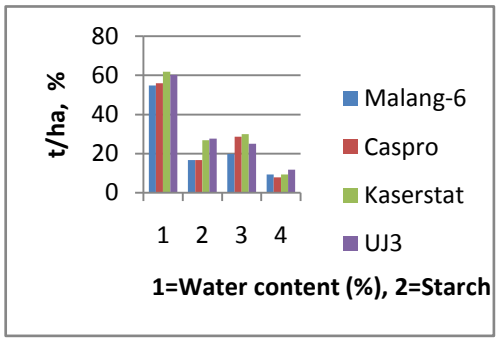

Fig 1. The water content, starch content, root production and bioethanol concentration

The data in table 1 and fig 1 showed that each variety of cassava have different Mean Concentration of bioethanol after 72 hour of innoculation. Threre is positive correlation between starch content and mean concentration of bioethanol.

The Estimation of bioethanol yield from cassava variety under this research are present in table 2.

Table 2 . The Estimation of bioethanol from 4 cassava variety

No	Cassava lines	Production of fresh root (ton/ha)	Mean Concentration of bioethanol (%) in 72 hours inoculation	Estimation Yield of bioethanol 95% v/v (lt/ha)
1	Malang-6	19.8	9.33	2957
2	Caspro	28.7	7.90	4100
3	Kaserstat	30.0	9.40	4411
4	UJ3	25.0	11.83	3615

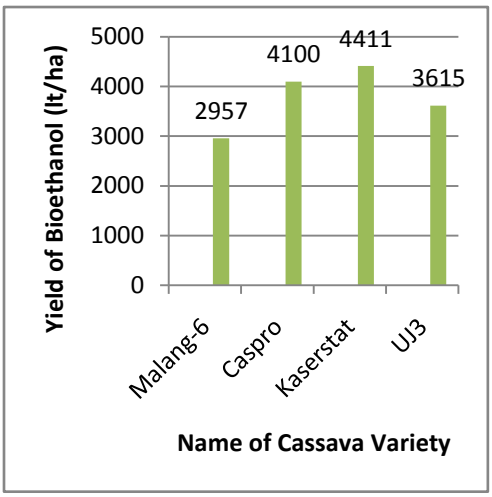

Fig 2. The Estimation of bioethanol yield per hectar in each variety of cassava

The data in table 2 and fig2 indicate that UJ-3 is the showed the mean value of bioethanol concentration 11.83% in 72hours of inoculation or fermentation. The bioethanol content of Kaserstaat, Malang 6 and caspro are 9.40% , 9,33 % and 7,90 % respectively. By this data was calculated that it needs 6,5 kg of UJ3, 6,7 kg Kaserstaat 6, 6,8kg/lt of Malang 6 and 7.0 kg of Caspro for one litre of bioethanol respectively.

4.Conclusions

. UJ3 as the higest starch content of cassava lines got the highest concentration of bioethanol about 11. 83% (v/v). The lowest starch content of cassava lines that is Caspro got the lowest concentration of bioethanol. In this research showed that the first grade and the second grade in producing bioethanol are Kaserstaat 4411 lt/ha and Caspro 4100 lt/ha respectively. There are different concentration of bioethanol in each cassava variety along 72 hours of inoculation that has positive correlation with starch content of cassava.

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