

“Sanitation Innovations for
Humanitarian Disasters in Urban Areas”

SPEEDY SANITITAZION AND STABILIZATION

APPENDIX 1

CAUSTIC SODA DOSAGE DETERMINATION PROCEDURE

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MATERIALS

- 300g Sludge sample
- Electronic balance
- 4 x 500ml Beakers
- 1L graduated cylinder
- Glass Stirring rod
- Spatula
- Weigh tray
- pH meter

SAMPLING

Using the 1L plastic sampling bottle a sample of faecal sludge to be used in the experiment was taken from the plastic drums where subsequent to the sludge being added.

PROCEDURE

1. A 1:10 solution of Caustic Soda (Sodium Hydroxide) was prepared.
2. 300ml of faecal sludge was added in the beaker.
3. Using a pH meter the initial pH of the sludge was measured and recorded
4. Using a micropipette 1mL of diluted sodium hydroxide was added to the beaker containing the faecal sludge.
5. Using a glass stirring rod, the caustic soda was mixed with the faecal sludge until it had become a homogeneous mixture.
6. The pH of the mixture was taken using the pH meter and recorded in the notebook
7. Steps 4-6 were repeated until the pH of the mixture reached above pH 12.1
8. This procedure was repeated for multiple sludge samples
9. Using Excel, the cumulative soda addition was calculated and a curve illustrated soda dosage per L sludge vs resultant pH was generated as given in Table 1 and Figure 1.

Table 1: Cumulative Soda Addition

RAW DATA COLLECTED		CALCULATED DATA	
Solution added (mL)	Measured pH sample 1	Cummulative Soda added (gr)	g Soda/L sludge
0	7,89	0	0,00
1	8,18	0,11	0,37
1	8,37	0,22	0,74

1	8,52	0,33	1,11
1	8,65	0,44	1,48
1	8,76	0,56	1,85
1	8,83	0,67	2,22
1	8,89	0,78	2,59
1	8,97	0,89	2,96
1	9,02	1,00	3,33
1	9,07	1,11	3,70
1	9,10	1,22	4,07
1	9,20	1,33	4,44
1	9,21	1,44	4,81
2	9,26	1,67	5,56
2	9,34	1,89	6,30
2	9,40	2,11	7,04
2	9,48	2,33	7,78
2	9,52	2,56	8,52
3	9,55	2,89	9,63
3	9,66	3,22	10,74
3	9,75	3,56	11,85
3	9,84	3,89	12,96
3	9,92	4,22	14,07
3	10,01	4,56	15,19
3	10,09	4,89	16,30
3	10,18	5,22	17,41
3	10,29	5,56	18,52
3	10,40	5,89	19,63
3	10,53	6,22	20,74
3	10,70	6,56	21,85
3	10,93	6,89	22,96
3	11,28	7,22	24,07
3	11,59	7,56	25,19
3	11,76	7,89	26,30
3	11,84	8,22	27,41
3	11,90	8,56	28,52
3	11,94	8,89	29,63
3	11,97	9,22	30,74
3	11,99	9,56	31,85
3	12,01	9,89	32,96

For the sludge samples tested for the experiment conducted on the 2nd February 2016, the following soda dosage curve was developed as illustrated in *Figure 1*.

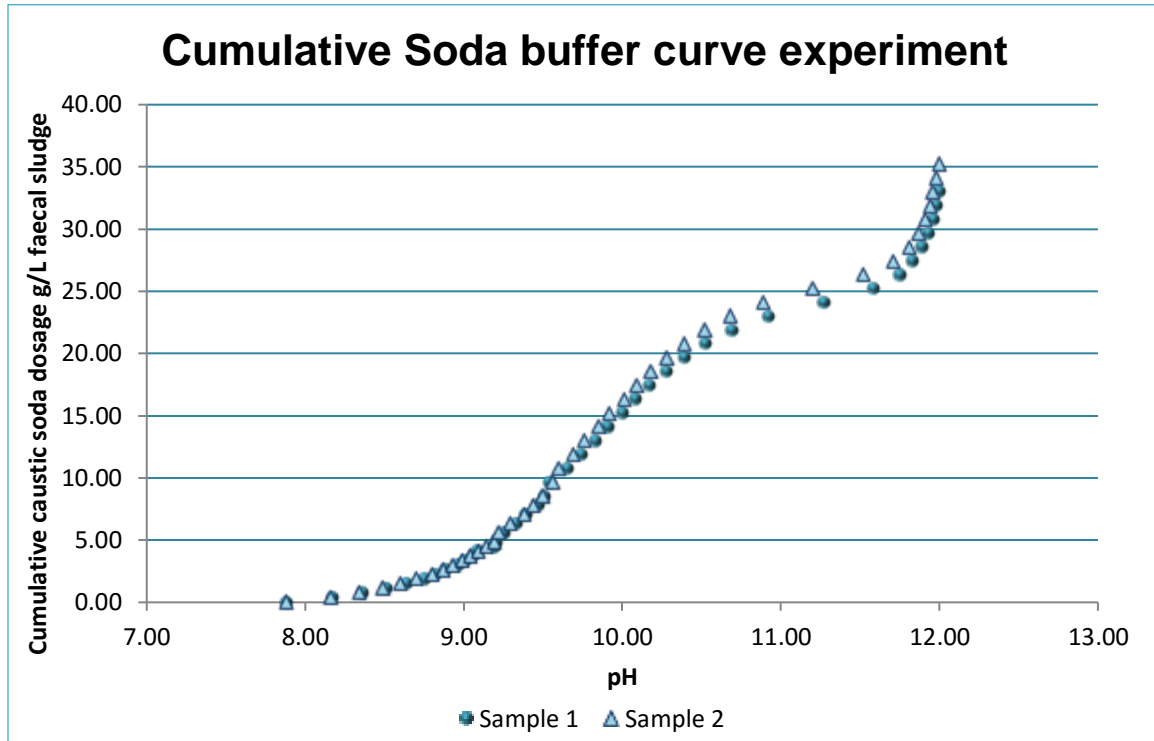


Figure 1: Cumulative Soda Buffer Curve for sample of sludge (2/02/2016)

Based on this experiment, the dosage of sodium hydroxide was estimated to reach different pH as it is shown in the *Table 2*.

Table 2: Estimated Soda dosage at different pH

Desired pH	Estimated dosage (gNaOH/Lsludge)
pH 9	2,86
pH 10	14,00
pH 11	20,44
pH 12	26,55