Table1 shows among other things that gas production started earlier in set A which also reached its peak first and diminishes earlier than set B(Figure 1). This is symbolic to Kirchofir law that " object that heat fast cool fast".

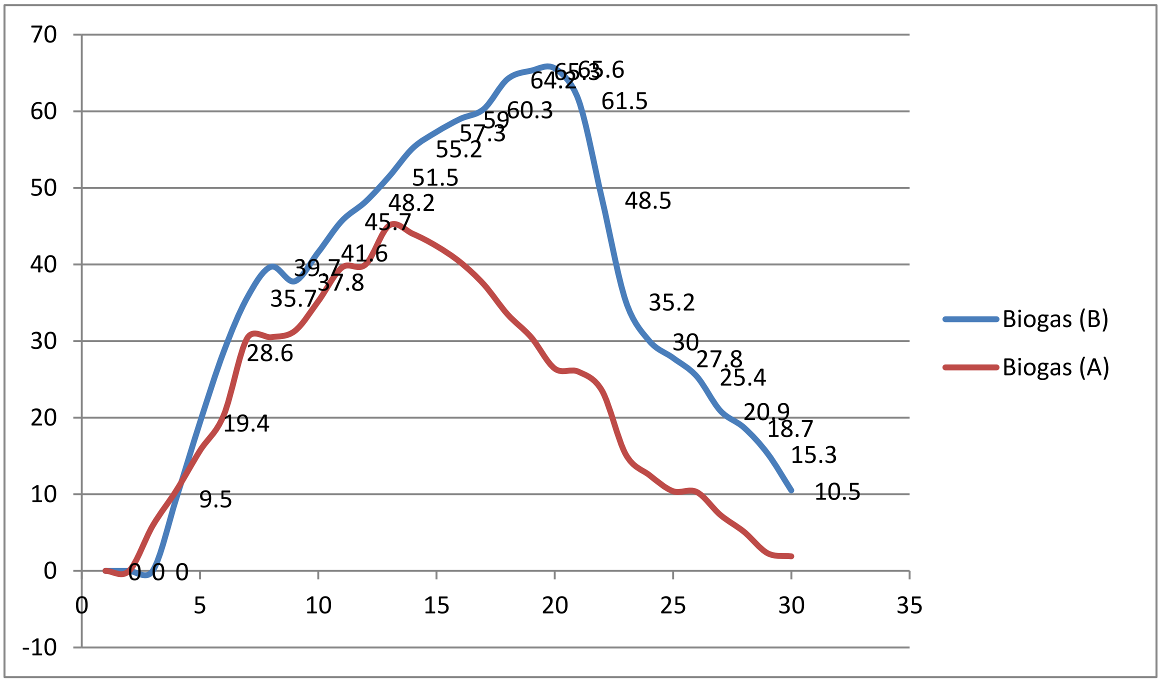

Figure 1: The Daily Volume of Biogas Produced in Both Experiments (A and B)

Figure 1 shows zero production of biogas in the first two days in both experiments. Set A started producing gas on the 3rd day when it recorded the second to least volume (5.90Ml) and accelerated until the twentieth (13^{th}) day when it reached its peak (45.10Ml) and started reducing to the least volume recorded (1.900Ml) on the thirtieth (30th) day. On the other hand, gas production started on the fourth day in set B when it recorded the smallest volume (9.50Ml) and accelerated until the twentieth (20th) day when it reached its peak (65.60Ml) and started reducing to second least volume recorded (10.50Ml) on the thirtieth (30th) day.

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The inability of the digesters to produce gas in the first two days may be due to presence of oxygen in both the digesters and substrates before the setup. Thus, fermentation could not take place until the oxygen is used up by aerobic bacteria.

Even after gas production has started, the volumes of biogas produced were never constant at any point in both set up; however, the volumes of gas recorded reached the peak in 14th to 21st day and in the 17th and 21st day in set A and B respectively.

As it is in table 1, figure1 clearly showed that even though gas production started earlier in set A, set B produced more gas and lasted longer than set A. This is because cow dug can easily decompose than melon waste and mixed waste has higher caloric value than cow dug. Earlier researches showed that multiple substrates produce more biogas than single substrate (Azeem et al,2012; Jyothilakshmi and Prakash, 2016; Ukpabi, *et al.*, 2017. According to Azeem et al (2012)) "addition of melon waste to the substrates increased the biogas yield by 50%".

Student t test was used to compare the difference between the biogas yield in the two set up (Table 2)

	CowDug(A)	Dug& Melon Waste (B)	A-A	B-B	$A-A^2$	$B-B^2$
1	0.00	0.00	22.45	35.95	504.00	1292.40
2	0.00	0.00	22.45	35.95	504.00	1292.40
3	5.90	0.00	-16.55	35.95	273.90	1292.40
4	10.50	9.50	-11.95	-26.45	142.80	699.60
5	15.70	19.40	-6.75	-16.55	45.56	273.90
6	20.30	28.60	22.45	-7.35	504.00	54.02
7	30.40	35.70	22.45	35.95	504.00	1292.40
8	30.50	39.70	-16.55	35.95	273.90	1292.40
9	31.30	37.80	8.85	35.95	78.32	1292.40
10	35.20	41.60	12.75	5.65	162.56	31.92
11	39.60	45.70	22.45	9.75	504.00	95.06
12	40.00	48.20	22.45	12.25	504.00	150.06
13	45.10	51.50	-16.55	35.95	273.90	1292.40
14	44.00	55.20	21.55	35.95	464.40	1292.40
15	42.40	57.30	19.95	35.95	398.00	1292.40
16	40.30	59.00	22.45	23.05	504.00	531.30

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17	37.40	60.30	22.45	24.35	504.00	592.92
18	33.50	64.20	-16.55	28.25	273.90	798.06
19	30.50	65.30	8.05	35.95	64.80	1292.40
20	26.40	65.60	3.95	35.95	15.60	1292.40
21	26.00	61.50	22.45	35.95	504.00	1292.40
22	23.50	48.50	22.45	12.55	504.00	157.50
23	15.20	35.20	-16.55	-0.75	273.90	0.56
24	12.50	30.00	-9.95	-5.95	99.00	35.40
25	10.40	27.80	-12.05	35.95	145.20	1292.40
26	10.30	25.40	22.45	35.95	504.00	1292.40
27	7.30	20.90	22.45	35.95	504.00	1292.40
28	5.10	18.70	-16.55	-17.25	273.90	297.56
29	2.30	15.30	-20.15	-20.65	406.02	426.42
30	1.90	10.50	-20.55	35.95	422.30	1292.40
Statistical Technique						
Total	673.50	1078.40			10136.04	24822.76
Mean	22.45	35.95				
Variance	212.76	418.42				
Standard Deviation	14.59	20.46				
T test	12.04					

The degree of freedom (n-2) 28 then critical t at 28 is 3.68. Therefore, calculated t 12.04 is greater than critical t 3.68(Cal.>Cri @0.05%)

Decision:

Since the calculated t value of 12.04 is greater than the critical t value of 3.68 Ho "there is no significant difference between biogas yield from cow dug slurry and yield from combination of cow dug and melon waste at 95% significant level" is rejected. Thus, there is a significant difference between biogas yield from cow dug slurry and combination of cow dug and melon waste at 95% significant level. Therefore, mixed substrates with higher mean of 35.95 compare to 22.45 mean for cow dug yielded more gas than single cow dug.

Conclusion

Biogas production was possible in cow dug and in combination of cow dug and mixed substrates (cow dug and melon waste). However, there is a significant difference between biogas yield from cow dug slurry and combination of cow dug and melon waste at 95% significant level. The mixed substrates (cow dug and melon waste) produced more gas than single substrate (cow dug).

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