APPENDIX

APPENDIX A

FORMULATED THIOGLYCOLLATE BROTH SUPPLEMENTED WITH 120 mM PHOSPHATE

Formulated thioglycollate broth supplemented with 120 mM phosphate

		g/l
a.	Carbohydrate	- *
	H_2O	200 ml
b.	Yeast extract	5.0
	Sodium thioglycollate	0.5
	NaCl	2.5
	L-Cystine	0.5
	Casitone	15.0
	H_2O	500 ml
c.	K_2HPO_4	10.5
	KH_2PO_4	8.25
	H_2O	300 ml

These three major medium components a, b and c were prepared and autoclaved as separate solution before combining together.

* molasses in the amount as described in the experiments.

APPENDIX B

TITRATION OF ACETIC ACID
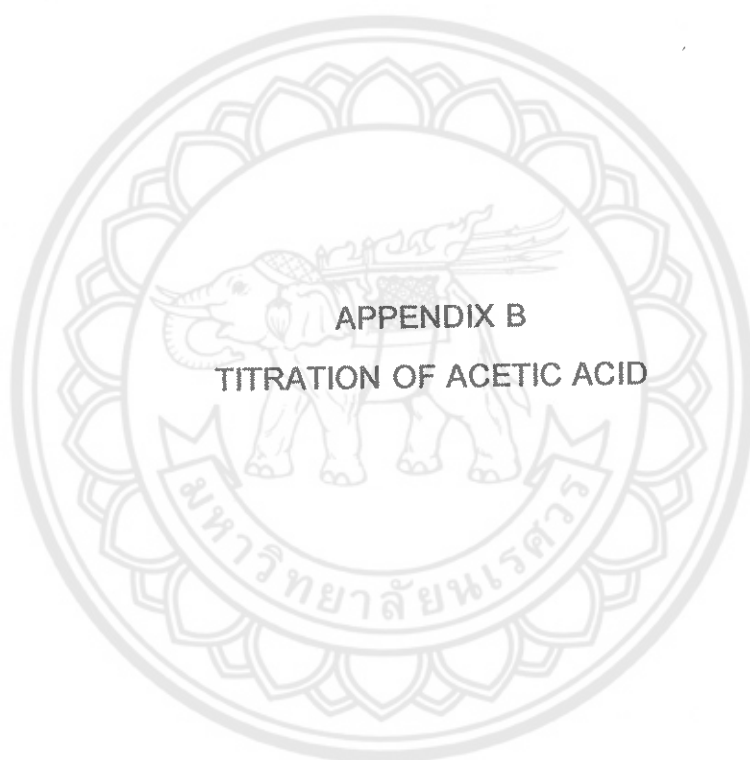
Titration of acetic acid

For determined the acetic acid concentration, 0.5 Milliliter of sample was diluted to 100 milliliter of water with 3 drop of 1% phenolphthalein and then titrates with 0.02 mol NaOH.

The equation for calculating is;

$$N_a V_a = N_b V_b \qquad \qquad \dots\dots (o)$$

Where

N_a = Normality of acid = ? N V_a = Volume of acid = 0.05 ml

N_b = Normality of base = 0.02 N V_b = Volume of base = from titration = X ml

The reaction between CH3COOH and NaOH is 1:1 ratio

Substitutes into equation (o)

N_a = (X * 0.02)/0.05 N

= (X) x 0.04 N
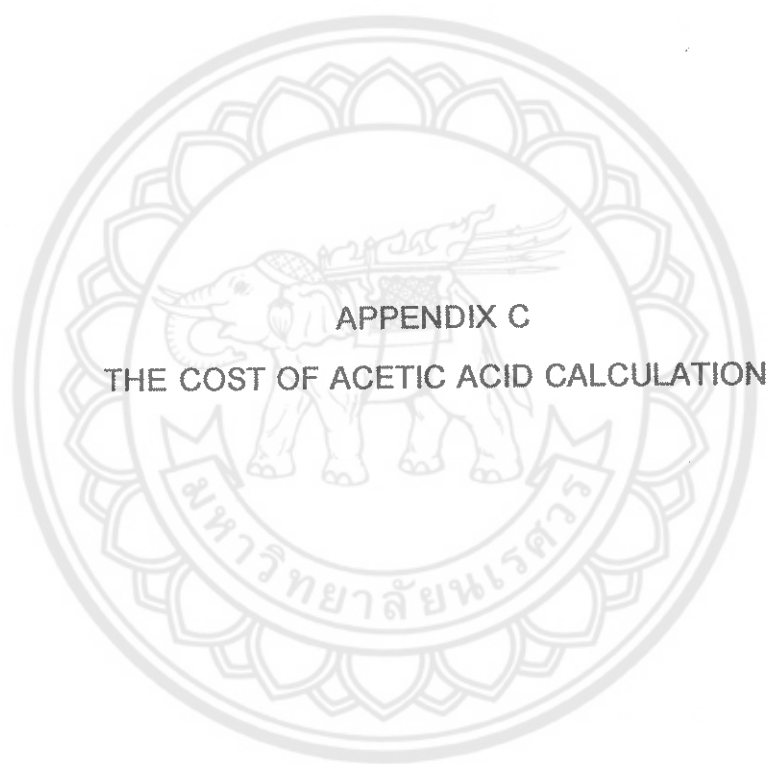
Which, 1 N of CH_3COOH = 1 mol of CH_3COOH

$$mol = mass (g) / molecular\ weigh (CH_3COOH = 60) \qquad \dots\dots (p)$$

Therefore

$$mass = (X) \times 0.04 \times 60\ g/L \qquad \dots\dots (q)$$

The result, equation (q) used to calculating the acetic acid concentration.

APPENDIX C

THE COST OF ACETIC ACID CALCULATION

The cost of acetic acid calculation

The calculation cost of acetic acid production by batch fermentation system based on an estimated operational life of fifteen years and 5% interest rate.

The equation for calculating the cost of acetic acid is as follow;

$$\text{Cost of acetic acid production} = \frac{(\text{Capital cost} \times \text{CRF}) + \text{Operating cost}}{\text{Quantity of acetic acid produced}} \quad \dots\dots \text{(j)}$$

Where

Capital cost = 200,000 baht

Operating cost = 26,461 baht/year

Quantity of acetic acid produced = 1,320 g/year

CRF = Capital recovery factor

$$= [\, i\,(1+i)^n\,] / [(1+i)^n - 1] \quad \dots\dots \text{(k)}$$

Where

i = Interest rate = 5%

n = Number of year = 15

Substitutes into equation (k)

$$\text{CRF} = [0.05(1+0.05)^{15} / [(1+0.05)^{15} - 1]$$

$$= 0.096$$

Therefore

$$\text{Cost of acetic acid production} = \frac{[(200{,}000 \times 0.096) + 26{,}461]}{1{,}320}$$

$$= 34.59 \text{ baht/g}$$