Appendices

1 Preparation of Media and Reagents

Basic media:

Table 1 Nutrient agar (Himedia m 001)

Ingredients	gms/lit
Peptic digest of animal tissu	5.00g
Beef extract	1.50g
Yeast extracts	1.50g
Sodium chloride	5.00g
Agar	15.0g
pH	7.4

Note: Suspend 28.0 grams in 1000 ml distilled water. Heat to boiling to dissolve the medium completely. Sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes

Table 2 Buffered peptone water (BPW), Himedia

Ingredients	gms/lit
Peptone	10.00g
Sodium chloride	5.00g
Disodium phosphate	3.50g
Mono-potassium phosphate	1.50g
Distilled water	1.00g
pH	7.2
Sterilize	121"C/15'

Note: This medium is used as a growth medium and as the base of carbohydrate fermentation media when pH is adjusted to 8.5

2 Differential and Selective Media

Table 3 Brilliant green agar (Himedia)(A highly selective medium for the isolation of *Salmonella sps*)

Ingredients	gms/lit
Yeast extracts	3g
Proteose-peptone	10g
Sodium chloride	5g
Lactose	10g
Sucrose	10g
Phenol	0.08g
Brilliant green	0.0125g
Agar	20g
Distilled water	1 000 ml

Suspend 58 gms in 1000 ml of distilled water. Boil to dissolve the media completely, sterilized by autoclaving at 15 lbs pressure (1 210 c) for 15 minutes with sulpha supplement. Aseptically add rehydrated contents of one vile of Sulpha supplement (FD 068). Mix well before pouring in to sterile Petri Plates.

Brilliant green agar in this concentration inhibits essentially all non enteric bacteria and many enterics other than Salmonella. Enteric bacteria such as *E. coli, Klebsiella, Enterobacter*, some *Proteus* strains, if they do grow, will ferment one or both sugars, with acid production. This will turn the medium toward yellow, the acid colour of phenol red. Bacteria able to grow on BGA but unable to ferment either sugar, i.e. mainly, Salmonella will produce pink colonies.

Table 4 Xylose-lysine tergitol 4 agar (XLT4) (High media, M 1147)

Ingredients	gms/lit
Proteose Paptone	1.60g
Yeast extract	3.00g
L-lysin	5.00g
Xylose	3.75g
Lactose	7.50g
Saccharose	7.50g
Ferric ammonium citrate	0.80g
Sodium thiosulphate	6.80g
Sodium Chloride	5.00g
Phenol red	0.08g
Agar	18.00g
Final pH	7.4(at25$^{0\,c)}$

Note: Formula adjusted, standardized to suit performance parameters

Suspended 59.03gm in 1000 ml distilled water containing 4.6 ml XLT4 supplement (FDI52). Heat to boiling to dissolve media completely. Do not autoclave. Cool to 45-50°C and pour in to sterile Petri plates.

3 General Media

Suspend 91.5gms in 1000 ml of distilled water. Heat just to boiling or place in flowing steam for 30 minutes. Do not autoclave. Cool to 45oc. Mix and add 40 ml of iodine (8gms of Potassium Iodide and 5 gms of Iodine / 40 ml solution). Mix well and dispense 10 ml amounts in sterile tubes. Do not heat after addition of Iodine.

Table 5 Tetrathionate broth base (TT broth base), HIMEDIA, Ref M327

Ingredients	gms/lit
Peptone, special	18.0g
Yeast extrac	2.00g
Sodium Chloride	5.00g
D-mannitol	2.50g
Dextrose	0.05g
Sodium deoxycholate	0.50g
Sodium thiosulfate	38.0g
Calcium carbonates	25.0g
Brilliant green	0.01g
pH	7.6

Table 6 Simmons citrate agar

Ingredients	gms/lit
Magnesium suphate	0.2g
Monoammonium phosphate	1.0g
Dipotassium phosphate	1.0g
Sodium citrate	2.0g
Sodium chloride	5.0g
Agar	15g
Bromothymol blue	0.08g
Distilled water	1000 ml
pH	6.8

Note: Sterilize 121°C at 15 lbs pressure

Determines the ability of an organism to use citrate as the sole source of carbon. Useful in identification of Enterobacteriaceae and certain other gram negative bacteria. Organisms capable of growing on this medium, i.e. capable of utilizing citrate, turns the medium blue (alkaline).

Table 7 Triple sugar iron agar (TSI)

Ingredients	gms/lit
Casein enzymic hydrolysate	10.00g
Peptic digest of animal tissue	10.00g
Beef extract	3.0g
Yeast extract	3.0g
Lactose	10.00g
Sucrose	10.00g
Dextrose	1.00g
Sodium chloride	5.00g
Ferrous sulfate	0.20g
Sodium thiosulfate	0.30g
Agar	12.00g
Phenol red	0.024g
Distilled water	1000 ml
pH	7.4

Note: Used for presumtive identification of the gram negative organisms and the basis for addition tests.

Suspended 65 gm in 1000 ml of distilled water. Heat to boiling to dissolve the medium completely. Mix well and distribute in to test tubes. Sterilize by autoclaving at 10 lbs pressure (1150c) for 15 minutes. Allow the medium to set in sloped form with a butt about one inch long.

Table 8 Key to interpretation

Orange red	uninoculated
Yellow (acid)	glucose/sucrose/lactose fermented
Red (alkaline)	glucose/sucrose/lactose not fermented
Blackening in butt	H2S production
Gas bubbles in butt	aerogenic organism

Most *Salmonella* spp. produce an alkaline (red) slant and acid (yellow) butt, with gas bubbles in the agar and a blackening due to H_2S. *Salmonella gallinarum* does not form gas in TSI, whereas *S. pullorum* may show weak gas production. Both of these organisms may or may not show H_2S production.

Table 9 Lysine iron agar (Peptic digest of animal)

Ingredients	gms/lit
Tissue	5.0g
Yeast extracts	3.0g
Dextrose	1.0g
L-lysine	10.g
Ferric ammonium citrate	0.5g
Sodium thiosulfate	0.04g
Bromocresol purple	0.02g
Agar	15.0g
pH	6.7

Recommended for differentiation of enteric organism especially Salmonella based on their abiliy to decarboxylate or deaminate lysine to form H_2S.

Recommended for the differentiation of enteric organisms especially Salmonella serotype Arizona, based on their ability to decarboxylate or deaminate Lysin and to form Hydrogen Sulphite (H_2S).

Salmonella will show lysine decarboxylase, with a deeper purple (alkaline) slant or neutral butt with slight blackening due to H_2S. Proteus, Providencia and Morganella produce a reddish or port wine coloured slant and a yellow (acid) butt. Citrobacter gives a purple (alkaline) slant and yellow butt with some H_2S production.

Table 10 MIO (Motility-indole-ornithine) medium

Ingredients	gms/lit
Yeast extracts	3g
Peptone	10g
Tryptone	10g
L-ornithine HCl	5g
Dextrose	1g
Agar	2g
Bromocresol purple	0.02g
pH	6.5

Note: Used for the identification of primarily enterics on basis of motility L-ornithine decarboxylase and indole production

Read lysine deaminase, motility, and ornithine decarboxylase before adding Kovac's reagent for indole test. Ornithine deaminase occurs as a red or red brown colour reaction at top centimeter of the tube. Motility is indicated by clouding of the medium by growth extending from stab line. Ornithine decarboxylase is seen as a purple colour throughout the medium.

Table 11 Methyl red- voges proskauer (MRVP) broth (Sterilize)

Ingredients	gms/lit
Dipotassium phosphate	5.0g
Buffered pepton	7.0g
Glucose	5.0g
Distilled water	1000 ml
pH	6.9

Table 12 Urea broth base (Diagnostic Stuart's Urea Broth Base)

Ingredients	gms/lit
Yeast extract	0.10g
Monopotassium Phosphate	9.10g
Dipotassium phosphate	9.50g
Phenol red	0.01g
Sterilize	121"C/15'
pH	6.8

Recommended for the identification of bacteria on the basis of urea utilization, especially for the differentiation of *Proteus, Salmonella* and *Shigella* species.

4 Biochemical Test Reagents

4.1 Biochemical test reagents

Gram's stain reagents: A1mmonium oxalate crystal violet, lugol's iodine, ethyl alcohol (95%), safranin.

4.2 Oxidase test

Principle: To determine the presence of oxidase enzymes. The reagent serves as an alternate substrate for the cytochrome oxidase reaction. The reagent is colourless when reduced. Cytochrome C rapidly oxidises if present in bacteria turning purple.

Reagents: Tetramethyl-p-phenylenediamine (commercial disc)

Result:

Purple colour	Positive
No change in colour	Negative

4.3 Catalase tests

Principle: To detect the presence of the enzyme catalase. Catalase enzyme is found in most bacteria. It catalyses and breakdown of H_2O_2 with the release of free oxygen.

Reagent: 3% H_2O_2

Result:

Bubbles	Positive
No bubbles	Negative

4.4 Indole test

Principle: To detect the ability of an organism to breakdown trptophan to indole.

Reagent: Kovac's reagent

Ingredients	gms/lit
p-dimethylaminobenzaldehyde	5.0g
Amyl alcohol	75.0ml
Conc. HCl	25.0ml

Dissolve the aldehyde by gentle warming in a water bath (50-55°C), cool and add the acid. Protect from light and store at 4°C.

Result:

Pink/Red colour in top layer	Positive
Yellow	Negative

4.5 MR test

Principle: To test the ability of an organism to produce and maintain stable acid end products from glucose fermentation.

Reagents:

Ingredients	gms/lit
Methyl red	0.1g
Ethanol 95%	300ml
Distilled water	500ml

Result:

Red colour	Positive
Yellow	Negative

Note: Dissolve dye in alcohol, add water to volume and store at room temperature

4.6 VP test

Principle: To detect the production of acetylmethylcarbinol (acetoin), a natural product formed from pyruvic acid in the course of glucose fermentation.

Reagents:

Ingredients	gms/lit
1. Alpha naphthol	5.0g
1. Abs. ethanol	100ml
2. Potassium hydroxide	40.0g
2. Creatine	0.30g
2. Distilled water	100ml

Note: Store at room temperature

Result:

Pink/Red colour in top layer	Positive
Yellow	Negative

4.7Nitrate Reduction

Principle: To determine the ability of an organism to reduce nitrate to nitrites or free nitrogen gas.

Requirements/Reagents:

Ingredients	gms/lit
1. Nitrate broth	
2. Sulphanilic acid	8.0 g
Acetic acid, 5N	1000ml
3. N,N-Dimethyl-1-naphthylamine	8.0g
Acetic acid, 5N	1000ml

Note: Store in refrigerator

Result:

Red colour	Positive
No change in colour	Negative

4.8 KOH test

Principle: For differentiation of gram positive from gram negative bacteria. Gram positive cells walls are resistant to the reagent, gram negative ones are dissolved by it. The viscid material is derived from the liberated nucleic acids.
Reagent: 3% KOH
Result:

Gram negative	gels within 5-60 seconds
Gram positive	no viscosity

5 Media Used in Sugar Utilization Test

5.1 Phenol red broth base (Himedia)

Use: A basal medium to which Carbohydrates may be added to determination of fermentation reaction of pure cultures of microorganisms.
Suspend 15gm in 1000ml of distilled water heat if necessary to dissolve the medium completely. Mix well and dispense in tubes containing inverted Duram's tubes and sterilized by autoclaving at 15 pounds atmospheric pressure (121°C) for 15 minutes. Ascoptically add filter sterilized or autoclave sterilized amount of carbohydrates solution to sterile base of medium.

Ingredients	gms/lit
Proteose peptone	10gm
Beef extract	1.00gm
Sodium chloride	5gm
Phenol red	0.018gm
Final PH (at 25°C)	7.402

5.2 Fil media RM 3050-500gm

D(+) Maltose, monohydrate, crystalline 4 - 0- ά -d – D - Glucopyranosyl-D-glucose
C12H12O11.H2O-molecular wt = 360.32
Minimum assay 94%
Maximum limits of impurities
Glucose (TLC) =1.5%
Heavy metals (as Pb) = 0.0051
Water 5 to 5.5%

5.3 D-(+)-Glucose, anhydrous

Dextrose, anhydrous
C5H12O6, mol.wt:180.14
CAS NO: 50-99-7
Minimum assay: 99-0%
Maximum Limits of impurities: lead (pb) 0.0005%
Chloride (Cl) 0.005%
Sulphate (SO4) 0.005%
Loss on drying 0.1%
Specific reaction (a) 20 D+52.5d to 53d

5.4 RM 027.500gm, D- mannitol, extra pure, mannite

C6H1404 Molint: 182.18
Cas No,: 69-65-8
Minimum assay: 99.0%
Maximum Limits of impurities: chloride(c) 0.005%
Sulphated ass 0.07%
Heavy metals (as Pb) 0.0005%
Arsenic (As) 0.0001%
Specific reaction (a/20D+23c to +25c
C=10, (Sodium borate)

5.5 RM 090-10gm, adonitol, adonite, ribitol

C5H12O5 Mol. Wt. 152.15
Minimum assay: 99%

5.6 RM 062-25gm, L (+) rhamnose, monohydrate, 6-deoxy-L- mannose, monohydrate
C5H12O5 H2O Mol. Wt. 182.17
CAS NO-6155-35-7
Minimum assay: 99%
Specific rotation (a) 20+8.7+9.2
Maximum Limits of impurities
Heavy metals (as pb) 0.0005%
Glucose (HPAC) 0.2%

5.7 RM 483-1gm, DC-arabinose
C5H10O5, Mol. Wt. 150.13
Minimum assay: 99%
Melting point 158-160C

5.8 RM 108-10gm, salicin
2- (Hydroxymethyl) phenyl B-D-glucopyranoside
Crystalline for bacteriology
C13H18O7 mol wt 280.3

5.9 RM101-100gm, D (+) galactose
C6H12O6, Mol. Wt. 180.20
CAS No: 59-23-4
Minimum assay: 99%
Maximum limits of impurities
Calcium (ca) 0.01%
Sulphated ash 0%
Sulphate (so4) 0.02%
Loss on drying (at 10C)

5.10 Dulcitol, galacitol; dulcite
C6H14O6 Mol wt. 182.2
CAS NO: 608-66-2
Minimum Assay: 99%
Melting Point: 185-188C
Maximum Limits of impurities: Heavy metal (as pb) 0.001%
Water 0.5%

5.11 Inositol, meso-inositol; myo-inosotol
C6H12O6 Mol Wt. 180.16
CHSNO: 87-89-8
Minimum Assay-98%
Maximum limits of impurities
Iron (Fe) 0.0005%
Chlorine (Cl) 0.005

6 Self-questionnaire Chart of 31 Slaughter HouseBased on Visual Perception

Code	Floor type	Water supply	Slaughtered species	cleanness	Defreeze	Soap management	Chop-board	Store	Viscera
Tfm	Tile	Tap	Ch/go	3	Yes	Open	Regular	Separate	Mix
Sm	,,	,,	,,	3	,,	,,	,,	,,	,,
Pem	Mud	,,	Po/Bu	1	,,	,,	,,	With bird	,,
Bl	Marble	,,	Po/Ch	2	,,	,,	No	,,	,,
Ss	,,	,,	Bu	3	No	,,	,,	,,	,,
Cf	,,	,,	Ch	2	Yes	,,	,,	,,	,,
Tb	,,	,,	Po	2	,,	,,	,,	Separate	No
Kb	Cement	,,	Ch	3	,,	,,	,,	,,	Mix
Mb	,,	,,	Po/Bu	2	,,	,,	Occasional	,,	,,
Pk	,,	,,	,,	2	,,	,,	,,	,,	,,
Ma	..	,,	Ch	2	,,	,,	No	,,	,,
Kn	Marble	,,	Ch	2	,,	,,	Occasional	,,	,,
Rrp	Tile	,,	,,	1	,,	,,	,,	,,	,,
Af	Cement	,,	,,	3	,,	,,	,,	With bird	,,
Nf	Cement	,,	Ch/Go	2	,,	,,	,,	,,	,,
Dh	Marble	,,	,,	2	,,	,,	,,	,,	,,
Kh	,,	Drum	,,	2	,,	,,	,,	,,	,,
Sd	Cement	Tap	Ch	1	,,	Close	No	Sepaqrat	No
Sp	,,	,,	,,	1	No	,,	,,	With bird	,,
Ntc	,,	,,	,,	1	Yes	,,	,,	,,	,,
Mm	,,	,,	Po	1	,,	,,	,,	Separate	,,
Nu	Wood	Drum	Bu	1	,,	,,	,,	,,	,,
Rna	,,	,,	,,	1	,,	,,	,,	,,	,,
Bas	,,	,,	Ch/Fi	1	,,	,,	,,	With bird	,,
Dna	Marble	Tap	,,	3	,,	,,	Occasional	,,	,,
Gun	,,	,,	Ch/Go	3	,,	,,	No	,,	,,
pok	Tile	,,	,,	3	,,	,,	,,	,,	,,
Dha	,,	,,	Fi/Ch	3	,,	,,	,,	,,	,,
Nns	Cement	,,	,,	1	,,	,,	,,	,,	,,
Kz	Wood	Drum	,,	2	,,	,,	,,	,,	,,
Rrp	Tyle	,,	Go	3	,,	,,	,,	Separate	,,

7 Selection Procedure for Biochemical Test on the Basis of Reaction on TSI and LIA, Referred Model as "Edward and Ewing's identification of Entrobacteriaceae" (1986)

Triple Sugar Iron Agar			Lysine Iron Agar		Polyvalent Sera		Disposal
Butt	Slant	H2S	Butt	H2S	O	H	
Y	R	+	P	+	+		B. and M.T.
Y	R	+	P	+	+		B. and M.T.
Y	R	-	P	-			B. and M.T.
Y	R	-	Y	-	+		*B. and M.T.
Y	R	-	Y	-	-		Discard
Y	R	+	Y	+/-			B. and M.T.
Y	Y	-	Y or P	-			Discard
Y	Y	+	P	+			**B. and M.T.
NC	NC						Discard

Note: Y= yellow; R= red; P= purple; B. and M.T.= go for biochemical and motility test; NC= no change in colour; *= *Salmonella typhisuis*; **= *Salmonella enterica* subsp. *Arizonae* or *S. enterica* subsp. *Diarizonae*

8 Biochemical Tests

Table 13 Biochemical tests performed for the identification of isolates, buff

Coding	MR	VP	Citrate	Oxidase	Urease	TSI(b/s)	LIA(b)	H_2S T/L	Gas	Indole	Motility	Ornithine Decarboxylase
10Xb#	+	-	+	-	-	A/k	P	+/-	+	-	M	+ve
25Xb#	+	-	+	-	-	A/k	P	+2/-	+	-	M	+ve
27Xb#	+	-	+	-	-	A/K	P	+/-	+	-	M	+ve
28Xb#	+	-	+	-	-	A/K	P	+3/+	+	-	M	+ve
47Xb#	+	-	+	-	-	A/k	P	+/+	_	-	NM	+ve
62Xb*	+	-	+	-	-	A/k	P	+/+	+	-	M	+ve
65Xb#	+	-	+	-	-	A/k	P	+2/+	+	-	NM	+ve
69Xb#	+	-	+	-	-	A/K	p	+/+	-	-	M	+ve

Note: - = Negative reaction or absence of H_2S production, + = Positive reaction or trace H_2S; production; +2 and +3= H_2S production more and excess; A/K = Acidic/ Alkaline, P= Purple, M= Motile, b=butt, s= slant, b#= buff; X= Growth on XLT4, B= Growth on BGA

Table 14 Biochemical tests performed for the identification of isolates, Chevon:

Coding	MR	VP	Citrate	Oxidase	Urease	TSI(b/s)	LIA(b)	H_2S T/L	Gas	Indole	Motility	Ornithine Decarboxylase
8XBg	+	-	+	+	-	A/K	P	+3/+	-	-	M	+ve
10Xg	+	-	+	+	-	A/K	P	+/+	+	-	M	+ve
16Xg	+	-	+	+	-	A/K	P	+/+	+	-	M	+ve
20XBg	+	-	+	+	-	A/K	P	+/+	+	-	M	+ve
21XBg	+	-	+	+	-	A/K	P	+/-	+	-	M	+ve
40Xg	+	-	+	+	-	A/K	P	+/+	+	-	NM	+ve

Note: += Positive reaction or trace H_2S production; +2 and +3= H_2S production more and excess; A/K = Acidic/ Alkaline, P= Purple; M= Motile, b=butt, s= slant, g=chevon; X= Growth on XLT4, B= Growth on BGA

Table 15 Biochemical tests performed for the identification of isolates, Pork

Coding	MR	VP	Citrate	Oxidase	Urease	TSI(b/s)	LIA(b)	H_2S T/L	Gas	Indole	Motility	Ornithine Decarboxylase
18Xp	+	-	+	+	-	A/k	Y	-/-	+	-	M	+ve
45Bp	+	-	+	+	-	A/K	P	+/+	+	-	M	+ve
53Xp	+	-	+	+	-	A/K	P	+3/+	-	-	M	+ve
80Xp	+	-	+	+	-	A/K	P	+/+	+	-	M	+ve

Note: - = Negative reaction or absence of H_2S production; + = Positive reaction or trace H_2S production; + 2 and +3= H_2S production more and excess; A/K = Acidic/ Alkaline, P= Purple; M = Motile, b=butt, s= slant, p=pork; X= Growth on XLT4, B= Growth on BGA

Table 16 Biochemical tests performed for the identification of isolates, chicken

Coding	MR	VP	Citrate	Oxidase	Urease	TSI(b/s)	LIA(b)	H_2S T/L	Gas	Indole	Motility	Ornithine Decarboxylase
32Bc	+	-	+	-	-	A/k	P	+/-	+	-	M	+ve
39Xc	+	-	+	-	-	A/k	P	+2/-	+	-	M	+ve
42Xc	+	-	+	-	-	A/K	P	+/-	+	-	NM	-ve
43Xc	+	-	+	-	-	A/K	P	+3/+	+	-	M	+ve
45Xc	+	-	+	-	-	A/k	P	+/+	-	-	NM	+ve
48Xc	+	-	+	-	-	A/k	P	+2/+	+	-	M	+ve
53Bc	+	-	+	-	-	A/k	P	+/+	+	-	NM	+ve
70Bc	+	-	+	-	-	A/K	p	+/+	-	-	M	+ve

Note: - = Negative reaction or absence of H_2S production; + = Positive reaction or trace H_2S production; + 2 and +3 = H_2S production more and excess; A/K = Acidic/ Alkaline, P = Purple, c = chicken; M = Motile, NM = Non motile, b = butt, s = slant; X = Growth on XLT4, B= Growth on BGA

9 Sugar Fermentation Test

Table 17 Sugar fermentation test, buff

	Rhamnose	Arabinose	Dulcitol	Salicin	Inositol	Mannitol	Glucose		Maltose
Sample	Acid	Acid	Acid	Acid	Acid	Acid	Acid	Gas	Acid
10X	+	+	_	+	-	+	+	+	+
25X	+	+	_	_	-	+	+	+	+
27X	+	+	_	+	-	+	+	+	+
28X	+	+	_	+	-	+	+	+	+
47X	_	_	_	_	+	+	+	+	+
62X	+ve	-	-	-	-	+	+	+	-
65X	_	_	_	_	_	+	+	_	+
69X	+ve	_	_	+	+	-	+	+	-

Table 18 Sugar fermentation test, pork

	Rhamnose	Arabinose	Dulcitol	Salicin	Inositol	Mannitol	Glucose		Maltose
Sample	Acid	Acid	Acid	Acid	Acid	Acid	Acid	Gas	Acid
18X	-	-	_	-	-	+	+	-	+
45b	+	+	_	+	-	+	+	-	+
53X	-	-	_	+	-	+	+	+	+
80X	-	-	_	+	+	+	+	-	+

Table 19 Sugar fermentation test, chevon

Sample	Rhamnose Acid	Arabinose Acid	Dulcitol Acid	Salicin Acid	Inositol Acid	Mannitol Acid	Glucose Acid	Glucose Gas	Maltose Acid
8XB	+ve	+	_	+	-	_	+	+	-
10X	+	+	+	_	-	+	+	+	+
16X	+	+	+	_	-	+	+	+	+
20XB	+	+	+	+	+	+	+	+	+
21XB	+	+	+	_	_	+	+	+	+
40X	-ve	+	-	-	-	+	+	+	+
	Rhamnose	Arabinose	Dulcitol	Salicin	Inositol	Mannitol	Glucose		Maltose

Table 20 Sugar fermentation test, chicken

Sample	Rhamnose Acid	Arabinose Acid	Dulcitol Acid	Salicin Acid	Inositol Acid	Mannitol Acid	Glucose Acid	Glucose Gas	Maltose Acid
32B	+ve	-	_	+	-	+	+	-	+
39X	+ve	-	_	_	-	+	+	-	+
42X	-	-	+	-	-	+	+	-	+
43X	+ve	-	_	=	-	+	+	-	+
45X	_	_	_	_	-	+	+	+	+
48X	+ve	-	-	-	-	+	+	-	+
53B	_	_	_	+	_	-	+	+	+
70B	+ve	_	_	-	-	+	+	-	+
	Rhamnose	Arabinose	Dulcitol	Salicin	Inositol	Mannitol	Glucose		Maltose

10 Measurement of Inhibition Zone with HI Antibiotics Zone Scale-c

Table 21 Measurement of inhibition zone, buff

Samples	CF	CL	C	G	CO	E	O
10X	35	30	23	20	23	R	R
25X	34	22	25	19	30	R	16
27X	37	37	27	25	29	R	11
28X	33	30	19	22	23	R	R
47X	31	37	10	10	23	R	R
62X	22	21	23	24	R	R	R
65X	37	30	27	23	27	20	27
69X	33	30	24	21	30	R	R

Table 22 Measurement of inhibition zone, chevon

Samples	CF	CL	C	G	CO	E	O
8X	26	29	21	11	19	8	R
8B	27	35	26	22	27	12	22
10X	31	22	26	20	30	19	11
16X	37	31	27	24	29	10	29
20X	31	31	27	21	11	R	R
20B	26	21	21	21	8	R	R
21X	31	31	23	24	29	10	20
21B	37	37	23	29	27	11	22
40X	37	33	24	11	11	R	20

Table 23 Measurement of inhibition zone, pork

Samples	CF	CL	C	G	CO	E	O
18X	37	21	34	21	31	22	25
45B	27	21	23	24	19	21	11
53x	30	30	19	21	27	R	R
80X	33	33	11	21	23	R	R

Table 24 Measurement of inhibition zone, chicken

Samples	CF	CL	C	G	CO	E	O
32B	31	26	23	20	21	33	21
39X	37	37	27	26	22	R	R
42X	37	20	24	21	11	31	11
43X	32	14	21	26	20	33	R
45X	31	27	29	19	21	11	16
48X	33	33	21	29	27	11	13
53B	32	14	24	26	11	31	21
70B	30	21	23	21	20	23	19