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Universitas Bandar Lampung
20 - 21, June 2012
Lampung, Indonesia

PREFACE

The activities of the International Conference is in line and very appropriate with the vision and mission of the UBL to promote training and education as well as research in these areas.

On behave of the First International Conference of Engineering and Technology Development (ICETD 2012) organizing committee; we are very pleased with the very good responses especially from the keynote speakers and from the participants. It is noteworthy to point out that about 45 technical papers were received for this conference

The participants of conference come from many well known universities, among others: Universitas Bandar Lampung, International Islamic University Malaysia, University Malaysia Trengganu, Nanyang Technological University, Curtin University of Technology Australia, University Putra Malaysia, Jamal Mohamed College India, ITB, Mercu Buana University, National University Malaysia, Surya Institute Jakarta, Diponogoro University, Unila, Universitas Malahayati, University Pelita Harapan, STIMIK Kristen Newmann, BPPT Lampung, Nurtanio University Bandung, STIMIK Tarakanita, University Sultan Ageng Tirtayasa, and Pelita Bangsa.

I would like to express my deepest gratitude to the International Advisory Board members, sponsors and also welcome to all keynote speakers and all participants. I am also grateful to all organizing committee and all of the reviewers which contribute to the high standard of the conference. Also I would like to express my deepest gratitude to the Rector which give us endless support to these activities, such that the conference can be administrated on time.

Bandar Lampung, 20 Juni 2012

Mustofa Usman, Ph.D
ICETD Chairman

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Bandar Lampung,Indonesia
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The Research of Two Sugarcane Variety (*Saccharum officinarum*) as The Raw Materials of Bioethanol Production in Negara Bumi Ilir - Lampung

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Abstract—**This research was conducted in order to find out which sugarcane is better between GMP2 and Kidang Kencana as the raw material for bioethanol production by the application of organic and chemical fertilizer for the plant growth regulator. Four treatment with 3 replication was done that V1P1 was Kidang Kencana with organic fertilizer, V1P0 was Kidang Kencana wthout organic fertilizer, V2P1 was GMP2 with organic fertilizer and V2P0 was GMP2 without organic fertilizer. The application of green manure got better plant growth, total sugar and juice volume. GMP 2 seemed better than Kidang Kencana as the raw material for bioethanol production.**

Keywords **:GMP 1, Kidang Kencana , Green manure, Chemical fertilizer, Total sugar.**

I. INTRODUCTION

Nowadays Indonesia is doing the research of some alternative of biofuel production which renewable of raw materials and circumstance kindly. There are many kind of excellence biomass as raw materials in Indonesia such as cassava, corn, sweet potato, sweet sorghum, sugarcane and etc. There are many kind of Sugarcane variety (*saccharumofficinarum*) in Indonesia which suitable with the regional agroclimate. Which sugarcane is the best one for bioethanol in Negara Bumi Ilir Lampung Tengah ? This reserach would answer this question.

In the first year of research of sugarcane in 2010 was carried out 4 variety of sugarcane that is GMP 1, GMP 2, Kidang Kencana and PSBM 901. The result of this research showed that GMP 2 and Kidang Kencana seemed suitable as bioethanol raw materials in Negara Bumi Ilir. There fare in this year 2011 was carried out continuing research to find out the first and the second priority as raw materials of bioethanol between GMP 2 and Kidang Kencana with application of balance fertilizer.

The objection of this reserach were to find out the first and the second priority as raw materials of bioethanol between GMP 2 and Kidang Kencana by the application of organic and chemical fertilizer or balance fertilizer.

II. MATERIALS AND METHOD

Randomized block design with 2 repetition,2 treatment that is Kidang Kencana Variety andGMP 2 Variety.
Total Area = 0,5 ha.
V1P1 was Variety of Kidang Kencana with apllication of green manure 2 ton/ha.
V1P0 was Variety of Kidang Kencana without green manure.
V2P1 was variety of GMP2 with apllication of green manure 2 ton/ha.
Urea .....200 .....kg/ha (137 kg N/ha)
TSP .....250 .....kg/ha(115 kg P2O5/ha)
KCl .....150 .....kg/ha(90 kg K2O/ha)
Organic fertilizer (green manure) 2 ton per hectar was applied together with basic of fertilizer
In 2 month old of plant was applied second fertilizer that is (Anonimous, 2001).
Urea .....100 .....kg/ha(46 kgN/ha)
KCl .....150 .....kg/ha(90 kg K2O/ha)
Plant spacing **:** Intra row = 1,0 meter(14 row in a block). Spacing = 30 cm

III. RESULT AND DISCUSSION

TheData of plant growth in 3 month until 8 month old was showed in table 1 and table 2.

TABLE 1.
THE HEIGHT OF PLANT IN 3 MONTH UNTIL 8 MONTH OLD OF SUGARCANE PLANT.

No	Variety (Treatment)	Plant age (month)/ plant heigh (cm)					
		3	4	5	6	7	8
1	Kidang Kencana V1P1	162,30	192,03	194,10	202,83	230,37	283,33
2	Kidang Kencana V1P0	146,97	165.00	165,63	171,50	185,53	278.00
3	GMP 2 V2P1	202,80	244,97	250,80	265,63	283,23	346,67
4	GMP 2 V2P0	180,43	222,83	239,13	248,7	265,23	333,33

The data in table 1 was presented in figure 1 below.

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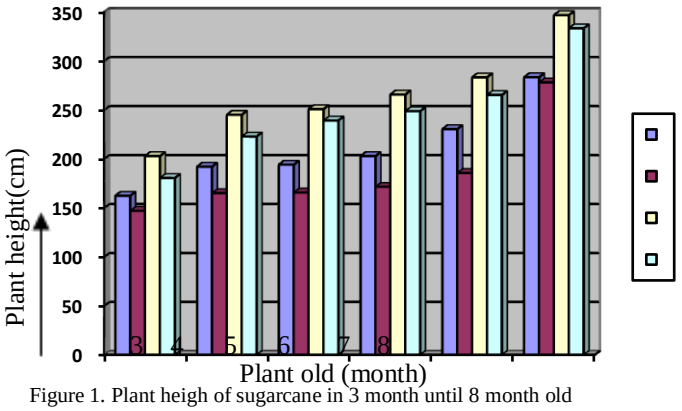

Figure 1. Plant heigh of sugarcane in 3 month until 8 month old

Note Blue= V1P1
Red = V1Po
Yellow = V2P1
Light blue= V2Po

According to the data in fig.1 and table 1 Kidang Kencana and GMP2 Showed the increasing of plant height since 3 month old until 8 month old about 75 percent and 80 percent respectivelly

TheGMP2V2P1 showed the highgest plant about 350 cm and the second was GMP2 V2P0 about 330 cm plant heigh. The third was Kidang Kencana V1P1 275 cm and the fourth was Kidang Kencana V1P0 220 cm plant height. The application of green manure showed the higher plant growth

No	Variety (Treatment)	Plant age (month/ diameter in cm)					
		3	4	5	6	7	8
1	Kidang Kencana (V1P1)	1,91	2,50	2,50	2,55	2,57	3,13
2	Kidang Kencana (V1P0)	1,56	2,04	2,07	2,15	2,24	3,07
3	GMP 2 (V2P1)	2,05	2,37	2,41	2,43	2,47	2,57
4	GMP 2 (V2P0)	1,66	2,17	2,24	2,27	2,32	2,70

The data in table 2 was presented in figure 2 below

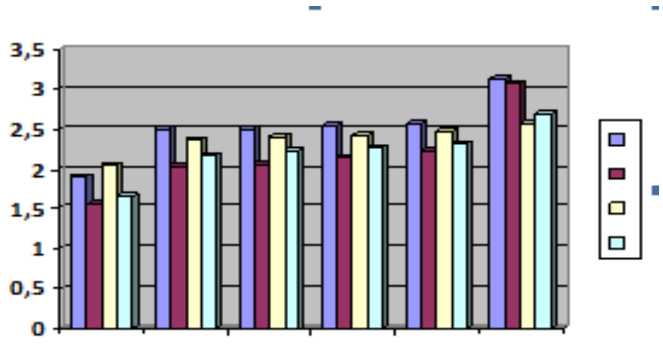

Figure 2.

The Diameter seemed increasing since 3 until 8 month old of plant. V1PI showed the bigest diameterabout 3,2 cm while V1P0 olnly 3,1 cm of diameter., V2P1 was 2,7 cm and V2P0 wa 2,5 cm of diameter respectivelly. In 8 month old Kidang Kencana has biger diameter of stem rather than GMP2 but in 3 month old of plant GMP2 has biger diameter than Kidang Kencana. It showed that the growth of diameter of Kidang Kencana is faster than GMP 2.

TABLE 3
THE WEIGHT OF SUGARCANE STEM IN 6 MONTH (OKT), 7 MONTH (NOV) AND 8 MONTH OLD (DESEMBER)

No	Observation time (Age)	Kidang Kencana V1P1	Kidang Kencana V1P0	GMP 2 V2P1	GMP 2 V2P0
1	Okt (6 month)	356,67	336,67	394,17	364,17
2	Nov (7 month)	666,67	588,33	749,17	770,00
3	Des (8 month)	776,67	897,5	1025,00	943,34

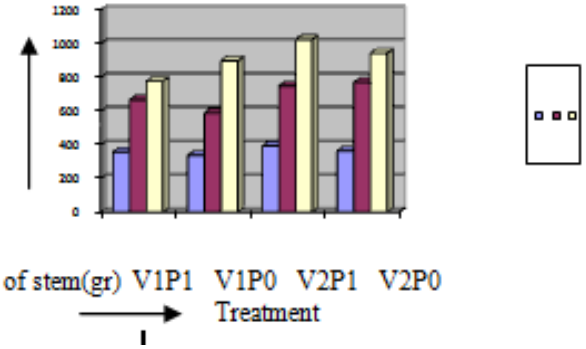

Figure 3. The mean weight of sugarcane stem in 6 month (Blue colour), 7 month (Red) and 8 month old(yellow)

The weight of stem since 6 month old until 8 month old increasing from 350 gr up to 775 gr for V1P1. V1P0 showed higher weight of stem up to 898 gr in each plant. It seemed that the application of for Kidang Kencana no different wiith the application of chemical fertilizer only. But GMP 2 showed better weight of plant by the application of green manure,

TABLE 4.
JUICE VOLUME IN 6 MONTH OLD, 7 MONTH OLD AND 8 MONTH OLD

No	Observation time(age)	Kidang Kencana V1P1	Kidang Kencana V1P0	GMP 2 V2P1	GMP 2 V2P0
1	Okt (6 month)	169,17	155,00	182,50	181,67
2	Nov. (7 month)	319,17	251,67	384,17	377,50
3	Des (8 month)	408,34	489,17	542,50	495,00

By the data in table 4 was made the figure 4 below.

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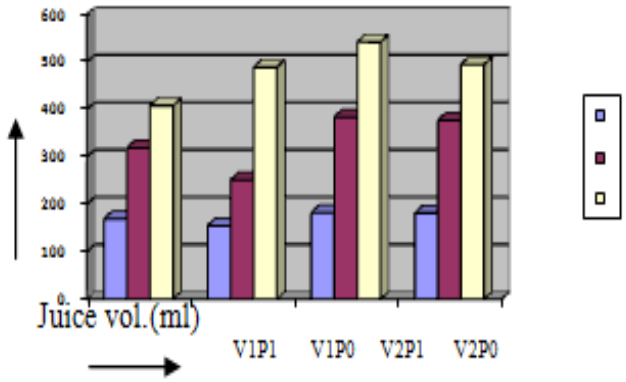

Fig 4. The juice volume of sugarcane in 6 month (blue colour), 7 month (red colour) and 8 month old (yellow colorur)

The juice volume since 6 month old until 8 month old was increasing from 165 ml up to 400 ml for V1P1 respectivelly. While V1P0 has juice volume 150 ml in 6 month old, 250 ml in 7 month old and 480 ml in 8 month old respectivelly.The highest juice volume was 542 ml by GMP2 with application ofgreen manure in 8 month old of plant. The total sugar presented in table 5.

TABLE 5.
THE TOTAL SUGAR IN 6 MONTH OLD, 7 MONTH OLD AND 8 MONTH OLD

No	Variety(treatment)	Age		
		6 mth mean	7 mth mean	8 mth mean
1	Kidang Kencana V1P1	15,01	13,16	11,31
2	Kidang Kencana V1P0	15,58	13,09	11,91
3	GMP 2 V2P1	13,95	12,61	11,40
4	GMP 2 V2P0	14,53	12,92	11,11

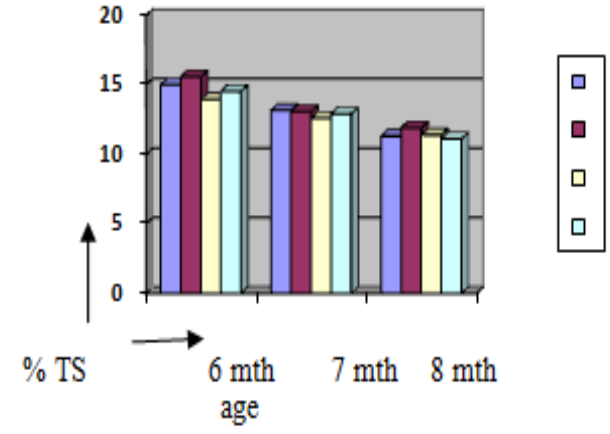

Figure 5.. The total sugar in sugarcane juice of V1P1 (blue colour), V1P0 (red colour) V2P1(yellow) dan V2P0 (ligh blue)

The juice volume with 15% total sugar able to produce 10 % volume as bioethanol. It means that every 1 litre of juice with total sugar 15% able to produce 0,1 litre bioethanol with concentration 95 %. The Kidang Kencana by V1P1 treatment in 6 month old produce about 1190 litre of bioethanol 95% v/v. In 8 month old Kidang Kencana produce 2181 litre of bioethanol 95%. While GMP 2 by V2P1 treatment in 6 month old produce 1067 litre and in 8 month old produce 3192 litre of bioethanol 95% v/v respectivelly.
The data of bagasse weight presented in table 6 and fig.6.

TABLE 6.
THE WEIGHT OF BAGASSE IN 6 MONTH OLD, 7 MONTH OLD AND 8MONTH OLD

No	Observation time (age)	Kidang Kencana V1P1	Kidang Kencana V1P0	GMP 2 V2P1	GMP 2 V2P0
1	Okt (6 bln)	98,34	141,67	160,84	177,5
2	Nov (7 bln)	283,33	262,50	300,84	325,84
3	Des (8 bln)	323,33	330,84	454,17	405,67

By the data in table 6 was presented figure 6 below.

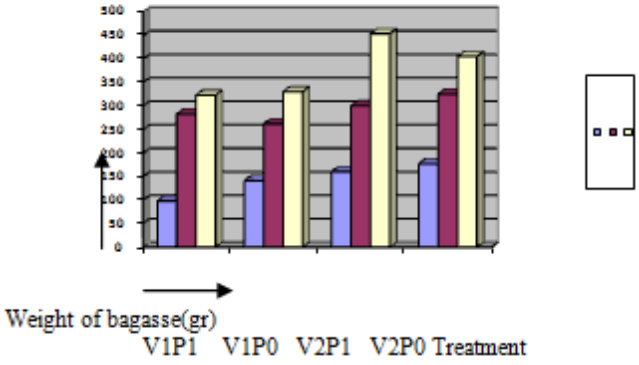

Figure 6. The weight of bagasse in 6 mont old (blue colour), 7 month old (red colour), and 8 month old (yellow)

8 month old of plant GMP 2 has 450 gr of bagasse by V2P1 treatment and 406 gr by V2P0 treatment respectivelly. This bagasse able to use as fuel of boiler and raw materials of second generation of bioethanol.

IV. CONCLUSION

GMP 2 is the first priority and KidangKencana is the second priority as the raw materialof bioethanol production

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