Species	Probe	Sequence	Satellite	Reference
Chicken	GMRS	GCGTTTTCTCTTCGCAAATCC	CNM	Matzke *et al.*, 1990
Turkey	MMRS	GTATTTGTGGGAGAAAAAGGG	TM	Matzke *et al.*, 1992
Pig	SSAS	ATTGAATCCACTGCATTCAATC	Ac2	Jantsch *et al.*, 1990
Horse	HMSR	CTACTTCAGCCAGATCAGGC	MES	Wijers *et al.*, 1993

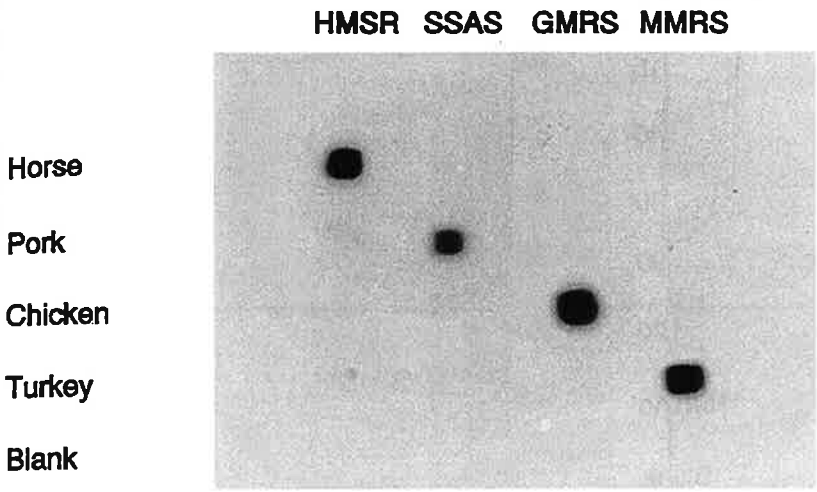


Fig. 2. Hybridizations of the HMSR, SSAS, GMRS and MMRS probes to DNA extracts of meat of horse, pig, chicken and turkey.

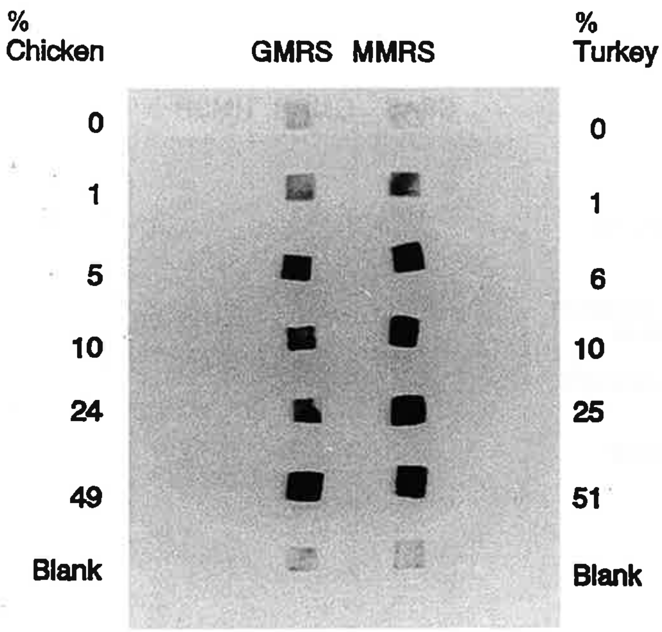


Fig. 3. Hybridizations of the GMRS and the MMRS probes to varying mixtures of chicken and turkey meat.

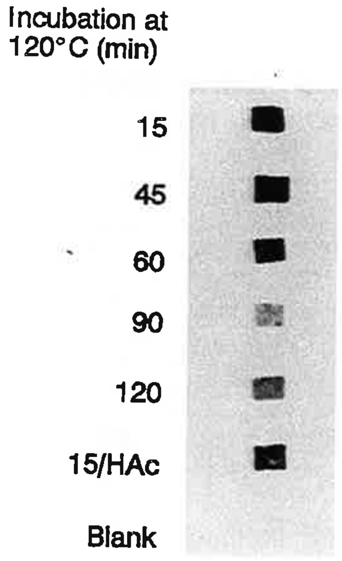


Fig. 4. Hybridizations of the MMRS probe to DNA extracts of turkey meat samples autoclaved at 120 °C for varying times and turkey meat incubated in 5 % HOAc.

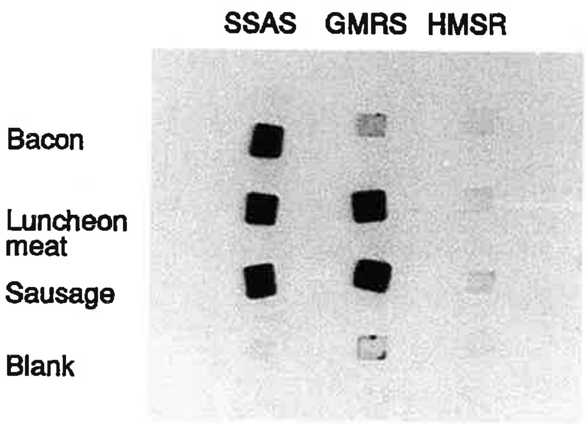


Fig. 5. Hybridizations of the SSAS, GMRS and HMSR probes to DNA extracts of lean smoked bacon, sausage and luncheon meat.

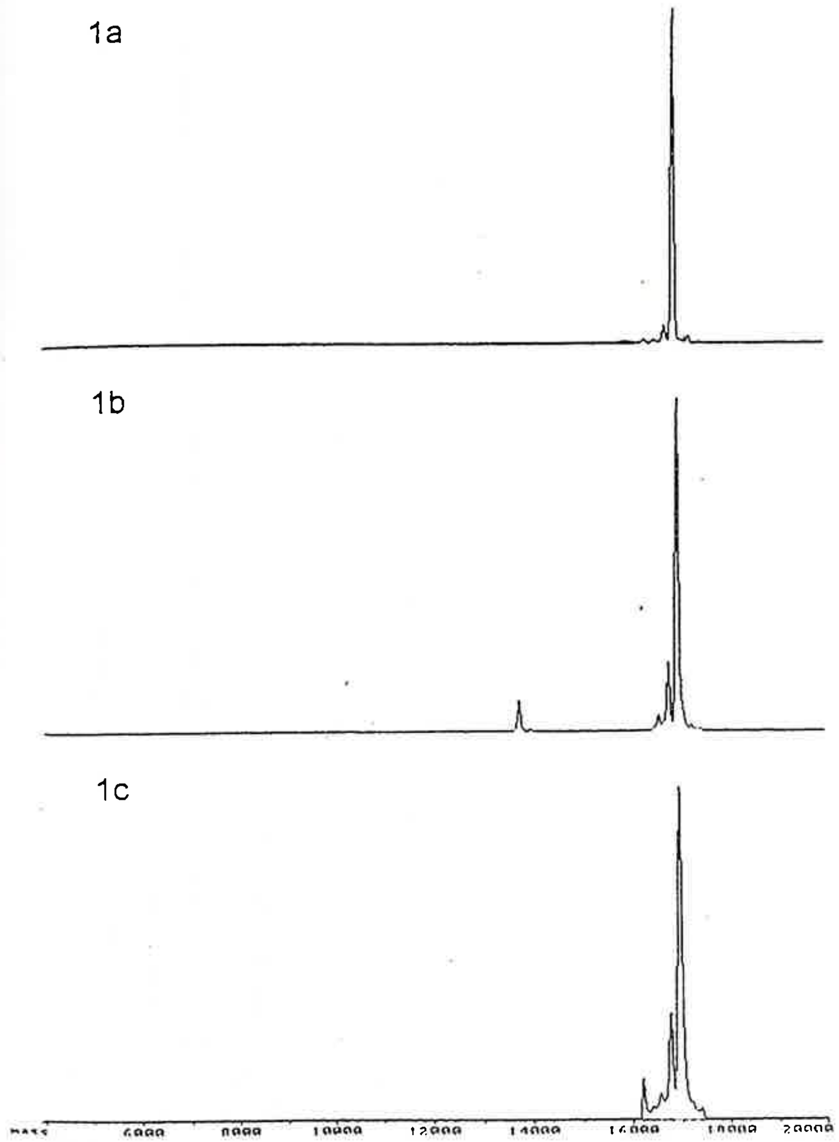


Figure 1. ESMS of standard sheep myoglobin heated at 121°C during (1a) 0 min, (1b) 30 min and (1c) 60 min.

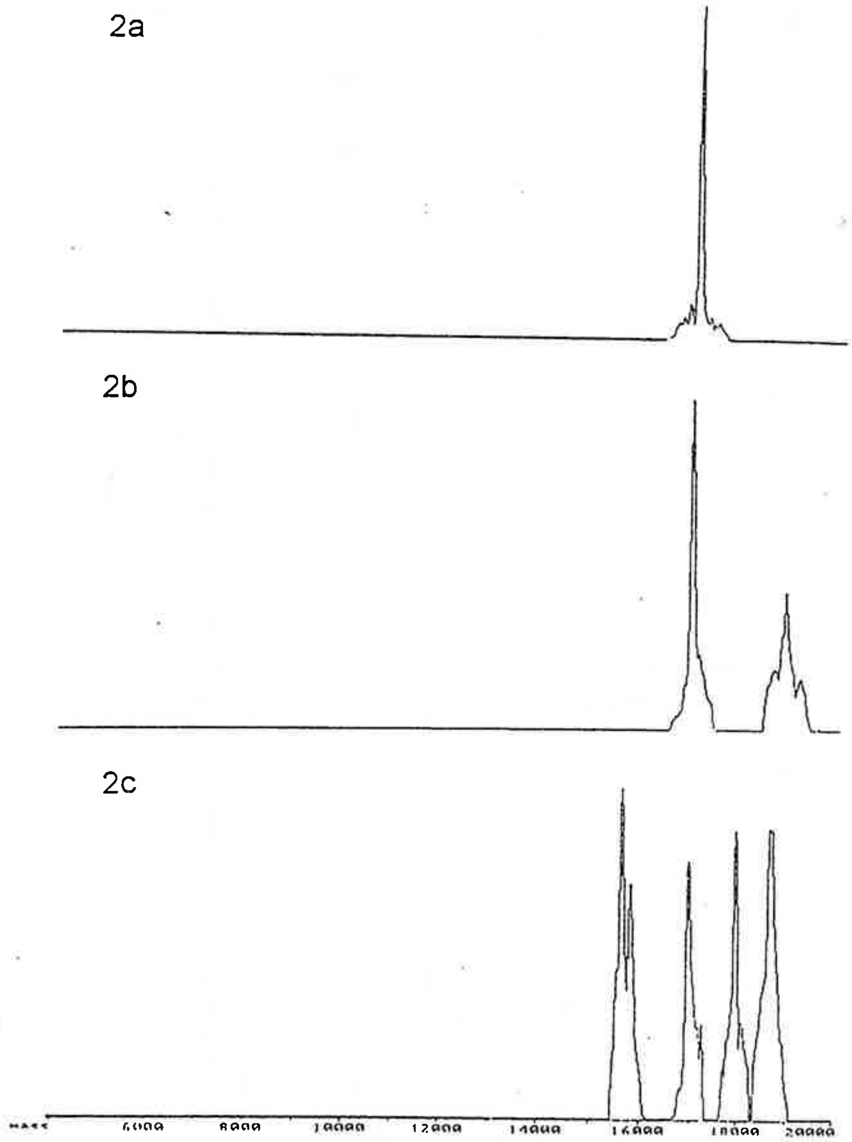


Figure 2. ESMS of lamb meat heated at 100°C during (2a) 0 min, (2b) 30 min and (2c) 60 min.

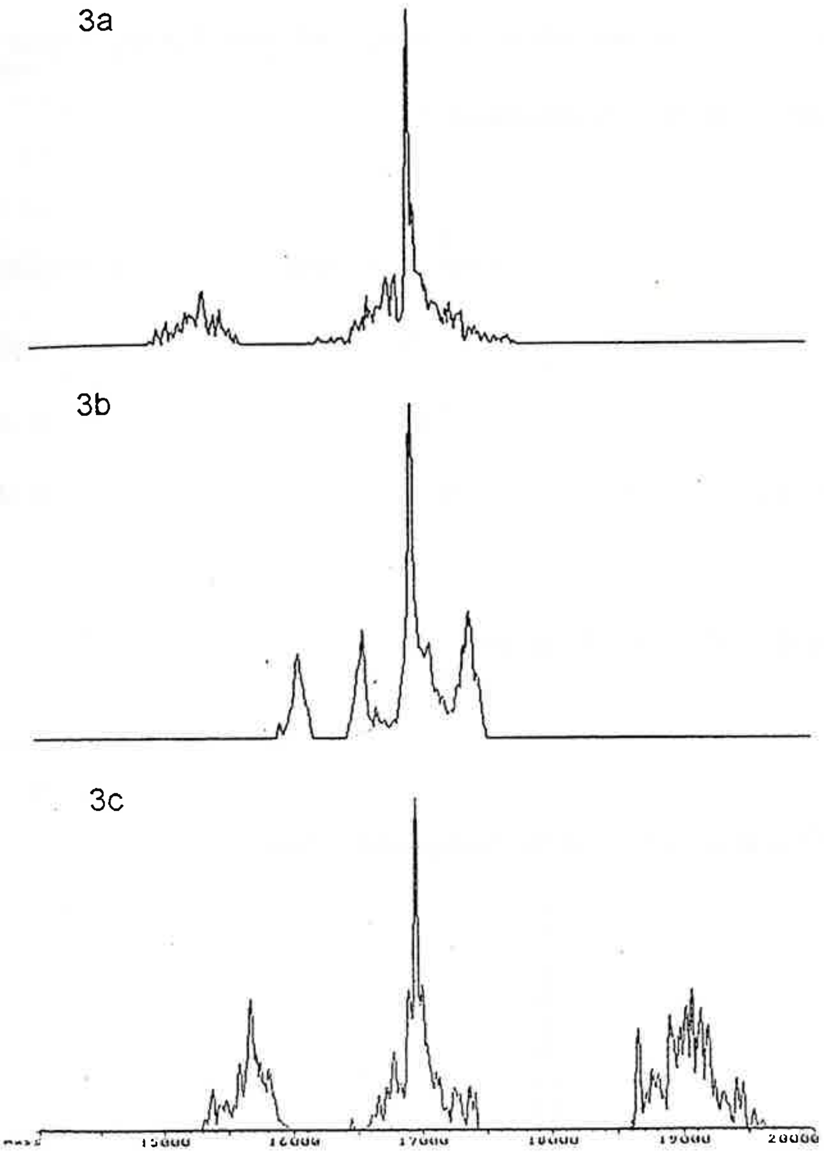


Figure 3. ESMS traces of beef burgers cooked during (3a) 0 min, (3b) 15 min and (3c) 20 min.

Table 1. The Haem Concentrations of Beef, Pork and Turkey Breast as Measured by High Performance Liquid Chromatography.

Species	n†	Myoglobin (mg/g)	Haemoglobin (mg/g)
Beef (L.D.)	20	8.38	0.45
Pork (L.D.	20	0.18	0.26
Turkey Breast	4	0.03	0.54

† Where n = number of extracted samples

Figure 1. Chromatogram of an extract of Beef *longissimus dorsi*

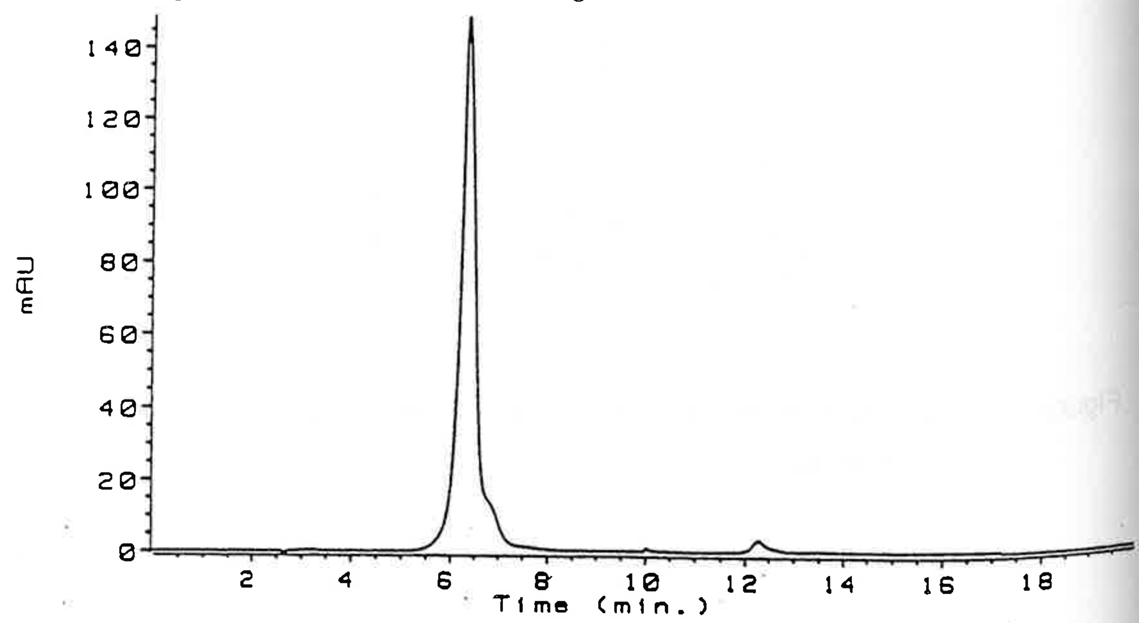


Figure 2. Chromatogram of an extract of Pork *longissimus dorsi*

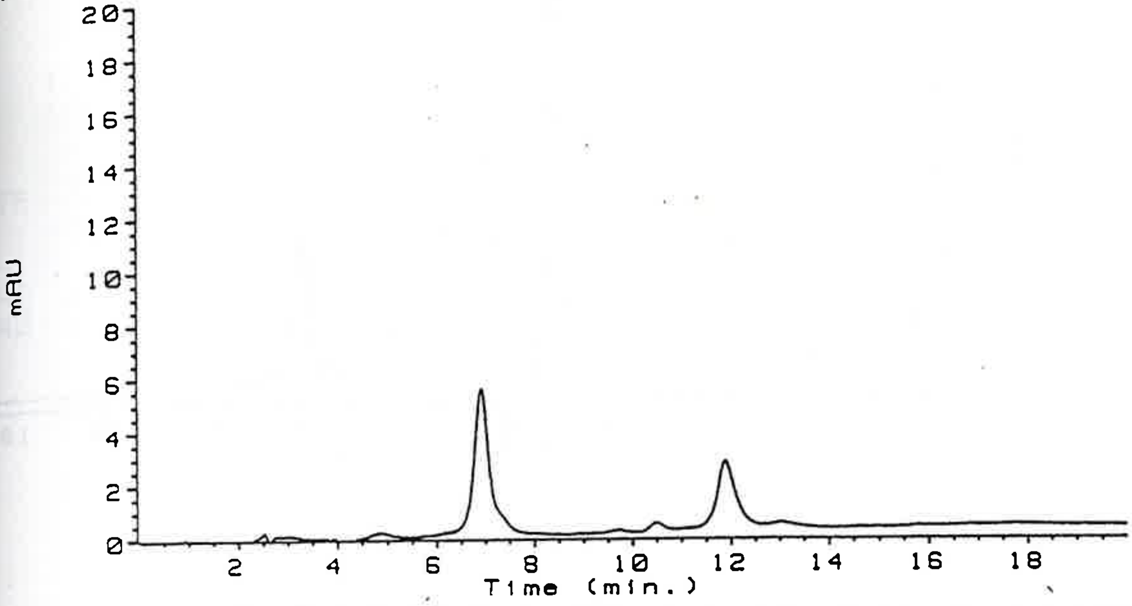


Figure 3. Chromatogram of an extract of Turkey Breast

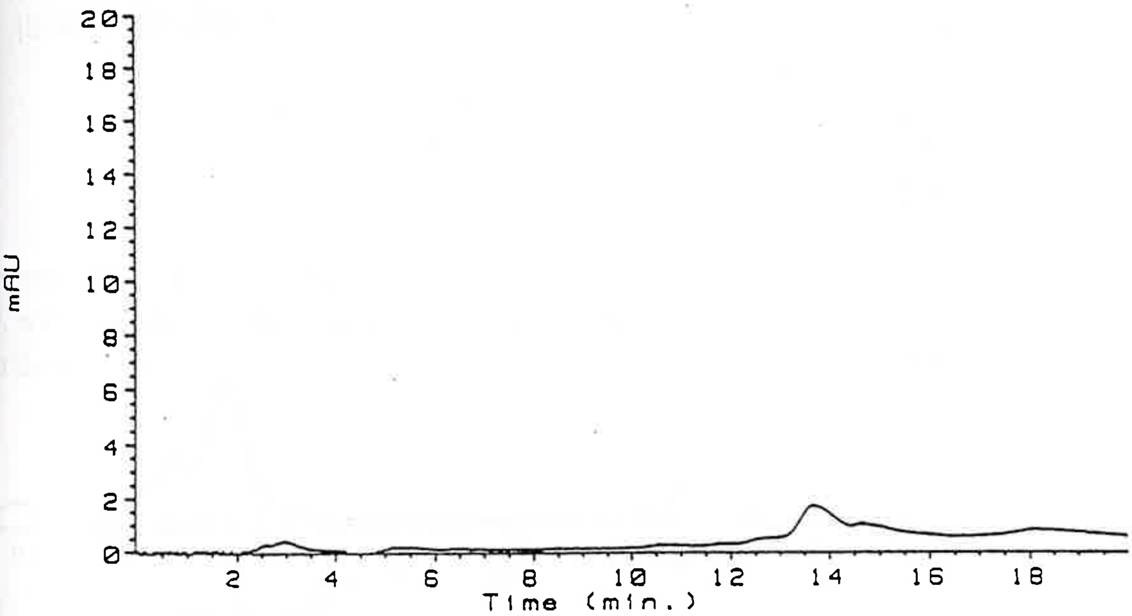


Figure 4. Chromatogram of equine myoglobin and bovine haemoglobin standards

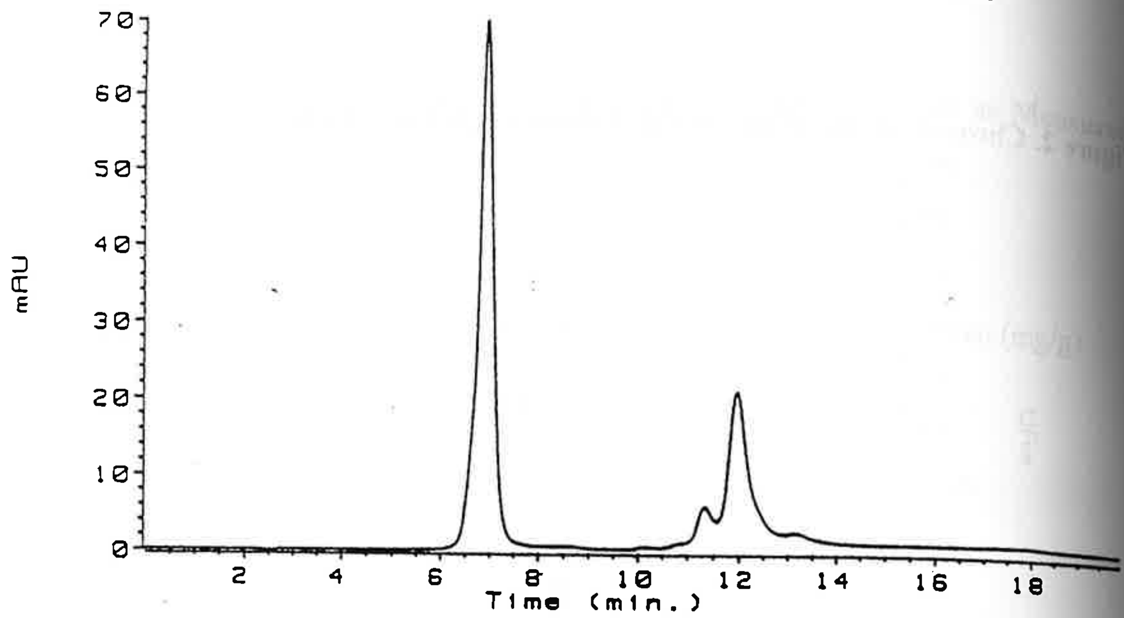
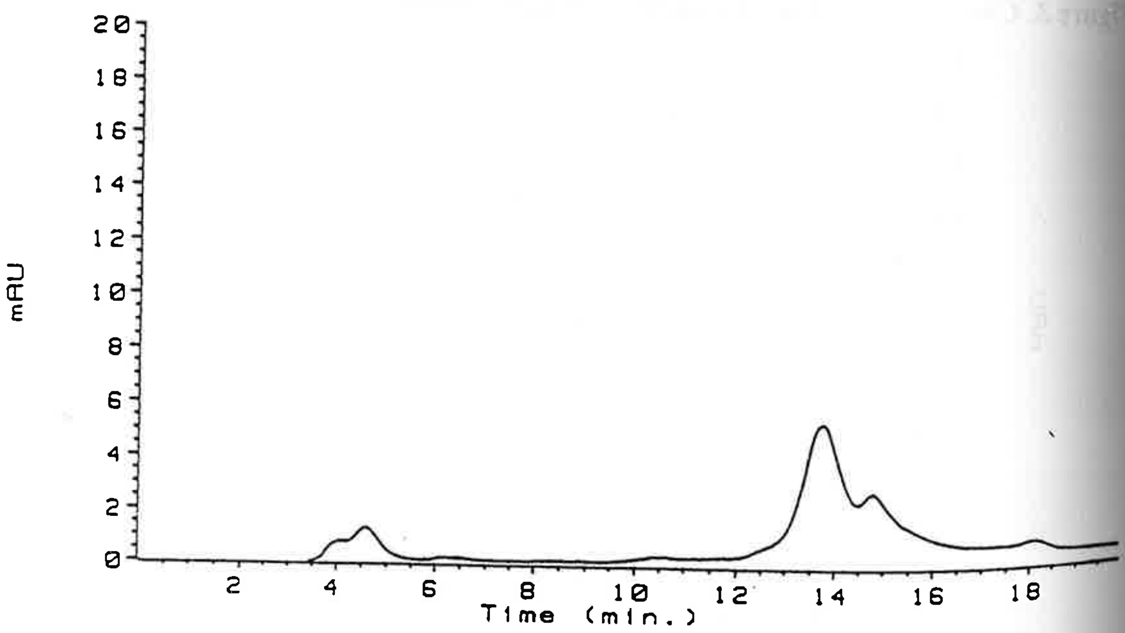
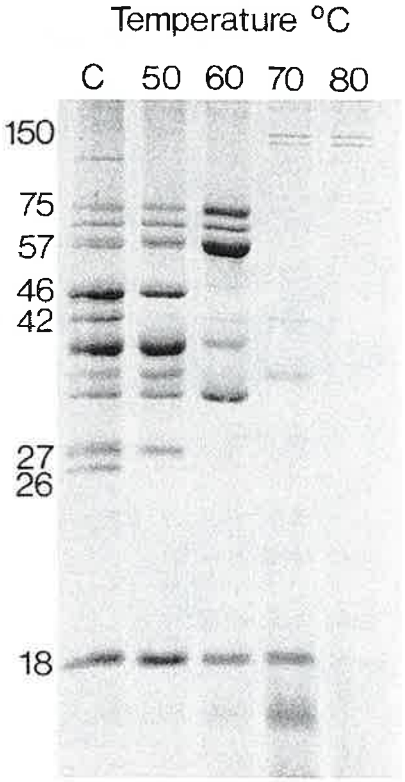


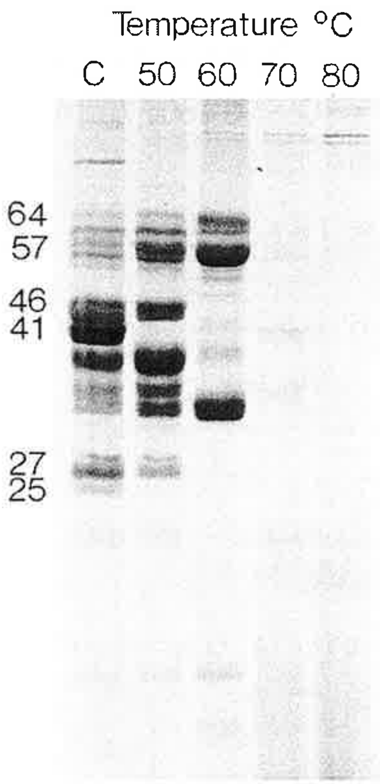
Figure 4. Chromatogram of a concentrated extract of Turkey Breast





gure 1. Pattern of proteins extracted from heated beef L.dorsi.
is control, water soluble proteins from raw meat. The molecular weights (KDa) are
dicated on the left side.

Figure 2. Pattern of proteins extracted from heated beef M.semitendinosus.
C is control, water soluble proteins from raw meat. The molecular weights (KDa) are indicated on the left side.



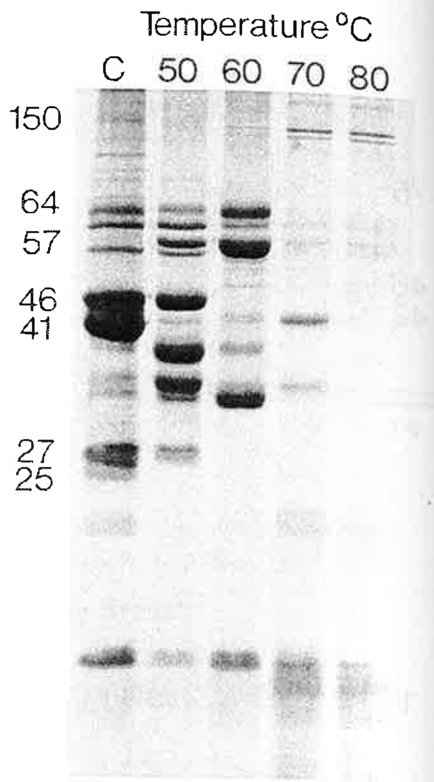


Figure 3. Pattern of proteins extracted from heated pig L.dorsi.
C is control, water soluble proteins from raw meat. The molecular weights (KDa) are indicated on the left side.

Figure 4. Pattern of proteins extracted from heated pig M.semitendinosus.
C is control, water soluble proteins from raw meat. The molecular weights (KDa) are indicated on the left side.

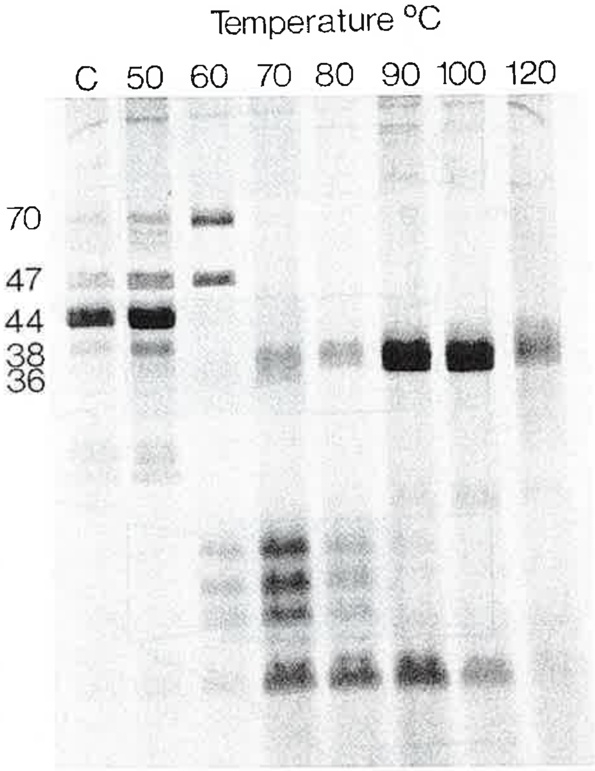


Figure 6. Pattern of proteins extracted from heated chicken thigh.
C is control, water soluble proteins from raw meat. The molecular weights (KDa) are indicated on the left side.

Figure 5. Pattern of proteins extracted from heated chicken breast.
C is control, water soluble proteins from raw meat. The molecular weights (KDa) are indicated on the left and right side.

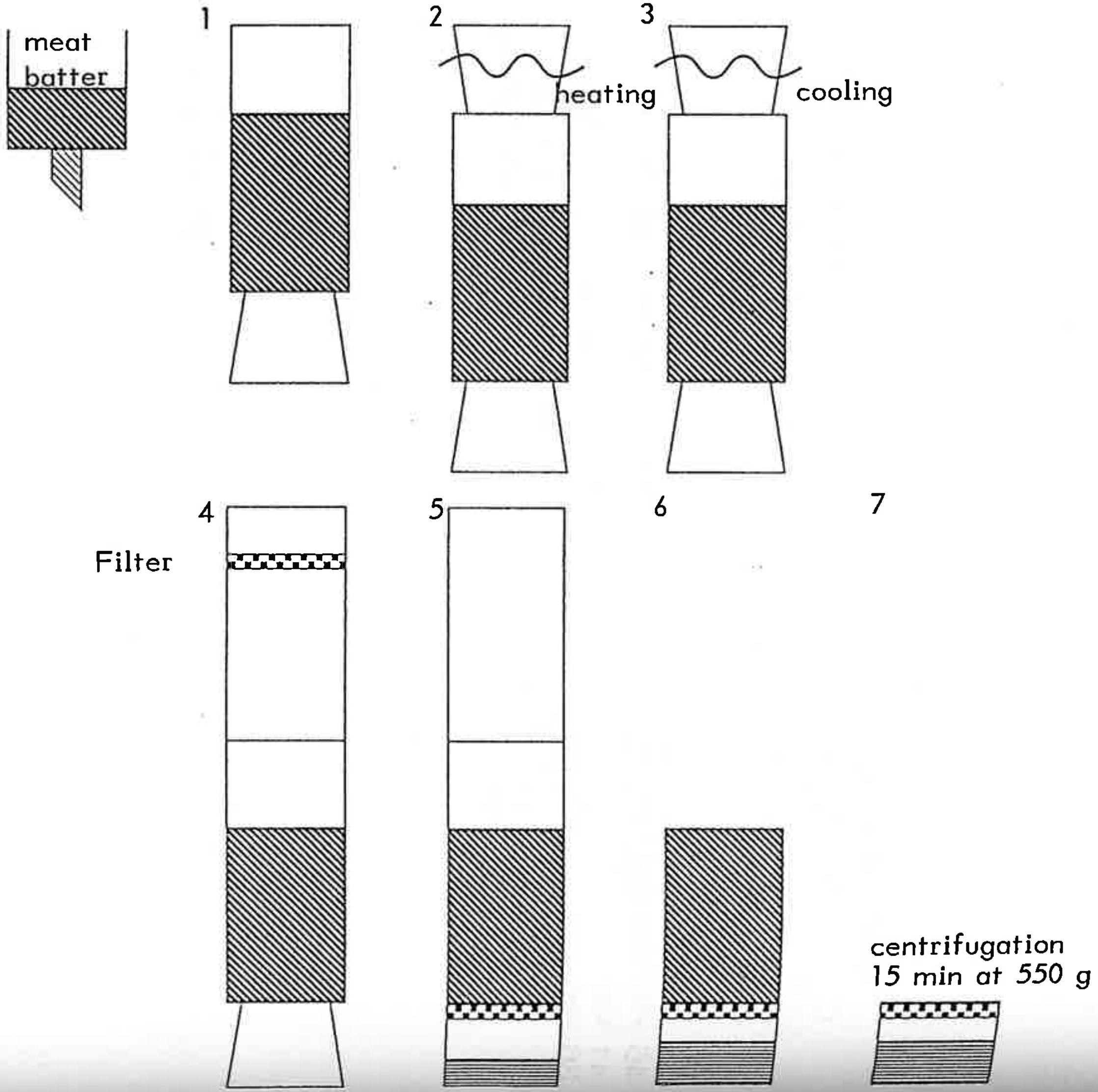
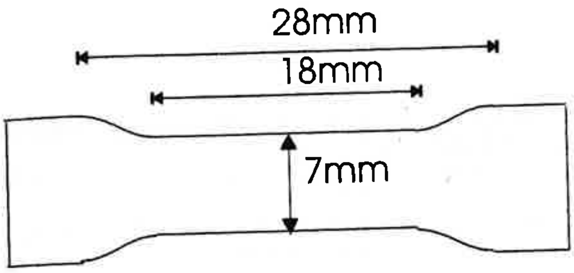
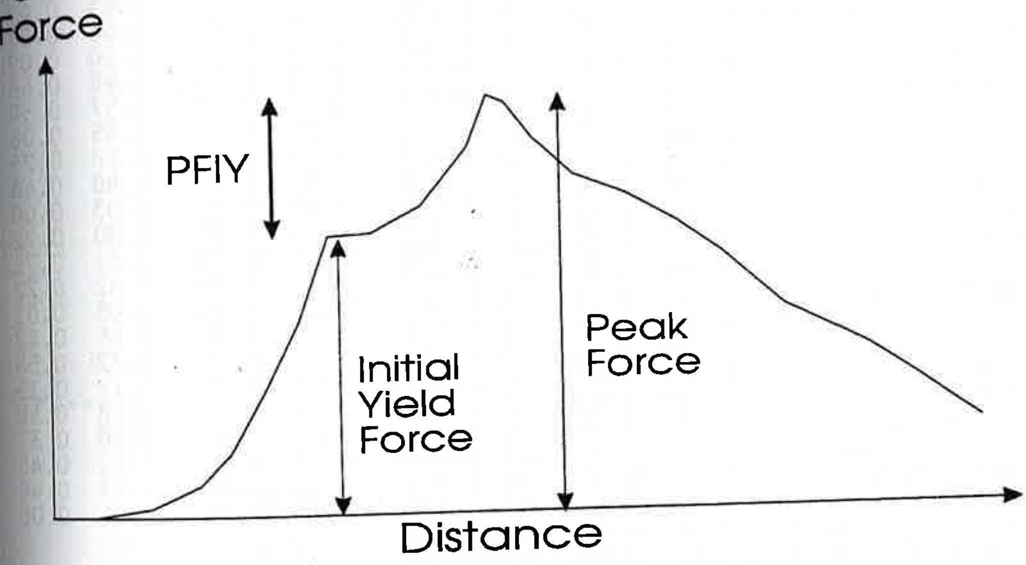


Figure 1

Diagram showing Phases of Water (and fat) Holding Measurement gure 1. Template shape and size.



igure 2. Typical WB shear force deformation curve



ure 3. Representative graph of penetrometer test showing the measured parameters.

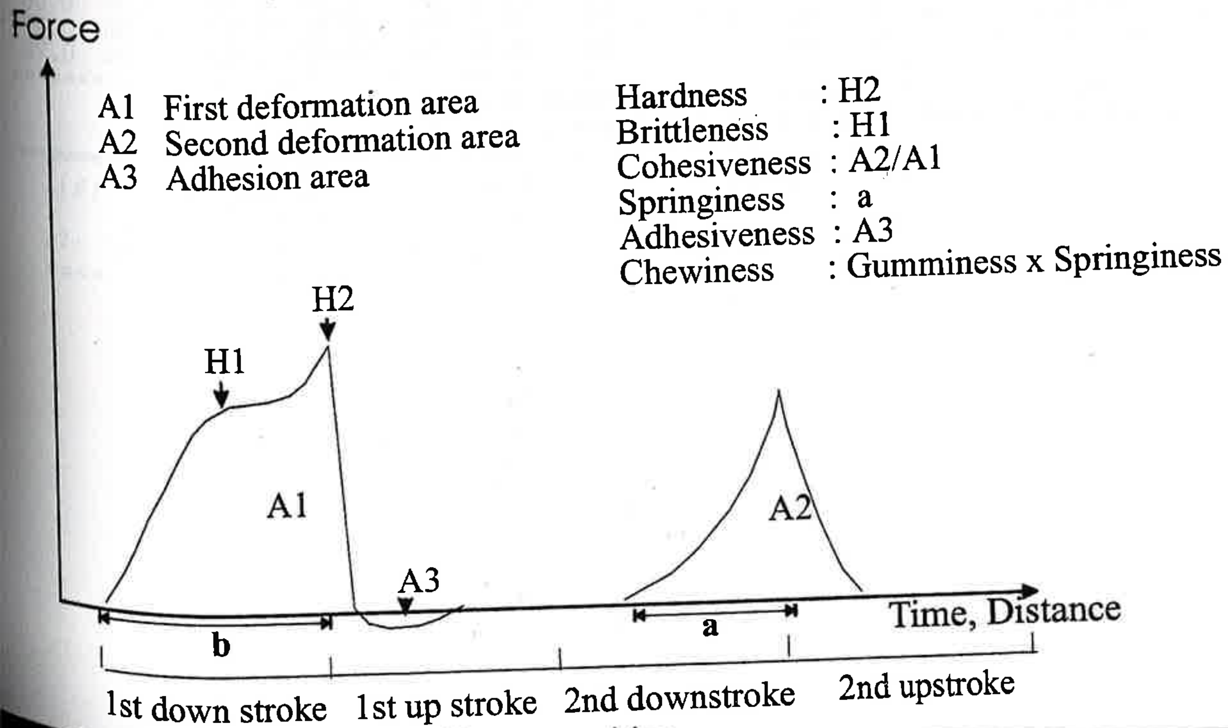


Table 1. - The 29 variables, the effect of Beta-Adrenergic Agonist treatment and NIRS calibration and cross-validation.

#	Variables		mean	SD	BAA/ /UNT	P<	R^2c	R^2cv	R^2c	R^2cv
							longissimus LD		hindleg HL	
1	Age	d	86.64	3.67	-2%	0.087	0.59	0.42	0.68	0.08
2	Live Weight	hg	24.40	3.18	-12%	0.009	0.77	0.52	0.65	0.47
3	Average Daily Gain	g/d	32.03	4.72	-6%	0.245	0.70	0.27	0.66	0.27
4	Food Conversion Ind.	g/g	4.44	0.51	-7%	0.068	0.57	0.22	0.10	0.09
5	Commercial Carcass	hg	14.45	1.91	-9%	0.046	0.75	0.55	0.59	0.46
6	Dressing Percentage	%	59.26	1.77	3%	0.007	0.43	0.19	0.57	0.35
7	Blood	%	2.93	0.40	-3%	0.461	0.40	0.15	0.35	0.08
8	Viscera	%	19.50	1.67	-4%	0.184	0.53	0.29	0.60	0.25
9	Skin	%	14.53	0.96	-12%	0.000	0.64	0.54	0.48	0.48
10	Cooling losses	%	1.83	0.49	19%	0.055	0.10	0.06	0.03	0.00
11	Kidney Fat	%	1.41	0.51	-44%	0.000	0.70	0.48	0.90	0.72
12	Scapular Fat	%	0.45	0.21	-40%	0.008	0.71	0.58	0.81	0.71
13	Kidney	%	0.99	0.10	-6%	0.097	0.40	0.20	0.42	0.22
14	Hearth Lungs Thymus	%	1.80	0.32	-2%	0.781	0.19	0.05	0.05	0.01
15	Liver	%	6.50	1.44	-3%	0.696	0.55	0.32	0.65	0.42
16	Head	%	8.40	0.80	3%	0.333	0.51	0.33	0.72	0.58
17	Hindleg Muscle	%	80.63	1.64	3%	0.000	0.68	0.22	0.17	0.15
18	Hindleg Bone	%	15.32	1.63	-4%	0.315	0.62	0.23	0.58	0.40
19	Muscle / Bone ratio		5.33	0.60	8%	0.053	0.77	0.40	0.60	0.33
20	Hindleg Other Tissues	%	4.05	1.21	-42%	0.000	0.73	0.50	0.59	0.45
21	Femurs+Tibiae+Humeri	%	4.43	0.72	5%	0.356	0.52	0.43	0.62	0.40
22	pH_u LD		6.06	0.18	1%	0.567	0.30	0.08	0.01	0.00
23	Ether Extract LD d.m.	%	3.16	0.93	-19%	0.056				
24	Crude Protein LD d.m.	%	86.07	0.83	1%	0.025				
25	Water_LD	%	73.68	0.54	1%	0.000	0.62	0.36	0.41	0.25
26	Water_HL	%	74.47	0.65	2%	0.000	0.76	0.66	0.93	0.83
27	Ultrasound scan 10	mm	19.52	1.95	-4%	0.204	0.59	0.36	0.09	0.06
28	Ultrasound scan 35	mm	20.28	2.24	-5%	0.196	0.42	0.27	0.56	0.27
29	Ultrasound scan 60	mm	20.04	2.46	-3%	0.554	0.48	0.36	0.64	0.28

LD: were 55 integer samples + 55 homogenized before freeze-drying;
HL: were 110 samples by two freeze dryers.

Table 2. Discrimination of BAA treated individuals from untreated by linear models of related traits and by NIRS spectra of freeze dried longissimus dorsi (LD) or hindleg (HL) muscles.

	R^2 model	R^2c LD	R^2cv LD	R^2c HL	R^2 cv HL
Linear models N=52					
A - monofactorial multivariate					
29 variables	0.85				
B - multilinear regression					
12 variables (#)	0.83				
#9 Skin %	0.368				
#17 Muscle_HL %	0.132				
#26 Water_HL %	0.074				
#23 Ether ex._LD %	0.064				
#8 Viscera %	0.038				
#12 Scap.fat %	0.032				
#29 Ultr.scan 60	0.029				
NIRS					
C - Partial least squares					
N=107		0.91	0.75	0.86	0.72
D - multilinear regression		0.51	0.48		
3 wavelengths (2108; 1418; 1318)					
3 wavelengths (1698; 1648; 2228)				0.55	0.51
2 wavelengths (1938; 1328)		0.42	0.39		
2 wavelenghts (2058; 1448)				0.46	0.43
1 wavelength (2098 nm)		0.27	0.25		
1 wavelength (1728 nm)				0.38	0.36

(#) in descending order from variables listed in table 1:
9-17-26-23-8-12-29-16-24-1-14-15
R^2c is R^2 calibration mode; R^2cv is R^2 in cross-validation mode

Table 1. Prediction of percentage lean in boxed beef trimmings using scan peak and meat temperature.

Fat level	Particle size	No. of boxes	R^2	RSD
56.6 ± 19.0%	variable	100	.94	4.64
	2.5 cm	100	.98	2.56
73.5 ± 2.2%	2.5 cm	20	.85	.89
	0.3 cm	20	.75	1.13

Table 2. Prediction of percentage lean in beef trimmings held in plastic tubs using scan peak, meat temperature and tub weight.

Fat level	No. of tubs	R^2	RSD
49.3 ± 4.2%	43	.68	2.43
64.1 ± 3.8%	39	.74	2.00
67.0 ± 3.0%	20	.74	1.74

Code of protein	Type of preparation	Protein content (%) (N x 6.38)	Bulk density (g/l)	pH value (water,20°C) (10%, w/v)
NaDMV	spray dried sodium caseinate (DMV Veghel)	90.0	350	6.8
NaPol	spray dried sodium caseinate (polish)	88.7	210	5.9
EM6	roller dried protein type Na caseinate	89.5	475	6.8
EMLV	roller dried low viscosity Na caseinate	90.0	475	6.8
EMHV	roller dried high viscosity Na caseinate	89.0	480	6.6
KCas	roller dried potassium caseinate	89.5	475	6.5
CaCas	roller dried calcium caseinate	90.5	475	6.7
Esp	ultrafiltrated whey protein concentrate	78.0	430	6.3
MPC	ultrafiltrated total milk protein	80.5	350	7.0
BPP	spray dried porcine blood plasma	76.5 (Nx 6.25)	400	8.9

Table 1 Physico-chemical properties of the protein preparations

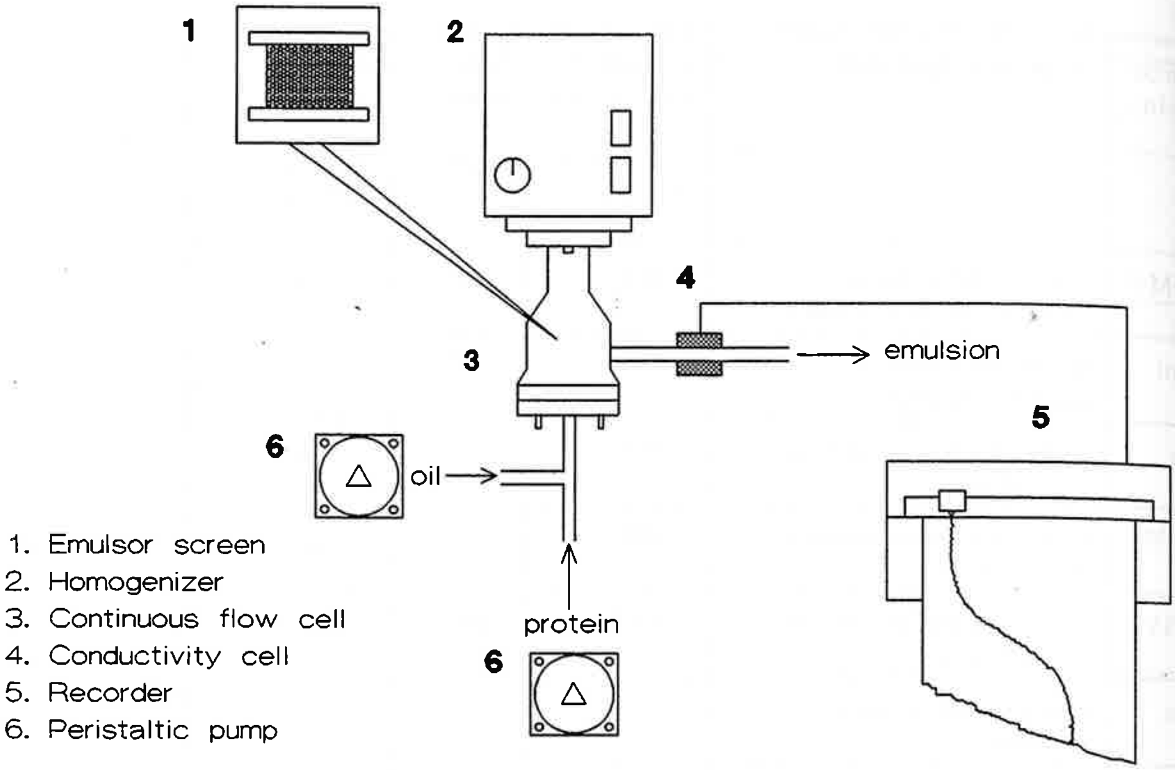


Figure 1 Schematic diagram of flow cell apparatus for emulsifying and collapse point detection

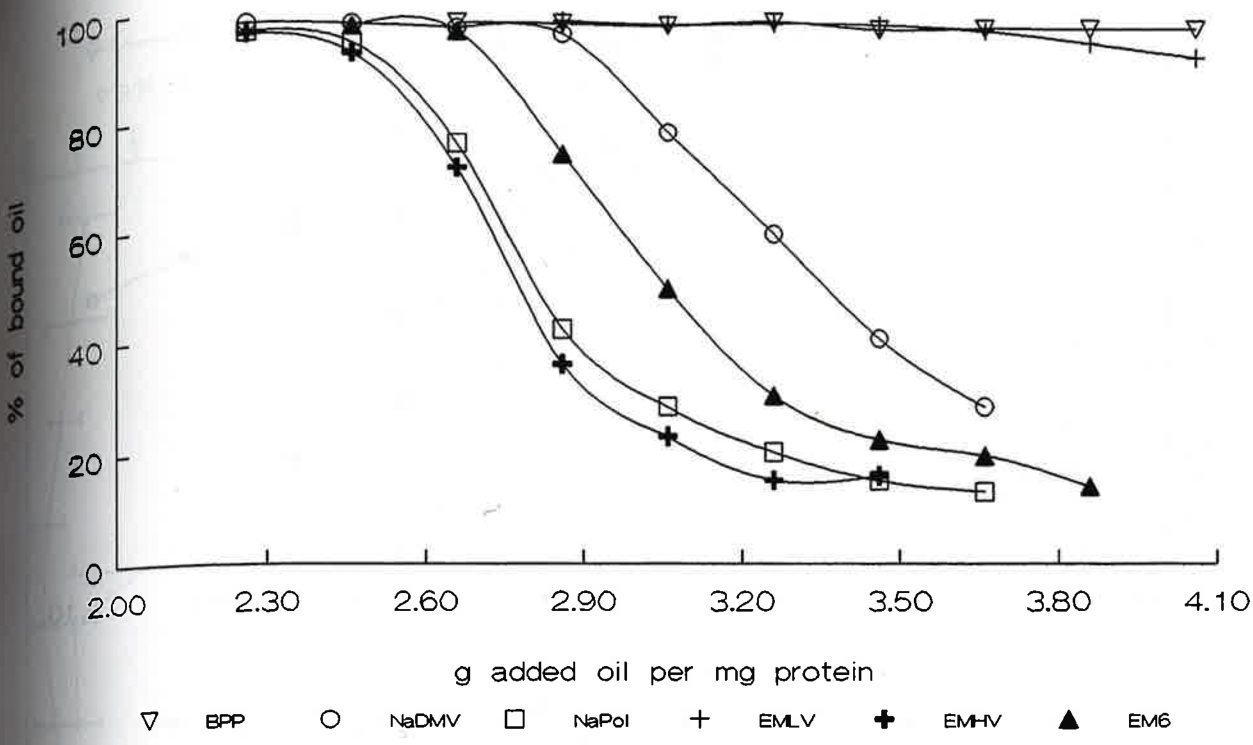


Figure 2 Emulsion stability curves of protein preparations (a)

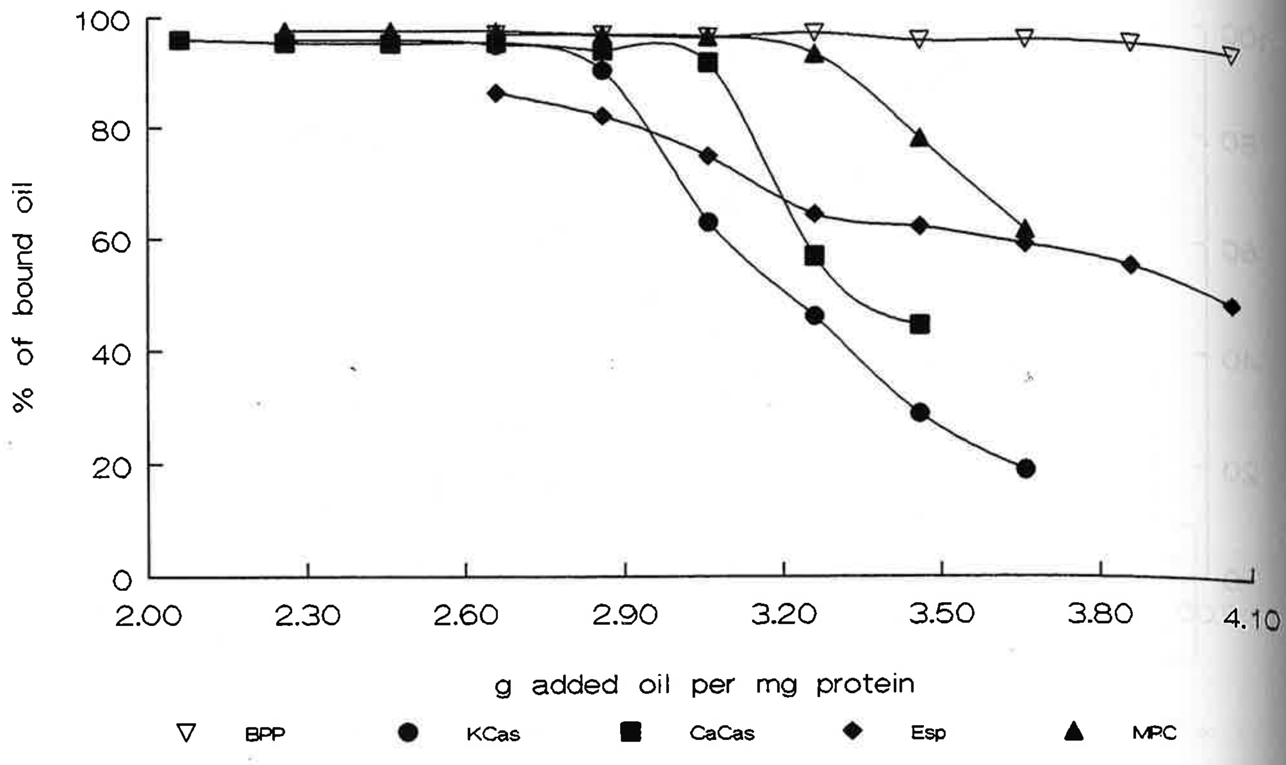


Figure 3 Emulsion stability curves of protein preparations (b)

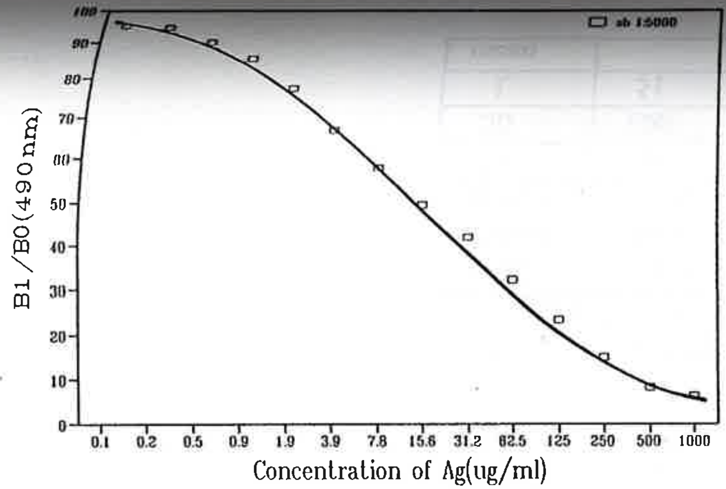


Fig. 1. Standard curve of bovine myosin

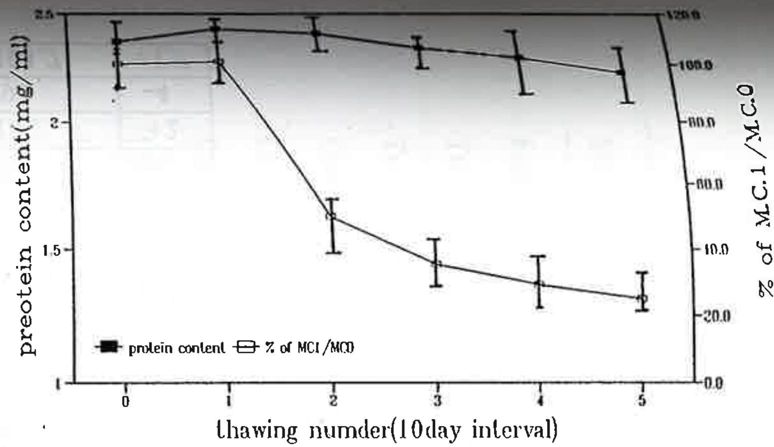


Fig. 3. The graph of detected content of myosin and proteins in 0.5M KCl, 10mM phosphate buffer(pH 6.8) solution ontained through the repeated freezing-thawing process meat by buiret method and ELISA method(M.C.1:detected myosin content, M.C.0:chilled meat myosin content)

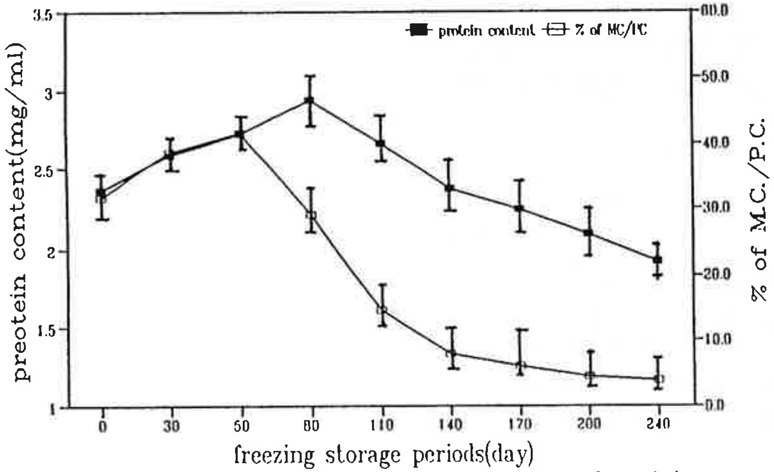


Fig. 2. The graph of detected content of myosin and proteins in 0.5M KCl, 10mM phosphate buffer(pH 6.8) solution obtained during freezing stored meat by buiret method and ELISA method(M.C:myosin content, P.C:protein content)

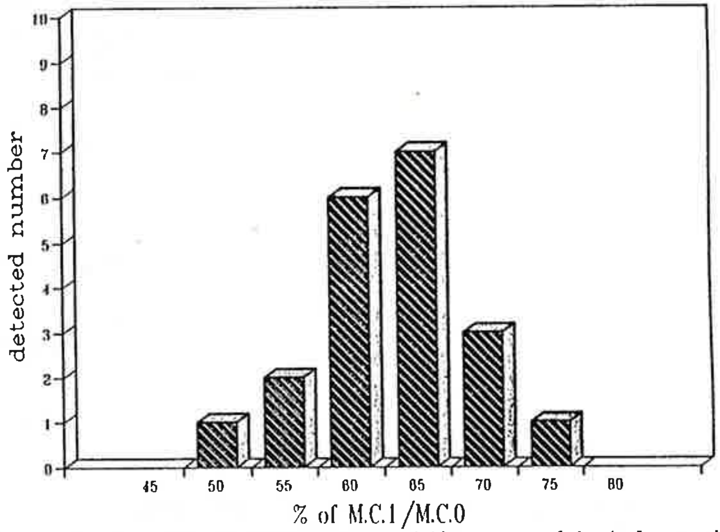


Fig. 4. The rate of the distribution of the range detected myosin content compared imported frozen meat with fresh meat by ELISA method

various Ags was showed at Table 1. The cross reactivity of the various Ags was showed at Table 1. This result shows epitopes have the differences belong to species. Intra-inter assay varience value was Table 2. Recovery test for the investigation of propriety appears on Table 3.

Table 1. Cross-reactivity of rabbit anti bovine myosin with various antigens

(%)

	bovine myosin	porcine myosin	rabbit myosin	chicken myosin
anti-bovine myosin	100	16.2	4.0	2.7

Table 2. Intra and inter assay result

serum	No. of determine	Mean SD(ug/ml)	CV(%)
intra assay varience			
A	10	0.9875 ± 0.012	10.3
B	10	50.125 ± 1.27	2.5
C	10	500.255± 0.15	10.0
inter assay varience			
A	10	499.25 ± 5.51	11.0
B	10	52.00 ± 3.04	5.9
C	10	1.075 ± 0.08	7.7

Table 3. The measurement of in fixed myosin additive amount of myosin

added amount (ug/ml)	expected value (ug/ml)	observed value (ug/ml)	Recovery (%)	Bias (%)
500	550	590	107	+7
50	100	102	102	+2
1	51	49	96	-4
mean			101.7	+1.7

Table 1. CIELAB[a] colour co-ordinates for different meat species muscle types
[a](diffuse/0° geometry, 10° observer curve, illuminant D65)

Species/muscle type	L*	a*	b*	hue.	chroma.
Beef	42.98	17.09	9.79	27.47	19.77
Turkey breast	66.00	2.12	5.12	64.74	5.64
Turkey leg	59.21	6.39	5.72	40.69	8.64
Goose breast	58.51	10.46	8.20	34.21	13.44
Goose leg	54.90	7.39	1.95	9.64	7.69
Chicken breast	62.94	3.29	8.93	69.18	9.56
Chicken leg	61.63	5.48	7.15	49.48	9.15
Pork	68.66	2.12	9.53	77.58	9.78
Significance of:					
Species muscle type	***	***	***	***	***
Breast vs leg	***	*	***	***	*

* $p < 0.05$ *** $p < 0.001$

Table 2 Pigment content of different meat species at reflectances at selected wavelengths

	Concentration mg g^{-1}					
Species/muscle type	Mb	Hb mg g^{-1}	Total haem	RA525	K/5525	RA730
Beef	8.38	0.42	8.80	0.96	1.02	0.44
Turkey breast	-	-	-	0.46	0.50	0.37
Turkey leg	0.21	1.42	1.63	0.59	0.65	0.36
Goose breast	0.32	3.42	3.74	0.61	0.68	0.29
Goose leg	1.86	0.85	2.71	0.65	0.70	0.35
Chicken breast	-	-	-	0.53	0.52	0.38
Chicken leg	-	-	-	0.54	0.59	0.32
Pork	0.18	0.26	0.44	0.42	0.45	0.29
Significance of:-						
Species muscle type	-	-	-	***	***	***
Breast vs leg	-	-	-	***	***	NS

K/S525 - ratio of absorption to scattering calculated as $\frac{(1-R525)^2}{2R525}$

RA730 - reflex attenuance at 730 nm

RA525 - reflex attenuance at 525 nm

Mb - myoglobin measured by HPLC

Hb - haemoglobin measured by HPLC

Table 3 Calculation of pigment content and proportions based on published equations

Species/muscle type	(RA580-RA630)	RA580/RA525	Proportion of pigments		
			MetMb	Mb	MbO
Beef	0.52	1.09	0.27	0.04	0.68
Turkey breast	0.15	1.08	NV	NV	NV
Turkey leg	0.25	1.09	0.11	0.57	0.31
Goose breast	0.34	1.15	0.14	0.12	0.73
Goose leg	0.24	1.11	0.22	0.31	0.45
Chicken breast	0.16	1.09	0.17	0.12	0.71
Chicken leg	0.10	0.97	0.43	0.14	0.42
Pork	0.22	1.08	0.14	0.37	0.48

NV - a non valid result was obtained for turkey breast

MetMb - metmyoglobin

Mb - myoglobin

MbO - oxymyoglobin

Table 1: Regression coefficients for equations predicting 48 hour color using a 24-hour measurement. Min=Minolta, SCM=SCM Datalogger.

Veal	48-hour (Y)	24-hour (X)	R^2-Min	R^2-SCM
Grain	Brisket	Brisket	0,12	0,17
		Flank	0,06	0,08
		Inside	0,04	NS
		Loin interior	N/A	0,05
	Loin interior	Brisket	N/A	0,12
		Flank	N/A	0,04
		Inside	N/A	0,12
		Loin interior	N/A	0,46
	Loin	Brisket	0,08	0,16
		Flank	NS	0,07
		Inside	NS	NS
		Loin interior	N/A	0,22
Milk	Brisket	Brisket	0,42	0,32
		Flank	0,27	0,38
		Inside	0,33	0,60
		Loin interior	N/A	0,53
	Loin interior	Brisket	N/A	0,29
		Flank	N/A	0,13
		Inside	N/A	0,34
		Loin interior	N/A	0,77
	Loin	Brisket	0,35	0,29
		Flank	0,19	0,18
		Inside	0,22	0,31
		Loin interior	N/A	0,34

Table 2: Selected correlation coefficients from color measurements on the brisket

Variables	1	2	3	4	5	6	7
Minolta 45-min	1,00	0,71	0,50	0,57	0,34	0,37	-,49
SCM 45-min	0,78	1,00	0,41	0,55	0,31	0,41	-,40
Minolta 24 hours	0,62	0,54	1,00	0,72	0,35	0,29	-,32
SCM 24 hours	0,56	0,50	0,84	1,00	0,52	0,41	-,57
Minolta 48hours	0,52	0,55	0,62	0,55	1,00	0,68	-,53
SCM 48 hours	0,60	0,68	0,68	0,60	0,84	1,00	-,47
Myoglobin	-,53	-.56	-,48	-,62	-,57	-,43	1,00

Table 3: Classification of veal carcasses as a function of pH taken at 48 hours postmortem. Measurements taken on the brisket and on the loin between the 11th and 12th ribs. Values in brakets are standard errors.

Variable	Ultimate pH		
	pH>6.0	5.8<pH<6.0	ph<5.8
N	12	12	76
pH of loin	6.21(.19)	5.84(.05)	5.38(.14)
pH of brisket	5.61(.14)	5.58(.19)	5.34(.09)
Minolta on brisket	35.0(4.6)	35.5(3.1)	38.7(4.0)
Minolta surface loin	29.6(8.1)	38.8(6.5)	42.4(5.3)
SCM on brisket	1.04(.17)	0.98(.18)	1.12(.19)
SCM interior loin	0.64(.10)	0.90(.38)	1.05(.24)
SCM surface loin	0.80(.23)	0.99(.25)	1.17(.19)

Table 1. Sensory and chemical markers for cooked/stored ground beef patties (n=3).

	TBA	HXL	TV	BM	BRO	BRC	SWT	PTY	CBD	SUR	BTR
0-DAY	5.49	24.0	278.9	3.47	2.08	2.31	0.85	0.22	0.23	0.53	0.26
± s.e.m.	0.74	2.6	40.1	0.06	0.12	0.02	0.04	0.02	0.01	0.05	0.02
4-DAY	13.47	66.6	355.3	3.14	1.96	2.00	0.86	0.55	0.51	0.62	0.35
± s.e.m.	2.18	13.9	58.6	0.05	0.04	0.04	0.08	0.03	0.03	0.02	0.03
7-DAY	16.93	76.7	516.5	n.a.							
± s.e.m.	1.02	3.1	45.8	n.a.							

abbreviations: TBA, 2-thiobarbituric acid reactive substances; HXL, hexanal; TV, total volatiles; BM, beefy/meaty; BRO, brothy; BRC, browned/caramel; SWT, sweet; PTY, painty; CBD, cardboardy; SUR, sour; BTR, bitter; n.a., not applicable.

Table 2. Mean percent phospholipid[a] content of raw, 0-day and 4-day stored ground beef patties (n=3).

	PG	PE	LPE	PC	LPC	Sp
RAW						
Mean	16.17	16.58	18.82	36.68	8.88	15.42
± s.e.m.	0.36	0.17	0.53	3.81	0.19	0.34
0-DAY						
Mean	13.51	14.87	18.15	40.26	8.22	14.66
± s.e.m.	0.52	0.54	0.77	3.37	0.39	0.68
4-DAY						
Mean	14.05	13.95	17.23	39.55	7.76	13.91
± s.e.m.	0.32	0.53	0.72	3.13	0.15	0.63

[a]Abbreviations: PG, phophatidyl glycerol; PE, phosphatidyl ethanolamine; LPE, lysophosphatidyl ethanolamine; PC, phosphatidyl choline; LPC, lysophosphatidyl choline; Sp, sphingomyelin.

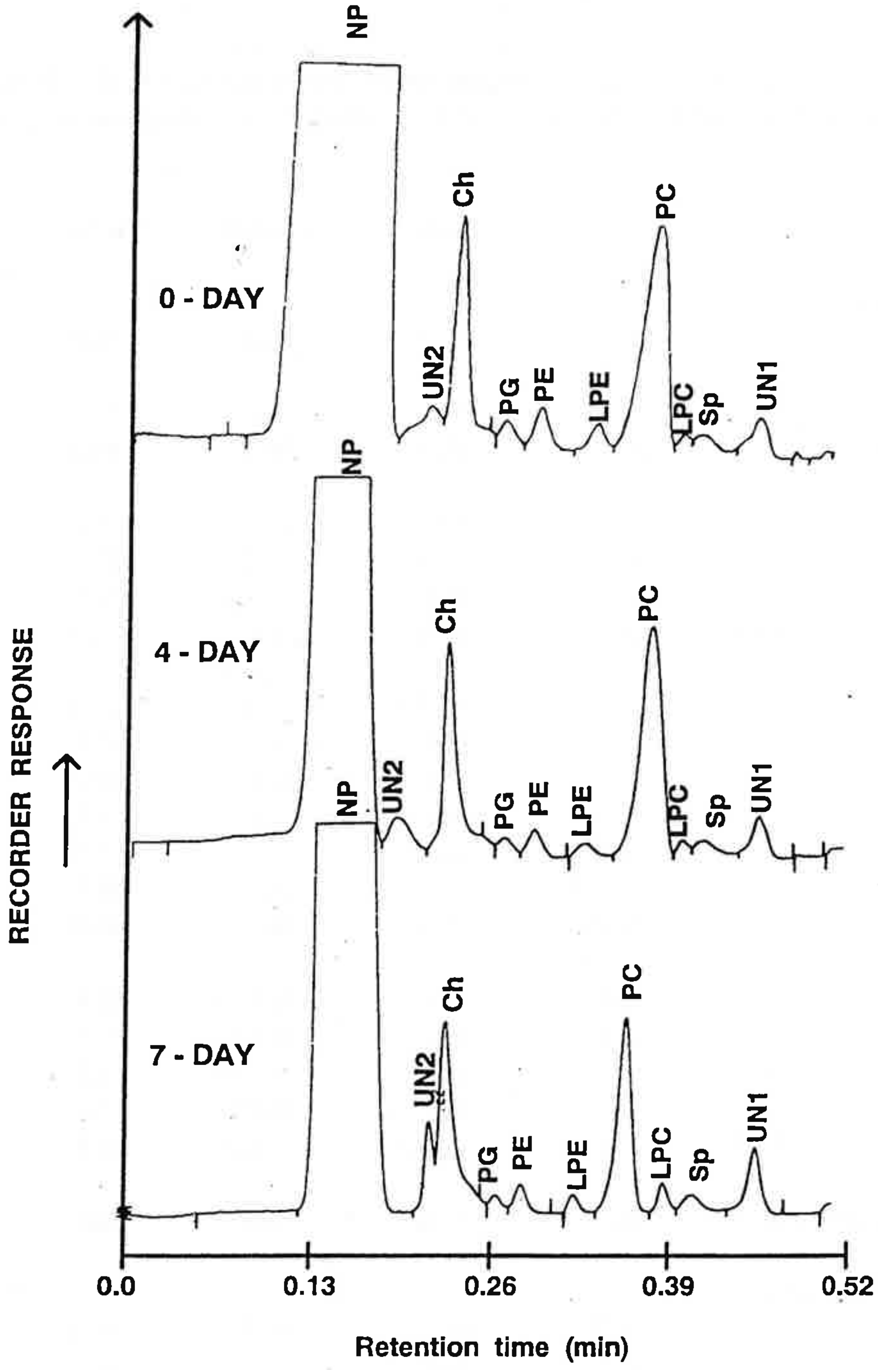


Figure 1. Iatroscan thin-layer chromatography/flame-ionization detector chromatograms of total lipids from cooked beef patties stored at 4°C. Abbreviations: NP, nonpolar; UN, unknown; Ch, cholesterol; PG, phophatidyl glycerol; PE, phosphatidyl ethanolamine; LPE, lysophosphatidyl ethanolamine; PC, phosphatidyl choline; LPC, lysophosphatidyl choline; Sp, sphingomyelin.

Table 1 : Fatty acid and aldehyde composition of phosphatidylcholine in Beef, Pork, Rabbit and Turkey muscles (as percent of the methylesters or the dimethylacetals present).

	Beef	Pork	Rabbit	Turkey
Fatty acids				
16:0	25.6	23.2	30.8	28.0
17:0	0.8	0.4	0.5	-
18:0	10.4	9.7	3.4	12.8
Saturated	**36.8**	**33.3**	**35.4**	**40.8**
16:1	3.9	1.9	1.4	1.1
18:1	35.8	27.4	25.2	22.0
20:1	-	0.1	-	0.5
Monounsaturated	**38.7**	**29.4**	**26.6**	**23.5**
18:2	14.8	30.7	23.6	22.4
20:2	-	0.1	0.3	0.6
20:3	0.4	0.6	0.8	0.9
20:4	3.7	3.9	7.5	5.5
22:4	0.6	0.2	2.0	1.2
22:5	-	-	0.7	0.5
N-6	**19.5**	**35.5**	**34.9**	**31.0**
18:3	3.4	1.1	0.5	0.4
20:5	0.4	0.3	0.5	0.6
22:5	1.2	0.4	1.6	1.8
22:6	-	0.1	0.4	2.0
N-3	**5.0**	**1.9**	**3.0**	**4.8**
Polyunsaturated	**24.5**	**37.8**	**33.1**	**35.8**
Fatty aldehydes				
16:0	88.2	84.5	88.7	85.4
18:0	7.4	6.8	6.4	6.1
18:1	4.4	8.6	4.9	8.5
Ald/FA x 100	**8.0**	**7.1**	**2.4**	**8.4**

Table 2 : Fatty acid and aldehyde composition of phosphatidylethanolamine in Beef, Pork, Rabbit and Turkey muscles (as percent of the methylesters or the dimethylacetals present).

	Beef	Pork	Rabbit	Turkey
Fatty acids				
16:0	2.4	6.7	3.4	5.2
17:0	1.1	0.1	0.4	-
18:0	15.9	17.6	12.5	21.8
Saturated	**19.4**	**24.4**	**16.3**	**27.7**
16:1	3.0	1.5	0.8	1.4
18:1	17.5	16.2	28.0	11.6
20:1	-	0.8	-	0.6
Monounsaturated	**20.5**	**18.5**	**28.8**	**13.6**
18:2	11.1	29.4	18.2	13.0
20:2	0.8	0.6	0.2	1.8
20:3	3.0	1.3	0.2	1.1
20:4	15.4	18.6	24.0	21.2
22:4	1.1	1.7	4.6	4.5
22:5	-	-	0.9	1.8
N-6	**31.4**	**51.6**	**48.1**	**43.4**
18:3	3.5	0.8	0.6	0.6
20:4	0.7	-	-	-
20:5	2.9	1.6	0.6	1.1
22:5	9.6	2.6	5.0	5.7
22:6	10.9	0.5	0.5	8.0
N-3	**28.5**	**5.5**	**6.7**	**15.4**
Polyunsaturated	**60.1**	**57.1**	**54.8**	**58.7**
Fatty aldehydes				
16:0	55.2	46.1	65.0	50.6
18:0	30.9	34.0	23.2	32.2
18:1	13.9	18.9	11.8	17.3
Ald/FA x 100	**26.6**	**34.0**	**42.5**	**29.7**

Table 3 : Major molecular species of phosphatidylcholine in Beef, Pork, Rabbit and Turkey muscles (as percent of the molecular species present).

	Beef	**Pork**	**Rabbit**	**Turkey**
16:0/18:1	38.4	24.5	28.2	23.7
16:0/18:2	15.6	33.4	48.1	34.6
16:0/20:4	1.2	2.2	1.8	0.8
16:1/18:1	0.7	1.3	-	-
18:0/18:1	1.3	0.9	0.2	2.7
18:0/18:2	8.1	3.7	1.9	13.0
18:0/20:4	5.5	3.1	4.3	-
18:1/18:2	9.7	17.6	7.2	7.1
Diacyls	**80.5**	**86.7**	**91.7**	**81.8**
16:0 ald/18:1	1.8	2.4	1.8	8.7
16:0 ald/18:2	9.1	10.9	4.1	5.2
16:0 ald/20:4	4.8	-	2.4	4.0
16:0 ald/22:6	2.5	-	-	-
18:0 ald/18:2	1.3	-	-	0.4
Plasmalogens	**19.5**	**13.3**	**8.3**	**18.2**

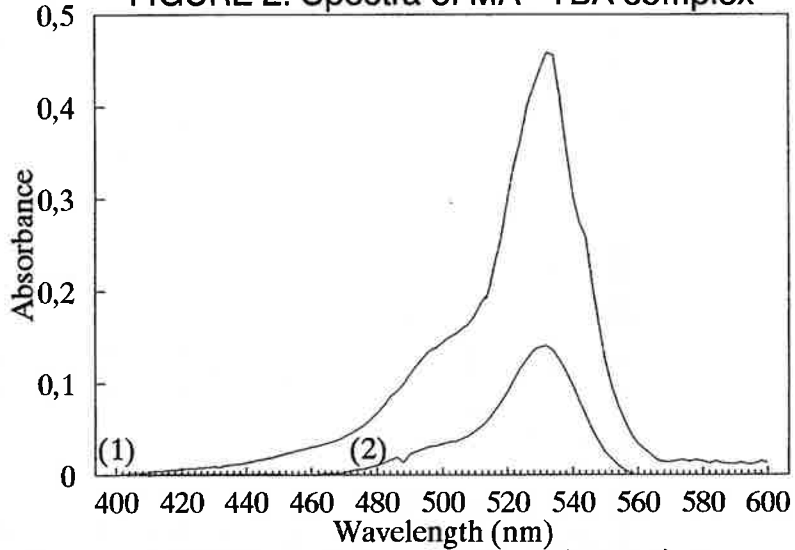
Table 4 : Major molecular species of phosphatidylethanolamine in Beef, Pork, Rabbit and Turkey muscles (as percent of the molecular species present).

	Beef	Pork	Rabbit	Turkey
16:0/18:1	4.2	2.2	5.6	4.1
16:0/18:2	9.1	-	2.7	-
16:0/20:4	1.7	1.0	0.4	0.7
18:0/18:1	2.9	1.2	1.7	0.6
18:0/18:2	16.5	17.2	6.2	18.2
18:0/20:4	13.4	13.2	14.8	23.3
18:1/22:6	2.7	3.9	4.2	3.0
Diacyls	**50.5**	**37.5**	**35.6**	**49.9**
16:0 ald/18:1	-	traces	4.2	2.7
16:0 ald/18:2	8.2	13.4	12.8	9.1
16:0 ald/20:4	6.1	17.6	1.2	6.5
16:0 ald/22:6	4.6	-	6.2	10.3
18:0 ald/18:2	7.9	6.5	1.7	1.9
18:0 ald/20:4	6.0	16.2	38.3	16.3
18:1 ald/18:2	3.1	8.8	traces	3.3
Plasmalogens	**35.9**	**62.5**	**64.4**	**50.1**
NI	13.6	-	-	-

SOURCE	SUM OF SQUARES	DEGREE FREEDOM	MEAN SQUARE	F	TAIL PROBABIL.
B	0.19337	1	0.19337	20.30	0.0000
S	0.06385	1	0.06385	6.70	0.0119
P	0.11582	1	0.11582	12.16	0.0009
T	1.59447	1	1.59447	167.36	0.0000
BP	0.13878	1	0.13878	14.57	0.0003
BT	1.17069	1	1.17069	122.88	0.0000
PT	0.06261	1	0.06261	6.57	0.0127
BPT	0.0498	1	0.04980	5.23	0.0256
1 ERROR	0.60974	64	0.00953		

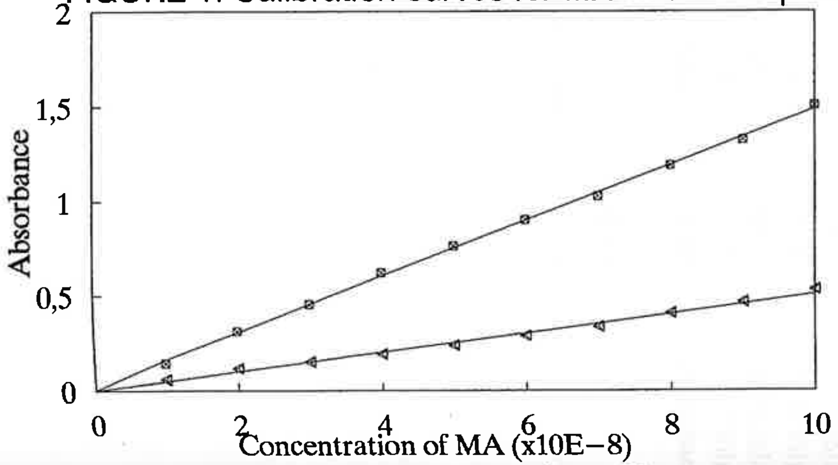
TABLE 1: ANOVA results of a five ways crossed factorial design (B: "paté"; S: sulfanilamide; P: phosphoric acid; T: time).

FIGURE 2: Spectra of MA–TBA complex



(1) 35 minutes (2) 900 minutes

FIGURE 1: Calibration curves for MA–TBA complex

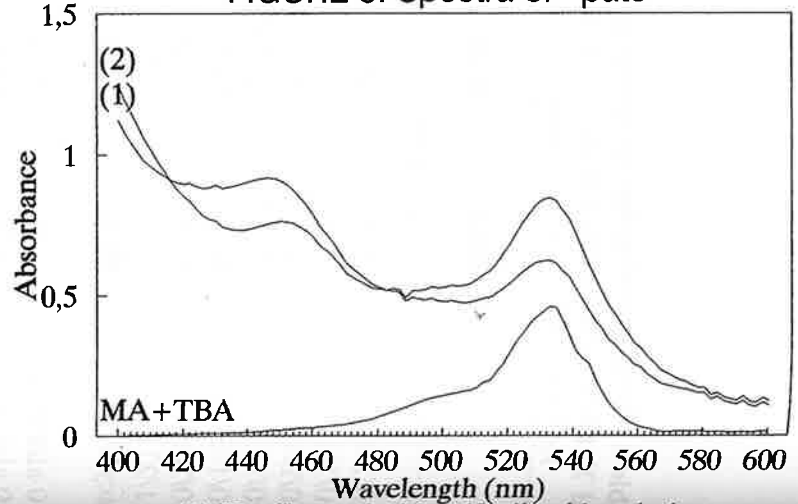


35 minutes(1) 900 minutes(2)

(1) y=0.01318+0.14754*x r=0.9972 P(tail)=0.0000 Se=0.0322

(2) y=–0.00349+0.05135*x r=0.9882 P(tail)=0.0000 Se=0.0231

FIGURE 3: Spectra of "paté"



(1) "Paté" trated with sulfanilamide solution

(2) "Paté" without sulfanilamide solution

Table 1: Effect of dietary Se supplementation on Se content and oxidative stability of raw pork Longissimus dorsi (L D) muscles and liver

Treatment (groups)	Se (mg/kg)	TBARS* number
Basal diet		
LD muscles	0.12	1.47
liver	0.66	1.13
Basal diet+0.3 ppm Na-selenite		
LD muscles	0.24	0.60
liver	1.11	0.77
Basal diet+0.3 ppm Se-yeast		
LD muscles	0.26	0.42
liver	1.34	0.67

* TBARS number is expressed as mg malonaldehyde/kg meat

Table 2: Effect of dietary Se supplementation on fatty acid profiles and total lipid content of pork Longissimus dorsi (L D) muscles and liver

	Basal diet		Basal diet + Na- selenite		Basal diet + Se-yeast	
	L D	liver	L D	liver	L D	liver
Fatty						
acid (%)	0.1	-	0.1	-	0.1	-
10:0	0.1	-	0.1	-	0.1	-
12:0	1.0	0.3	0.6	0.2	0.6	0.2
14:0	tr	0.3	0.1	0.2	0.2	0.5
15:0	25.7	15.9	22.5	15.3	21.2	14.2
16:0	2.8	0.8	1.0	0.7	2.0	0.6
16:1	0.5	4.0	0.4	2.3	0.8	3.6
17:0	0.2	0.5	0.2	0.2	0.5	0.4
17:1	13.2	25.2	12.6	29.8	12.1	28.7
18:0	39.1	14.1	24.7	15.7	25.2	13.4
18:1	12.9	15.8	25.6	13.7	24.9	15.8
18:2	1.,1	0.3	0.6	0.3	0.6	0.2
18:3	0.2	0.1	0.1	0.1	0.1	0.1
20:0	-	0.2	0.1	0.1	-	0.1
20:1	0.4	0.3	0.4	0.2	0.3	0.3
20.2	0.1	0.6	0.9	0.4	0.7	0.7
20:3	2.3	17..8	8.8	17.7	8.2	17.3
20:4	-	0.2	0.2	0.1	-	0.3
20:5	0.2	1.2	0.9	0.9	2.1	1.1
22:3	-	0.2	-	0.1	-	-
22:4	-	1.2	-	1.2	-	1.5
22:5	-	0.1	-	0.3	-	0.3
22:6						
Total lipids(%)	3.3	5.0	3.1	5.0	2.8	4.3

TABLE 1 - COMPOSITION OF MECHANICALLY DEBONED CHICKEN MEAT (MDCM)

Centesimal composition of MDCM:	
Water	64.295 %
Fat	22.660 %
Protein	12.191 %
Ashes	0.854 %

TABLE 2 - QUANTITATIVE DETERMINATIONS OF MDCM

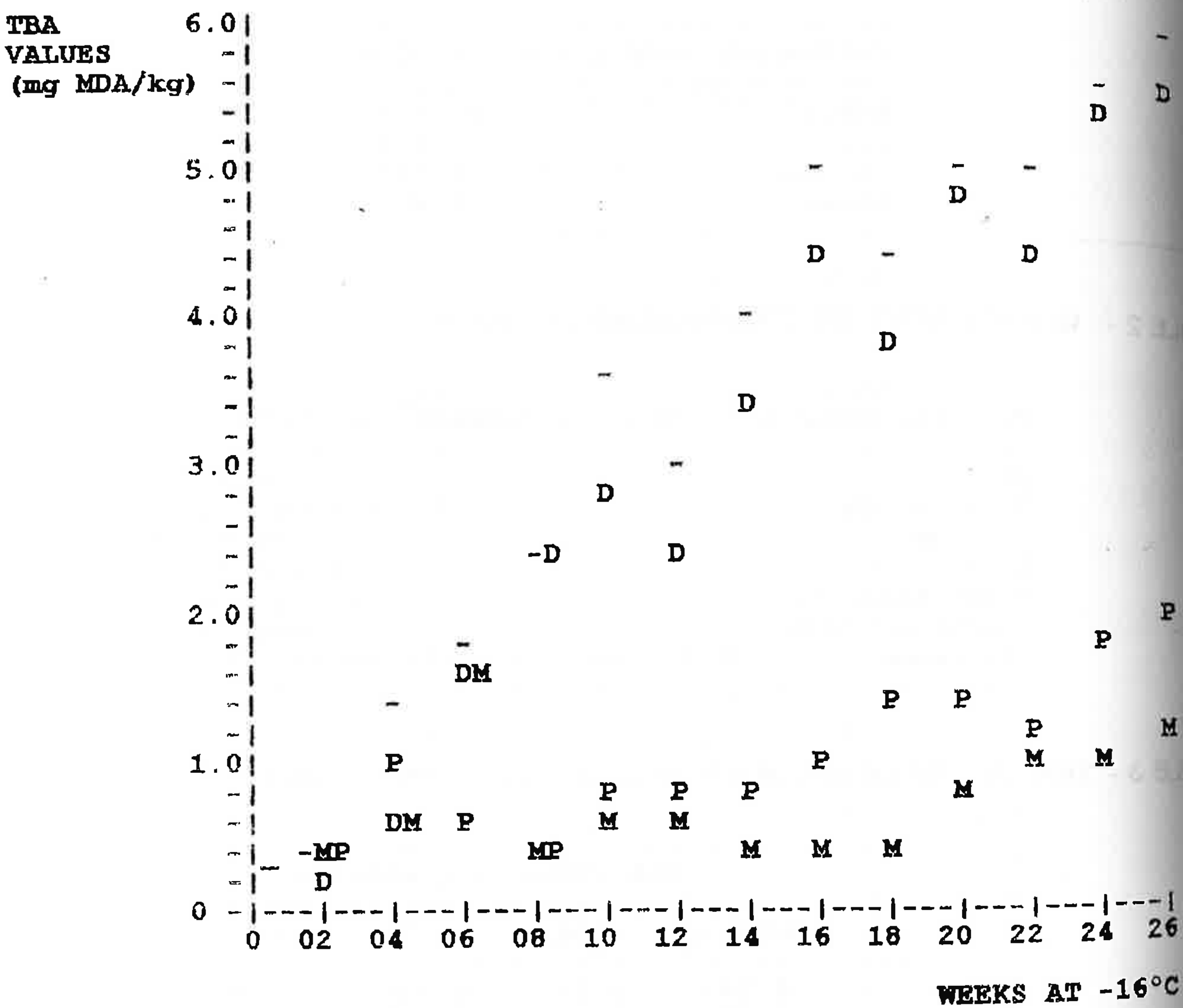
Physical-chemical characteristics of MDCM :	
pH	6.71
Total acidity	0.0016 g NaOH / g
Calcium	0.060 g%
Iron	0.008 g%
Total pigments	271 p p m
Peroxide index	1.775 meq/kg
TBA index	0.331 mg malonaldehyde(MDA)/kg

TABLE 3 - TBA VALUES OF MDCM STORED AT -16°C, DURING 6 MONTHS

WEEKS	TBA VALUES (mg MDA/kg)			
	CONTROL	DSO	MIN	PAS
00	0.331	0.331	0.331	0.331
02	0.458	0.221	0.429	0.545
04	1.369	0.562	0.629	0.924
06	1.883	0.776	0.792	0.528
08	2.352	2.503	0.301	0.347
10	3.606	2.887	0.610	0.766
12	2.944	2.327	0.684	0.750
14	3.973	3.386	0.423	0.807
16	5.052	4.369	0.374	1.147
18	4.309	3.746	0.471	1.330
20	4.985	4.757	0.852	1.342
22	5.113	4.464	0.929	1.219
24	5.699	5.368	0.993	1.705
26	5.947	5.579	1.298	2.036

CONTROL = MDCM with 22.66% of fat, without treatment.
DSO = MDCM with 0.4286% of distilled soybean oil,on fat weight.
MIN = MDCM with 0.6002% of combined antioxidants, on fat weight.
PAS = MDCM pasteurized at 60°C during 6 minutes.

FIGURE 1 - TBA INDEXES OF MDCM STORED AT -16ºC DURING 6 MONTHS



- \- MDCM CONTROL (without treatment)
- D MDCM with DSO (at 0.4286%)
- M MDCM with MIN (at 0.6002%)
- P MDCM with PAS (pasteurization at 60°C during 6 minutes)

TABLE 4 - MEANS OF TBA INDEXES FROM MDCM STORED AT -16ºC FOR 6 MONTHS

SAMPLE	CONCENTRATION (%)	MEAN OF TBA INDEX (mg MDA/kg)
MIN	0.6002	0.631 [a]
PAS	0	1.221 [b]
DSO	0.4286	2.924 [c]
CONTROL	0	3.723 [d]

Means followed by different letters are significatively different from each other by Tukey test ($P<0.05$).

TABLE 1 - Peroxide index (meq/kg) of lard with different antioxidants, under acceletrated oxidation test at 70°C during 16 days.

PEROXIDE INDEX OF LARD (meq/kg)																		
SAMPLES		STORAGE DAYS AT 70°C																
		0	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
CONTROL	(70°C)	10	17	42	58	88	104	109	132	161	166	209	232	221	254	248	258	268
AUXILIAR CONTROL	(4°C)	10	10	13	13	14	11	13	10	13	11	11	13	12	13	13	13	12
BHT	0.005%	10	18	22	33	59	79	89	126	159	202	227	247	263	269	296	282	296
BHT	0.010%	10	12	16	20	25	32	63	70	83	88	91	118	131	134	166	126	126
BHT	0.020%	10	09	11	12	15	15	15	18	15	27	27	30	38	49	65	73	87
BHA	0.005%	10	15	14	21	26	32	51	74	95	119	149	168	189	195	236	222	229
BHA	0.010%	10	12	12	14	29	20	21	24	26	30	41	79	82	89	106	112	135
BHA	0.020%	10	10	12	14	17	19	20	26	20	23	33	83	94	106	104	138	148
CITRIC ACID	0.005%	10	34	53	71	108	133	145	188	197	212	248	261	222	271	267	269	292
CITRIC ACID	0.010%	10	17	34	54	72	83	99	108	111	112	127	163	147	168	179	178	150
CITRIC ACID	0.020%	10	18	35	48	81	105	110	126	117	136	150	150	163	166	127	126	---
PROPYL GALLATE	0.005%	10	13	14	16	21	39	56	88	123	147	192	222	252	241	278	250	281
PROPYL GALLATE	0.010%	10	10	12	13	15	18	18	21	26	29	34	30	44	60	78	83	103
PROPYL GALLATE	0.020%	10	09	10	11	13	13	11	14	12	13	18	18	18	15	18	20	21
ANTIOX. MIXTURE	0.005%	10	17	17	50	46	73	97	123	163	202	228	271	259	275	309	264	309
ANTIOX. MIXTURE	0.010%	10	10	12	12	14	15	15	18	18	22	32	95	104	104	118	128	145
ANTIOX. MIXTURE	0.020%	10	11	10	10	11	13	10	13	12	11	19	64	79	78	81	96	119
KRAKI A-200	0.010%	10	30	58	73	107	92	161	185	207	224	255	259	267	265	261	249	267
KRAKI A-200	0.030%	10	11	15	24	40	65	107	113	116	130	141	139	169	166	142	108	105
KRAKI A-200	0.060%	10	08	13	15	19	22	28	18	85	90	99	99	122	131	142	133	160
GUARANA	0.010%	10	35	52	81	125	153	165	195	199	215	256	257	267	248	265	283	254
GUARANA	0.030%	10	15	39	56	45	112	128	123	119	143	153	161	107	195	135	150	---
GUARANA	0.060%	10	21	38	51	79	89	108	116	126	136	125	139	162	165	179	195	100
ASCORBIC ACID	0.010%	10	34	54	73	110	151	153	173	200	213	248	253	252	262	187	270	286
ASCORBIC ACID	0.030%	10	17	35	53	81	86	126	122	129	136	140	166	170	175	201	085	085
ASCORBIC ACID	0.060%	10	12	22	33	56	73	88	98	94	100	102	124	131	125	161	146	131
DIST. SOYBEAN OIL	0.142%	10	13	13	13	17	20	19	19	23	26	36	44	57	79	129	131	204
DIST. SOYBEAN OIL	0.428%	10	11	16	17	22	25	22	28	27	30	39	68	71	81	86	98	132
DIST. SOYBEAN OIL	0.857%	10	10	14	16	21	22	19	24	26	28	46	41	42	48	46	53	54
ROSMANOX 4942	0.030%	10	21	51	69	97	133	133	176	183	213	235	234	254	242	277	257	261
ROSMANOX 4942	0.060%	10	10	20	31	52	79	87	86	92	100	123	127	119	144	146	112	111
ROSMANOX 4942	0.120%	10	11	11	12	15	17	25	43	58	67	71	89	80	97	114	113	104
ROSMANOX E-4943	0.030%	10	14	14	14	17	20	19	22	32	56	98	130	169	197	218	250	258
ROSMANOX E-4943	0.060%	10	11	13	14	15	20	18	27	22	24	38	65	63	72	78	84	103
ROSMANOX E-4943	0.120%	10	10	10	11	13	14	13	16	17	15	26	32	31	35	37	47	53

TABLE 2 - Peroxide mean index of lard at 70°C during 16 days

SAMPLE	CONCENTRATION (%)	PEROXIDE INDEX MEANS (meq/kg)	
AUXILIAR CONTROL AT 4°C	0	12,062	a
PROPYL GALLATE	0,020	13,937	a
ROSMANOX E-4943	0,120	21,062	ab
BHT	0,020	26,812	ab
DISTILLED SOYBEAN OIL	0,857	29,125	abc
PROPYL GALLATE	0,010	31,312	abc
ANTIOXIDANT MIXTURE	0,020	33,000	abc
ROSMANOX E-4943	0,060	35,875	abc
DISTILLED SOYBEAN OIL	0,142	40,562	abcd
DISTILLED SOYBEAN OIL	0,428	40,687	abcd
BHA	0,010	44,187	abcde
ANTIOXIDANT MIXTURE	0,010	45,437	abcde
BHA	0,020	45,562	abcde
ROSMANOX 4942	0,120	52,062	bcdef
KRAKI A-200	0,060	64,625	cdefg
BHT	0,010	74,062	defgh
ROSMANOX E-4943	0,030	80,000	efgh
ROSMANOX 4942	0,060	83,625	fgh
ASCORBIC ACID	0,060	85,937	fgh
KRAKI A-200	0,030	93,500	ghi
BHA	0,005	101,000	hi
CITRIC ACID	0,010	103,875	hi
CITRIC ACID	0,020	104,250	hi
GUARANA	0,030	105,687	hi
ASCORBIC ACID	0,030	108,250	hij
GUARANA	0,060	108,687	hij
PROPYL GALLATE	0,005	122,625	ijl
CONTROL AT 70°C	0	144,312	jlm
BHT	0,005	148,812	lm
ANTIOXIDANT MIXTURE	0,005	150,250	lm
ROSMANOX 4942	0,030	161,562	m
ASCORBIC ACID	0,010	165,187	m
CITRIC ACID	0,005	168,062	m
KRAKI A-200	0,010	168,937	m
GUARANA	0,010	175,375	m

Means followed by different letters are significantly different by Tukey statistical test (P<0,05).

TABEL 1. Mass spectrometric identification and odour of volatile compounds in slow and fast cured bacon stored 21 days at 5°C by headspace gas chromatography.

Compound	Kovats* index	Reliability†	Slow cured	Fast cured	Odour
Alkanes					
Octane	800	a	+	+	
Aromatic hydrocarbons					
Toluene	768	b	+	+	Apples
m-Xylene	863	b-c	+	+	
p-Xylene	871	b-c	+	+	
Ethylbenzene	892	c	+	+	
o-Xylene	896	b	+	-	
Terpenoids					
D-Limonene	1034	b	+	+	
Aldehydes					
3-Methylbutanal	651	a	+	-	Cheese
2-Methylbutanal	659	b	+	-	
Hexanal	795	b	+	+	New-mown
Heptanal	897	b	-	+	
Benzaldehyde	966	b	+	-	
Octanal	998	b	+	-	Chemical
Nonanal	1100	b	+	+	Mushroom
Ketones					
Propan-2-one	-	a	+	+	Acetone
Butan-2,3-dione	580	b	+	+	Butter
Butan-2-one	591	b	+	-	
Pentan-2-one	686	b	+	+	Butter
Acetoin	710	a	+	+	
Hexan-2-one	785	b	+	+	
Heptan-2-one	886	b	+	+	
Octan-3-one	1019	c	+	+	
1-Phenylethanone	1071	c	+	+	
Alcohols					
Ethanol	-	a	+	+	
Propan-2-ol	590	c	-	+	
Methylbutenol	606	c	-	+	
1-Penten-3-ol	681	b	+	+	
Pentan-2-ol	697	b	+	+	Green
3-Methyl-3-buten-1-ol	728	b	+	+	
Penten-1-ol	730	c	+	-	
3-Methylbutanol	732	b	+	+	
Pentan-1-ol	767	b	-	+	
Buten-1,3-diol	772	c	+	+	
Propan-1,2-diol	774	c	+	-	
2-Butoxyethan-1-ol	902	b	+	+	
1-Octen-3-ol	975	b-c	+	-	Mushroom
Octan-2-ol	1070	b	+	+	
Phenol	973	b-c	+	+	
Nitrogen compounds					
Methylpyrazine	821	b-c	+	+	Spoiled meat
2,6-Dimethylpyrazine	909	b	+	+	
Sulfur compounds					
Dimethyldisulfide	746	b	+	+	
Chloride compounds					
Trichlormethane	613	a	+	+	
Tetrachlorethene	812	b	+	+	

Compound	Kovats' index	Reliability[†]	Slow cured	Fast cured	Odour
Unidentified compounds					
Unknown 1 (MP[‡]=45, 47)	674	d	+	-	
Unknown 2 (MP=55, 54)	722	d	+	-	
Unknown 3 (MP=70, 44, 57)	908	d	+	-	
Unknown 4 (MP=97, 67, 82)	999	d	+	-	
Unknown 5 (MP=57)	1025	d	+	+	
Methylbranched alkane	738	d	+	+	
Methylbranched alkane	994	d	+	-	
Methylbranched alkane	996	d	+	-	
Methylbranched alkane	1088	d	+	-	
Methylbranched alkane	1092	d	+	-	
Methylbranched alkane	1096	d	+	-	
Aromatic compund	957	d	+	-	
Aromatic compound	964	d	+	+	
Aromatic compound	971	d	+	-	
Aromatic compound	1056	d	-	+	
Aromatic compound	1072	d	+	+	

[†]Reliability of identification is indicated by:a, mass spectrum and Kovats' index identical with authentic compound; b, mass spectrum and Kovats' index in agreement with corresponding litterature data; c, mass spectrum consistent with spectrum found in litterature; d, tentative identification by mass spectrum or unknown.

[‡]Major peaks in mass spectrum in decreasing order.

Fig.1: Formation of biogenic amines in pork stored at 18°C

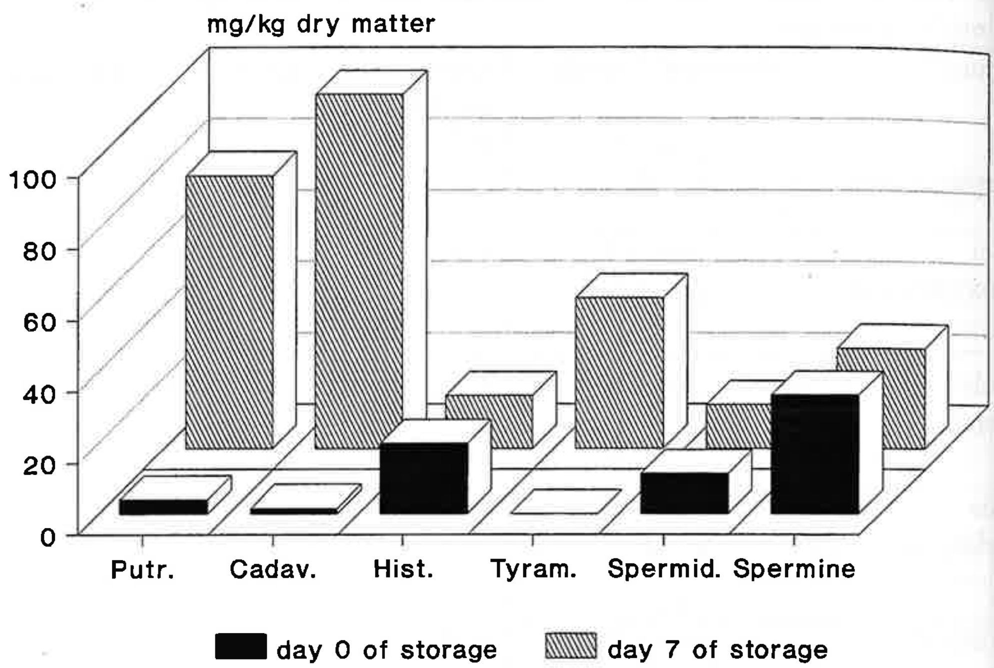


Fig.2: Formation of biogenic amines in pork stored at 4°C

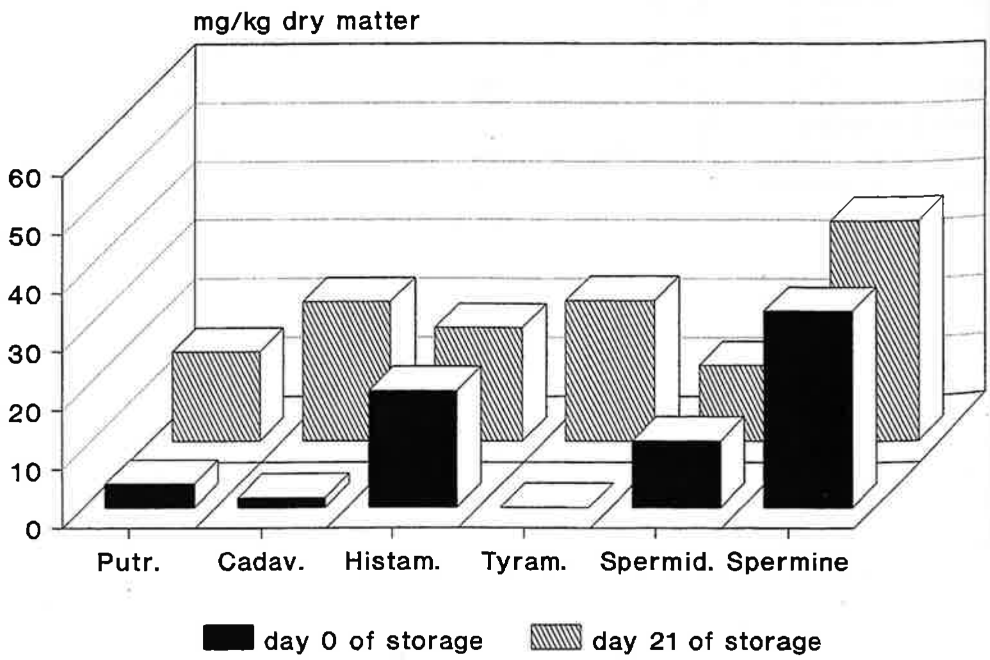


Fig.3: Amounts of biogenic amines in different Austrian raw sausages produced by 4 different enterprises

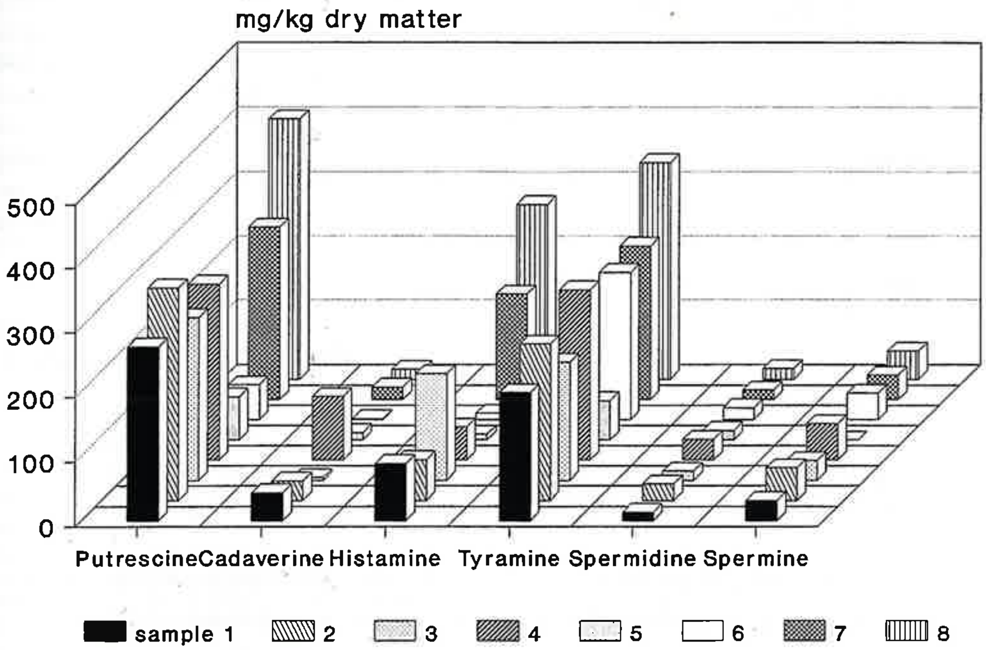


Fig.4: Histamine and tyramine in "Mettwurst" with addition of 0, 10^3, 10^4, 10^5 Lactobacillus hilgardii per gram

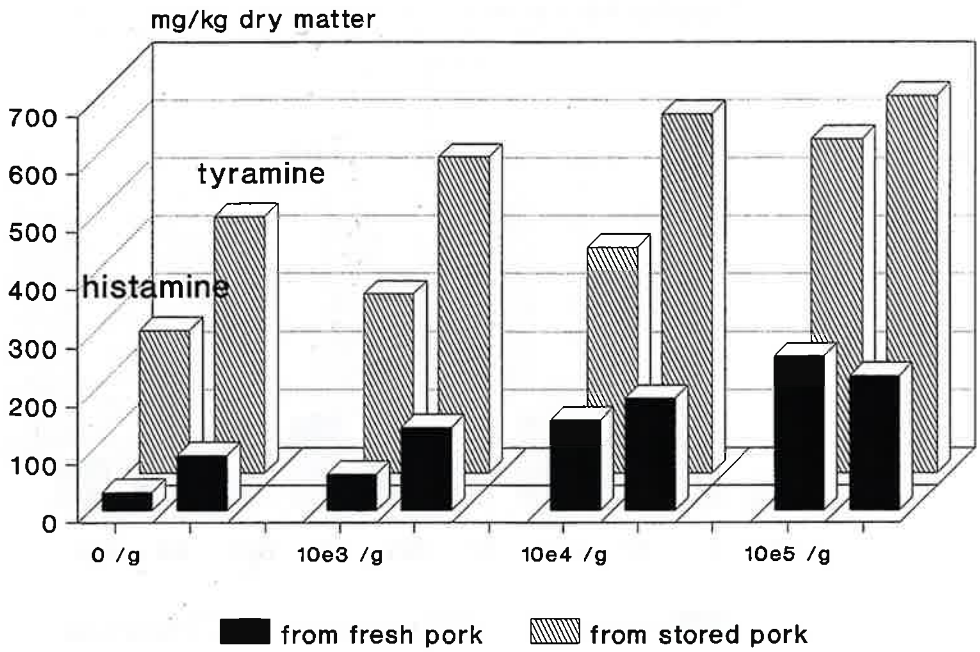


Fig.5: The influence of the amount of added Lactobacillus hilgardii on the formation of histamine and tyramine in "Mettwurst"

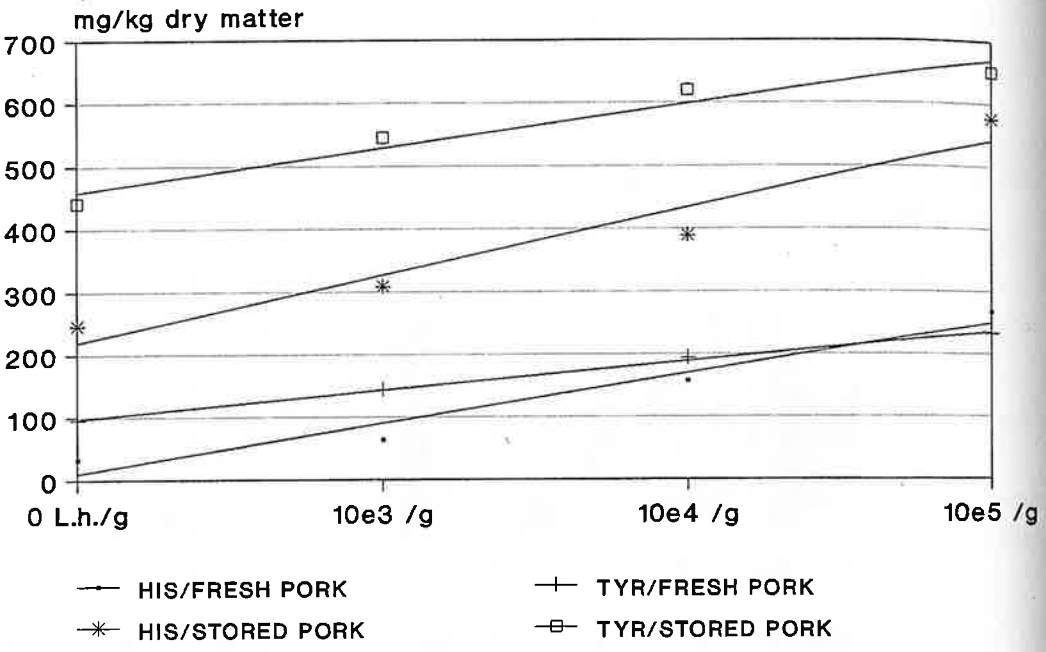


Fig.6: The influence of starter cultures on the formation of biogenic amines in "Mettwurst". 0 - without starter cultures and L. hilgardii; FF, SP, BK ..- different starter cultures; L - addition of 10^5 L. hilgardii/g