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THE PROBLEM OF REDOX POTENTIAL MEASUREMENT IN MEAT

by

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THE PROBLEM OF REDOX POTENTIAL MEASUREMENT IN MEAT

SUMMARY

Conditions found to be most satisfactory for the observation of redox potential in pork muscle tissue include maintenance of strictly anaerobic conditions (achieved in practice by a current of argon) and the use of gold electrodes 20mm long and 1mm diameter. Even under these conditions, however, a survey of three muscles from 17 pork legs gave widely divergent results. It is thought that the main difficulty lies in the lack of poising capacity of the muscle tissue.

ZUSAMMENFASSUNG

Die für die Beobachtung des Redoxpotentials in Schweinefleisch-Muskelgewebe geeignetesten Umstände enthalten die Erhaltungen der streng anaerober Bedingungen, die praktisch mit einer Argonströmmungen vorgesehen werden, und der Verwendung der Goldelektroden (20mm lange und 1mm Durchmesser). Sogar unter solchen Bedingungen hat jedoch ein Überblick auf dreien Muskeln von 17 Schweinebeinen weit divergierenden Ergebnisse hervorgebracht. Die Schwierigkeit kann man hauptsächlich zum Mangel der Pufferfähigkeiten des Muskelgewebes beilegen.

RÉSUMÉ

Le potentiel redox dans le tissue musculaire de porc est examiné. Ce travail a montré que les conditions les plus satisfaisantes pour y observer le potentiel redox comprennent le maintien rigoureux d'état anaérobique, ce qui est réalisé dans la pratique par un courant d'argon, et aussi l'emploi des électrodes d'or (20mm long et 1mm diamètre). Cependant, même dans celles circonstances, l'inspection de trois muscles de 17 jambes de porc a donnée des résultats largement divergents. On peut imputer la difficulté principal à la manque du pouvoir du tissue musculaire de maintenir la tension électronique.

THE PROBLEM OF REDOX POTENTIAL MEASUREMENT IN MEAT

Introduction

Interest in the measurement of the redox potential of pork muscle tissue arose in connection with work on the biochemistry of the curing process. The formation of nitrosylmyoglobin involves the reduction of nitrite and the conversion of the indigeneous pigment to the reduced form, both of which processes can be effected by surviving muscle tissue enzymes [1,2]. It was thought that the redox potential, as an indication of the reducing climate of the tissues, might serve as an index of the ability of the tissues to effect the necessary reductions. It soon became apparent that the main problem was concerned with establishing the validity of the experimental observations; it is easy enough to insert an electrode into a piece of meat and record a potential, but very difficult to establish that this potential has any real meaning. This paper reports some experiments aimed at achieving meaningful observations; this objective has, however, not yet been achieved.

Apparatus and equipment

Electrodes Two types of electrode were used, designated as 'macro' and 'micro' respectively.

Macro-electrodes were 15 - 20 mm. long x 1 mm. maximum diameter; they were sharpened to a point to facilitate insertion.

Micro-electrodes were fabricated from wire 1 mm. in diameter. The wire was coated 10 times with 'araldite' resin, and a small tip (not more than 1 mm. long) was exposed and sharpened to a point.

Electrodes were constructed of platinum, silver and gold. All electrodes were cleaned immediately before use by lightly scraping with a freshly fractured glass edge. The glass tubes supporting the electrodes were defatted with carbon tetrachloride and coated with water-repellent silicone resin. Electrode connections were made with screened co-axial cable, the screen being connected directly to earth.

The reference electrode was a saturated KCl-calomel half-cell, connected to the test sample through a KCl-agar bridge.

Potentiometer Potentials were measured with a Model 25A potentiometer manufactured by Electronic Instruments Ltd., Richmond, Surrey. This was stated by the makers to have an impedance of 10^{10} ohms. Direct comparison against a Vibron electrometer,

manufactured by the same makers and having a stated impedance of 10^{13} ohms, gave agreement to within 10 mV., indicating that the impedance of the normal instrument was adequate to prevent polarisation errors.

Observations on Aqueous Extracts

In attempting to establish consistency and reproducibility of results it seemed desirable initially to eliminate possible point-to-point variations by using a homogeneous liquid as the test medium. Aqueous extracts of muscle tissue for this purpose were prepared by grinding the tissue in a mortar with an equal weight of cold distilled water and a little sand and separating the insoluble residue by centifuging at low speed. The supernatant liquor used for the electrode measurements was virtually free from gross particles in suspension.

Importance of exclusion of oxygen Fig.1 illustrates the improvement in the response of platinum macro-electrodes resulting from the rigorous exclusion of oxygen. In experiment A exclusion of oxygen was attempted by covering the test liquid with a 1-inch layer of liquid paraffin; in experiment B strictly anaerobic conditions were maintained by a current of argon gas introduced through copper tubing. The latter conditions gave very much more rapid attainment of a relatively steady potential, improved agreement between electrodes inserted at successive intervals and substantially lower ultimate values. Similar comparisons using gold electrodes (Fig.2) gave generally similar results, particularly as regards the lower ultimate values, although the alteration in speed of equilibration was less marked.

Choice of electrode material Considerable indirect evidence has been accumulated to suggest that the potential indicated by platinum electrodes can be influenced by gaseous absorption at the electrode surface. Fig. 3 shows the effect of deliberate pre-treatment of the electrodes by exposure to an atmosphere of hydrogen; the low initial potentials recorded by these electrodes are clearly abnormal. Platinum electrodes also showed much greater fluctuations than gold in response to deliberate changes of atmosphere (Fig. 4). Silver electrodes showed a tendency to fluctuate rather more widely than gold under these conditions and gave appreciably lower absolute values (Fig. 5), although both electrodes came into conformity on addition of methylene blue. It has been repeatedly observed that the introduction of as little as 5 μg. per ml. of methylene blue is sufficient to effect stabilisation of the electrodes and it appears that lack of poising capacity is one of the major difficulties in obtaining reproducible readings.

Size of electrodes Any measuring electrode should, from first principles, be as small as possible, since it can only record an 'average' value representing a synthesis of conditions over the area of contact, and in a heterogeneous material such as muscle tissue the micro-climate may well be of importance. Direct comparison of macro- and micro-electrodes of gold in aqueous extracts indicated, however, that the macro-electrodes gave generally better reproducibility (see for example, Fig. 6), and on this account it has been preferred to work with the macro-electrodes.

Observations on Muscle Blocks

Blocks of muscle tissue 2.5 to 4 cm. thick were cut to fit a cylindrical glass vessel about 5 cm. in diameter. The vessel was sealed with a rubber bung carrying three electrodes, which were inserted into the sample as required by forcing them through the bung. The bung also carried inlet and outlet tubes for an argon current and an agar-KCl bridge for connection to the reference cell. The argon current was passed briskly for 15 minutes before insertion of the first electrode.

The indications of wider potential fluctuations with platinum and silver and of better reproducibility with macro-electrodes were found to be applicable also to measurements on muscle blocks (see Figs. 7 and 8). It was therefore concluded that macro-electrodes of gold were the most satisfactory of those examined.

A systematic survey has been made, using these electrodes under anaerobic conditions maintained by a current of argon, of the redox potential of the semimembranosus, quadriceps femoris and biceps femoris muscles of 17 pig legs. Each muscle was divided into two parts, which were separately examined, using three electrodes. The results of this survey are given in Table 1 ; it can only be said that they serve to emphasise the magnitude of the problem remaining unsolved.

References

1. WALTERS, C.L. and TAYLOR, A. McM. Food Tech., XVII : 118-123: 1963.

2. WALTERS, C.L. and TAYLOR, A. McM. Biochim.Biophys. Acta, 86: 448-458: 1964.

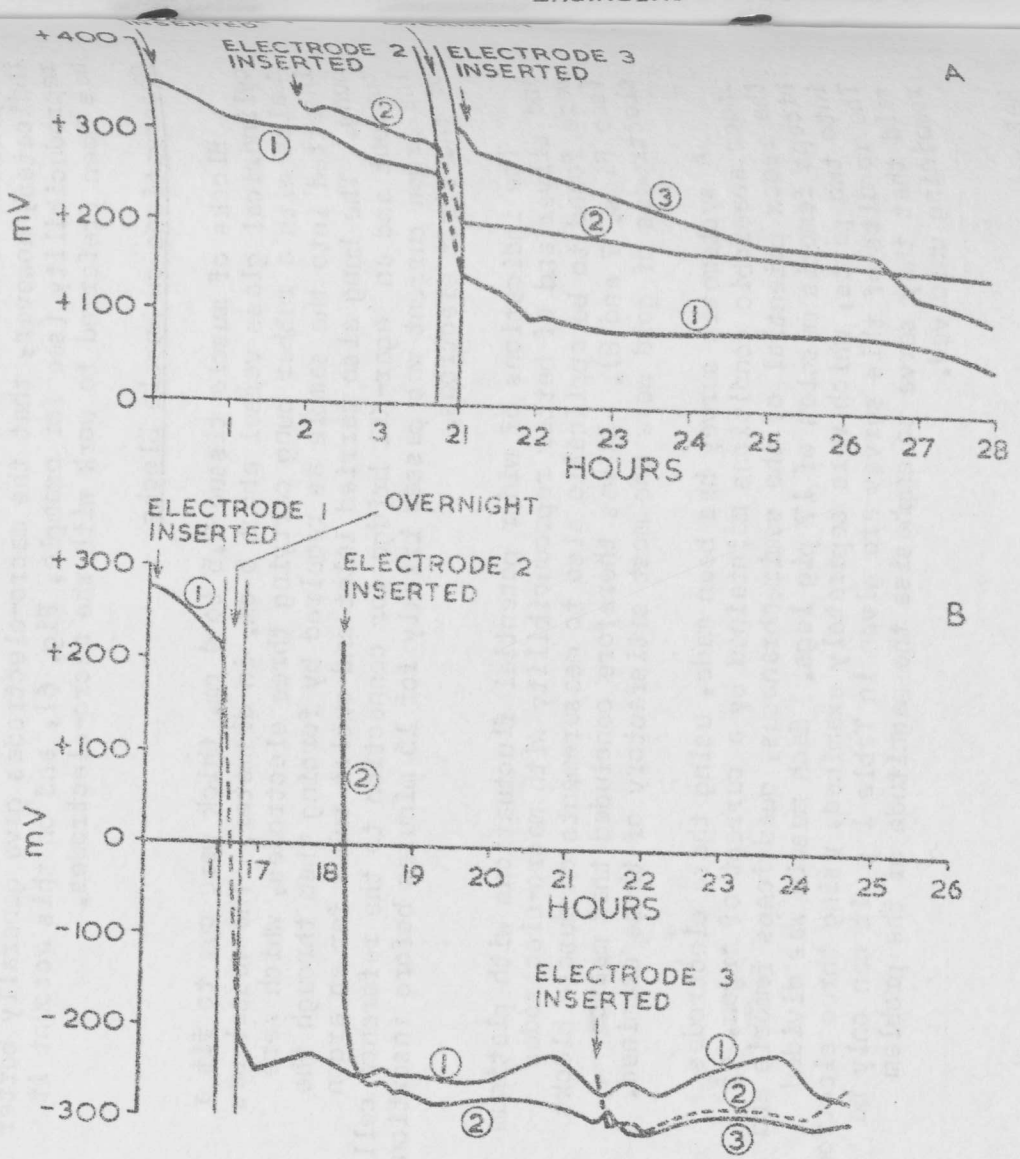

FIG. 1. ELECTRODE POTENTIALS IN PIG MUSCLE EXTRACTS.

(Platinum macro electrodes; anaerobic conditions maintained A under paraffin and B under argon; potentials given with respect to the hydrogen electrode).

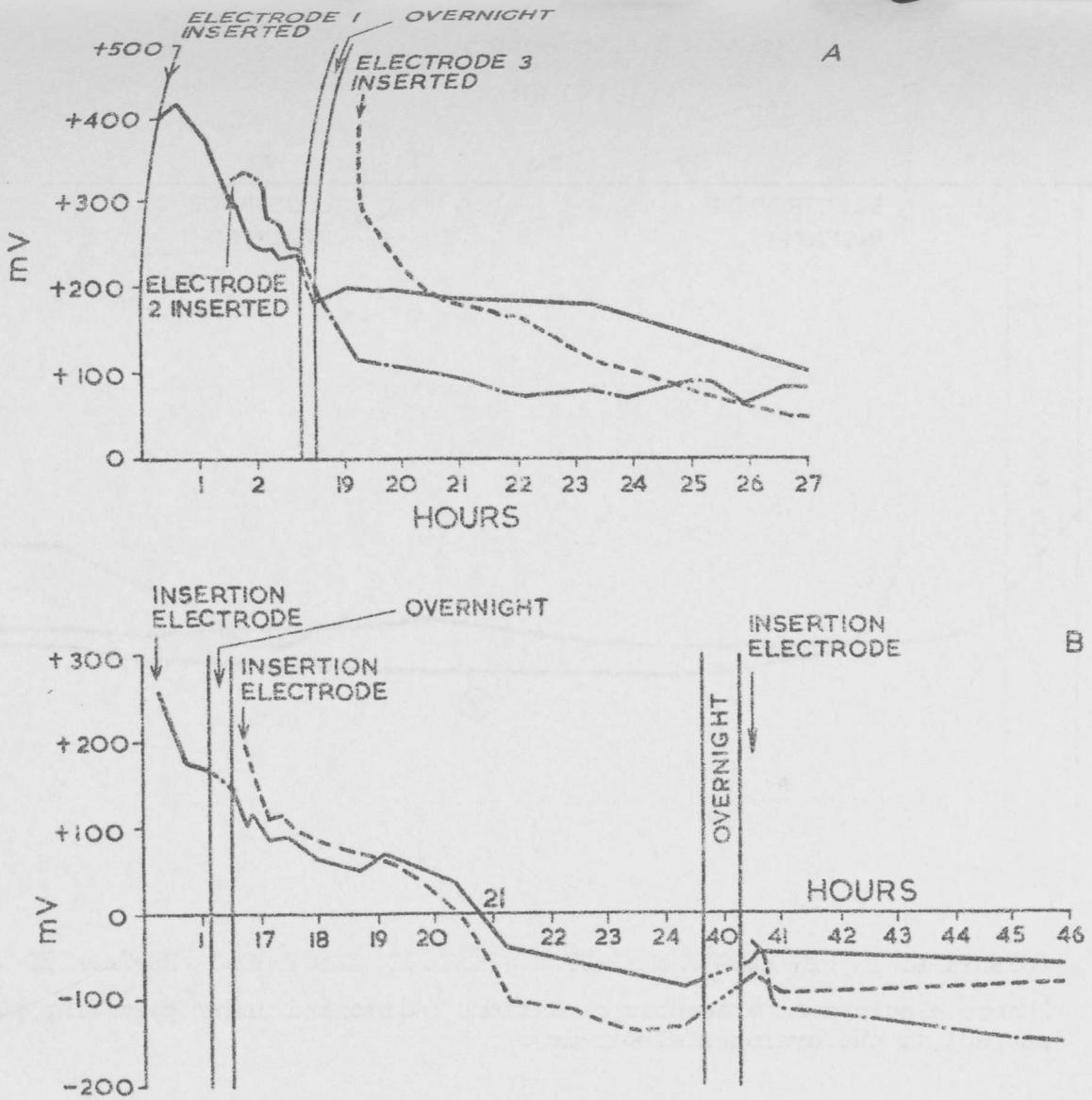

FIG. 2 . ELECTRODE POTENTIALS IN PIG MUSCLE EXTRACTS.

(Gold macro electrodes; anaerobic conditions maintained A under paraffin and B under argon; potentials given with respect to the hydrogen electrode).

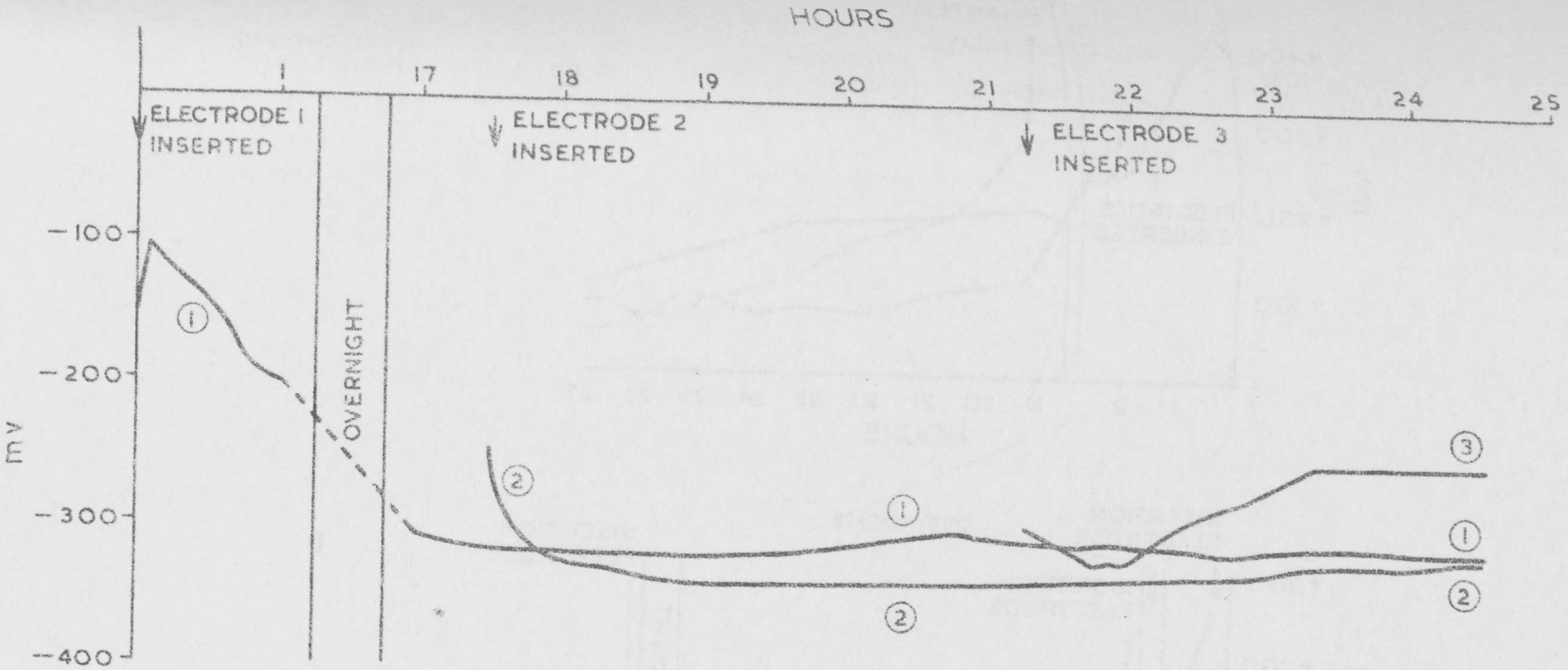

FIG. 3 . POTENTIALS IN PIG MUSCLE EXTRACT OF PLATINUM ELECTRODES PRE-TREATED WITH HYDROGEN.

(Macro electrodes; anaerobic conditions maintained under paraffin; potentials given with respect to the hydrogen electrode).

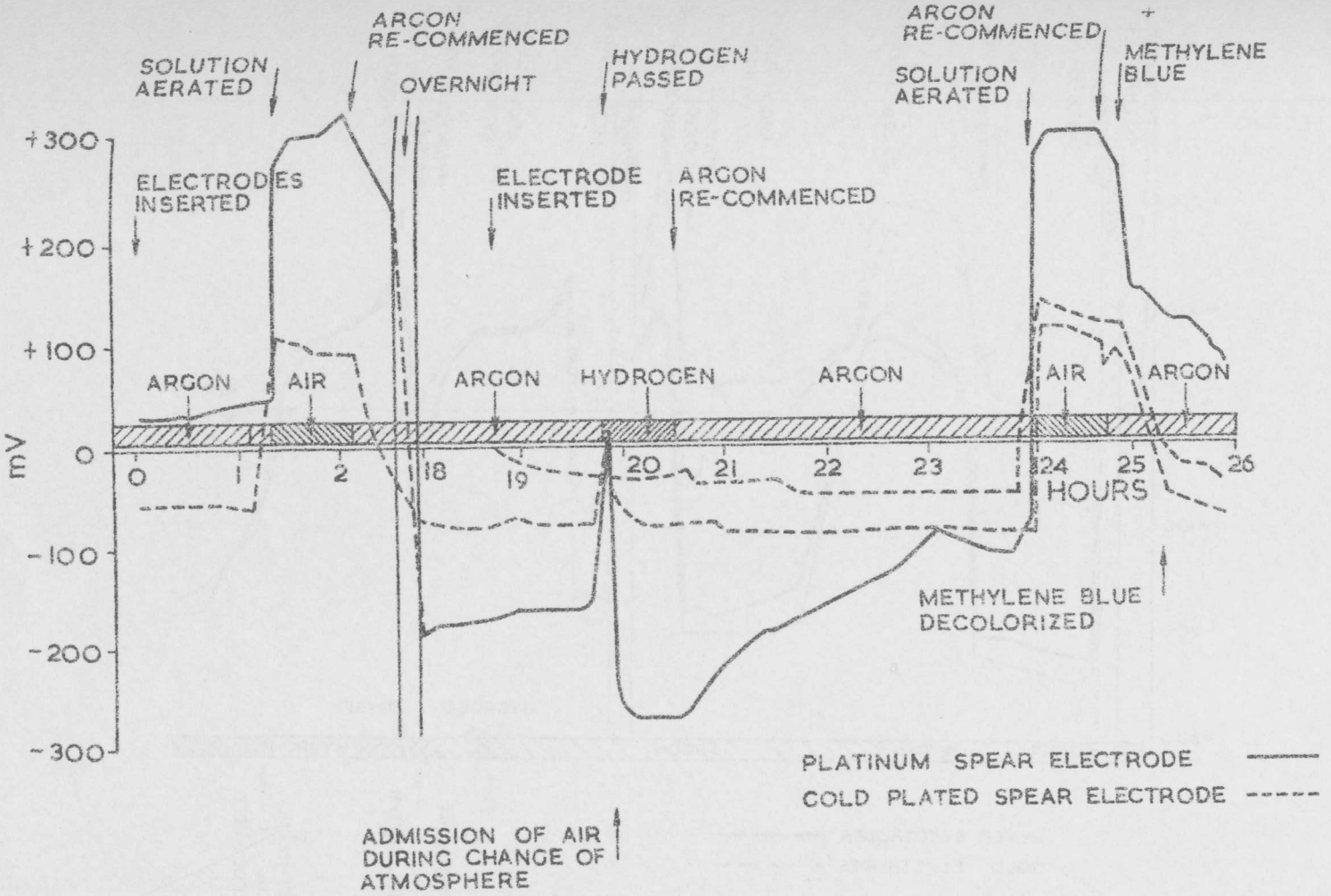

FIG. 4. ELECTRODE POTENTIALS IN PIG MUSCLE EXTRACT.

(Platinum and gold macro electrodes; atmospheres as indicated; potentials given with respect to the hydrogen electrode).

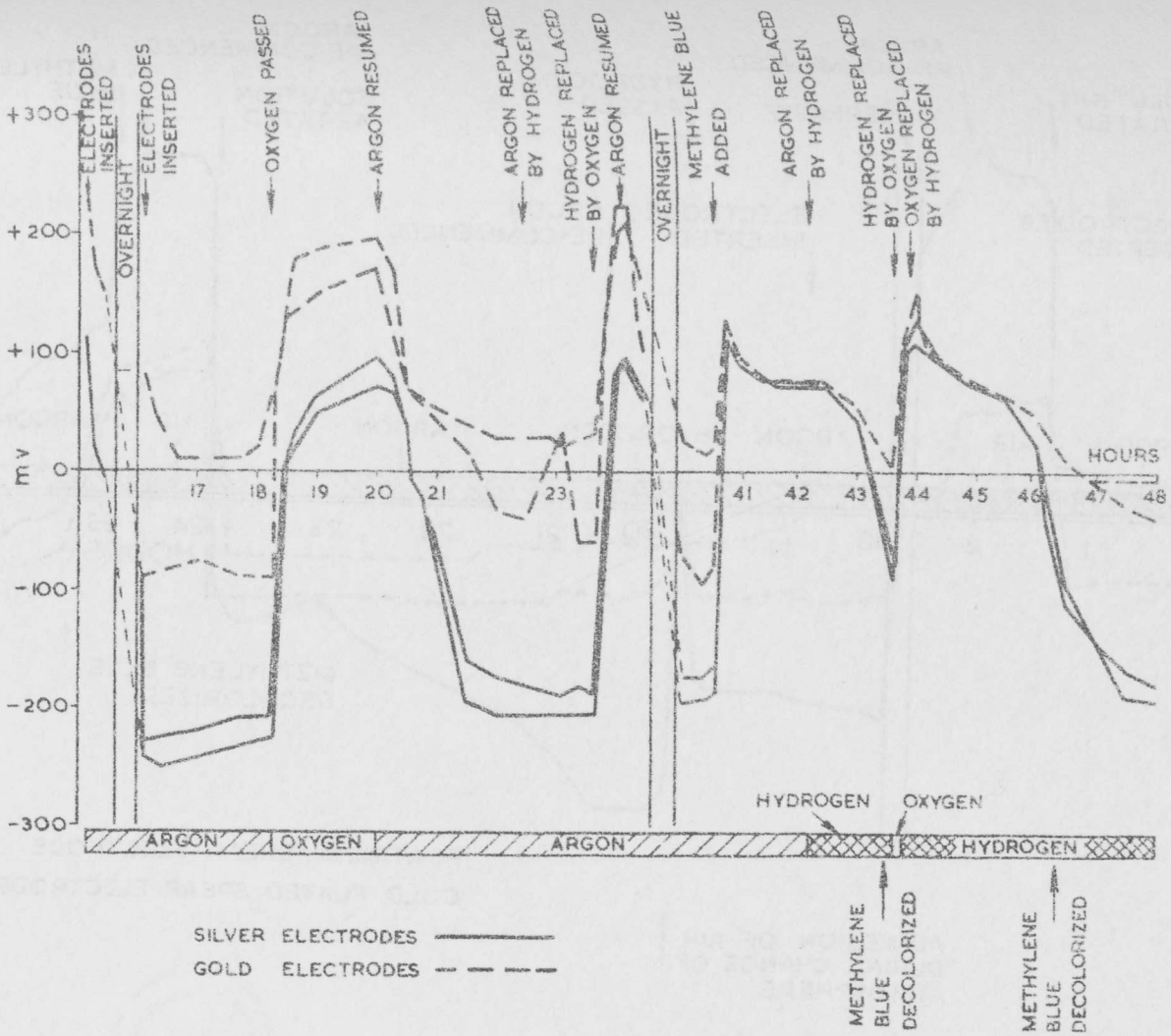

FIG 5. ELECTRODE POTENTIALS IN PIG MUSCLE EXTRACT.

(Silver and gold macro electrodes; atmospheres as indicated; potentials given with respect to the hydrogen electrode).

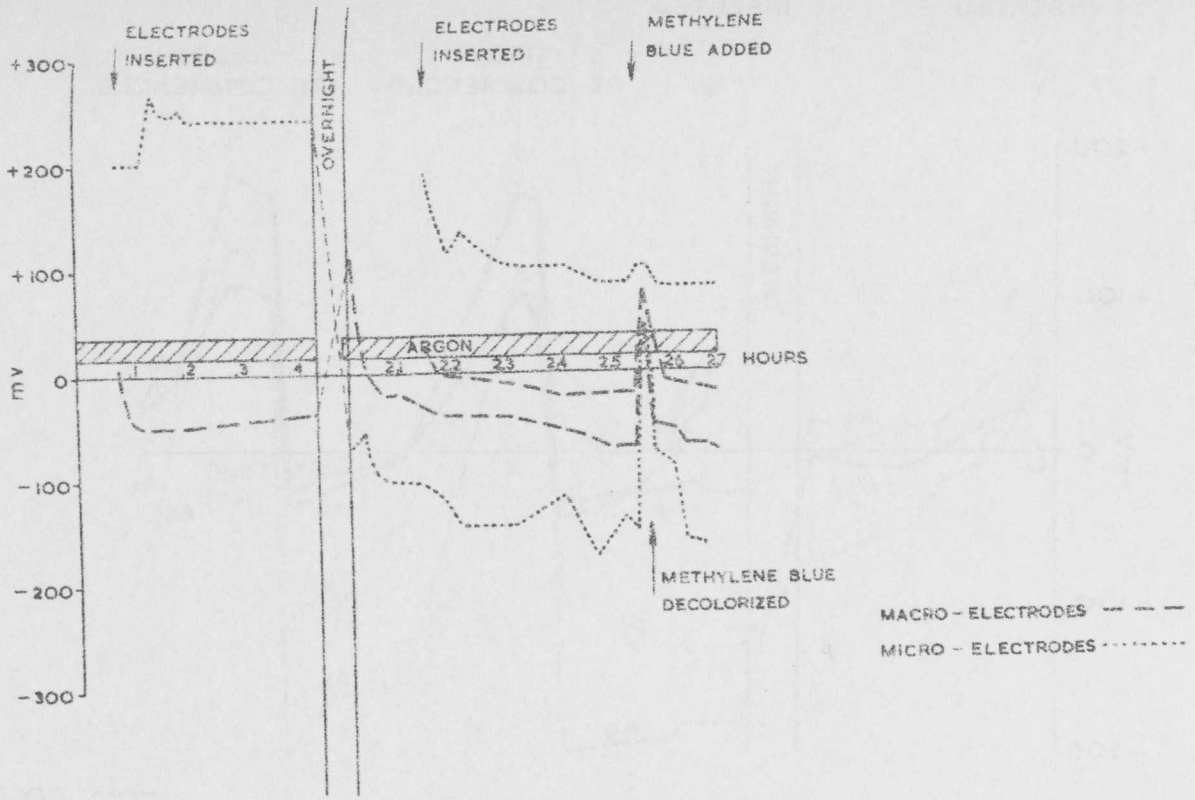

FIG. 6. ELECTRODE POTENTIALS IN PIG MUSCLE EXTRACT.

(Gold macro and micro electrodes; atmosphere argon; potentials given with respect to the hydrogen electrode).

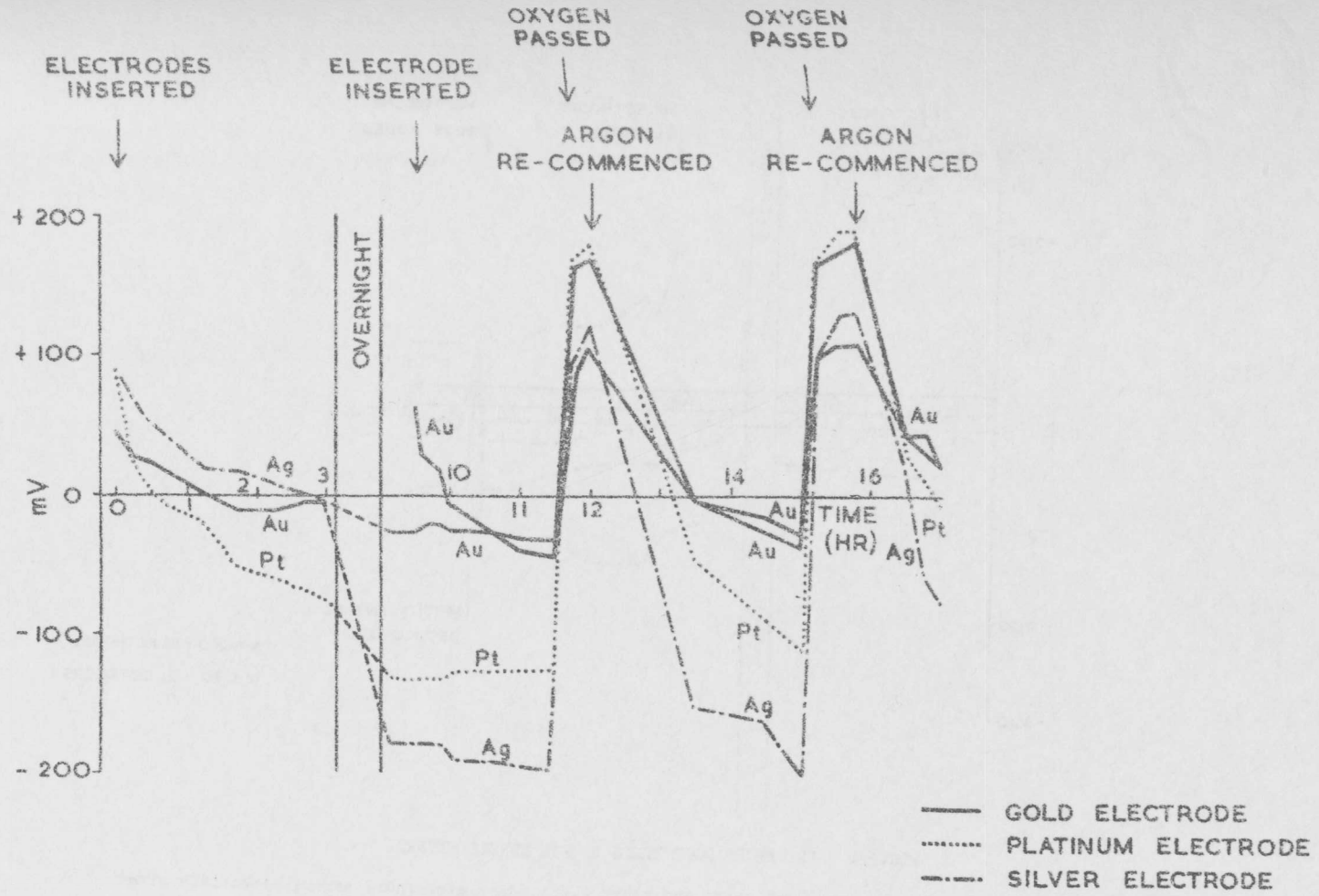

FIG. 7. ELECTRODE POTENTIALS IN PIG MUSCLE.

(Platinum, silver and gold macro electrodes; atmosphere as indicated; potentials given with respect to the hydrogen electrode).

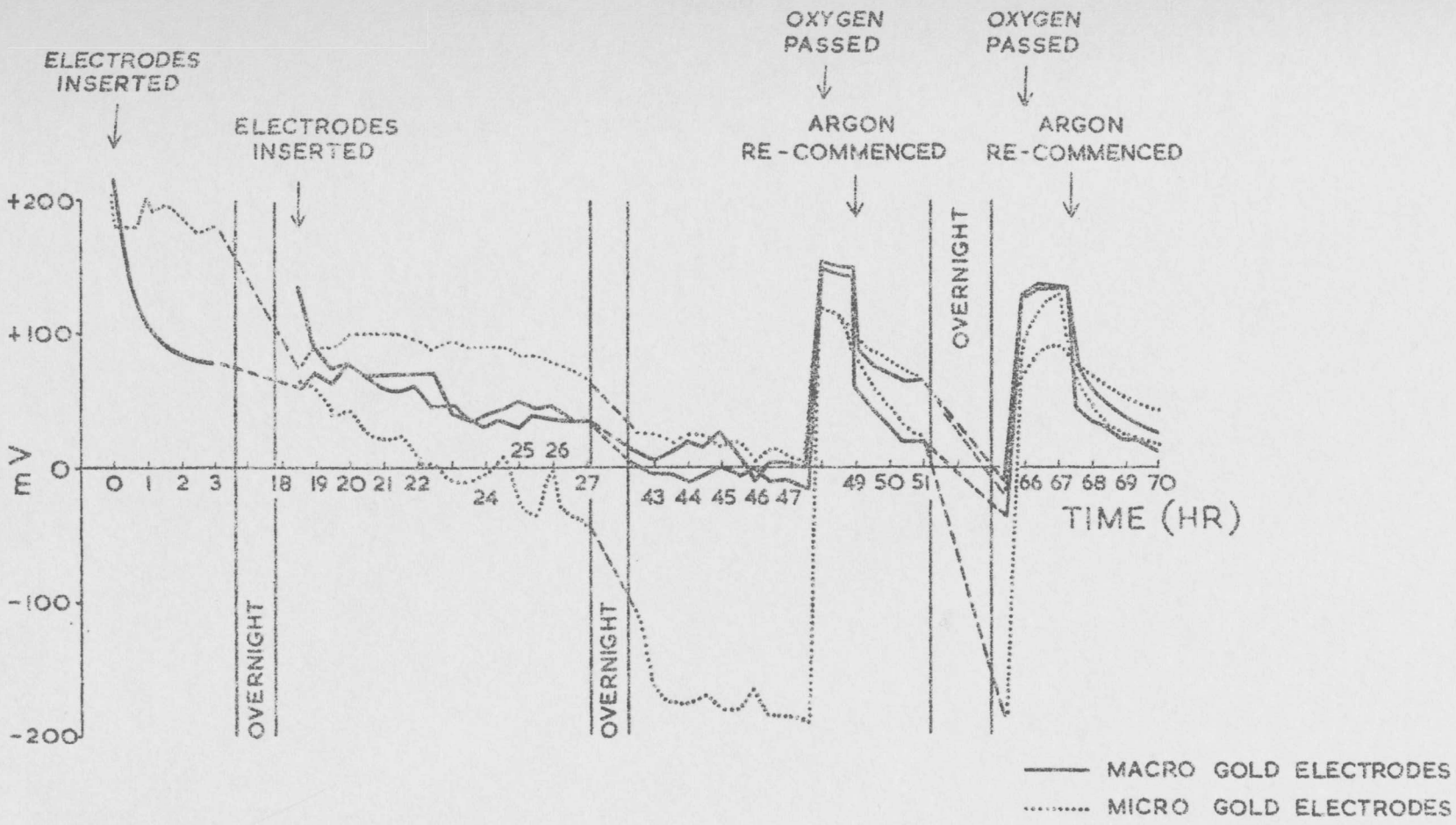

FIG 8 ELECTRODE POTENTIALS IN PIG MUSCLE.

(Gold macro and micro electrodes; atmosphere as indicated; potentials given with respect to the hydrogen electrode).

TABLE I. - Potentials acquired by macro gold spear electrodes inserted into blocks of pig muscle held under anaerobic conditions
(Potentials given with respect to the hydrogen electrode)

LEG NO.	SEMIMEMBRANOSUS POTENTIAL				QUADRICEPS FEMORIS POTENTIAL				BICEPS FEMORIS POTENTIAL			
	PART A		PART B		PART A		PART B		PART A		PART B	
	After 1 hr.	Final	After 1 hr.	Final	After 1 hr.	Final	After 1 hr.	Final	After 1 hr.	Final	After 1 hr.	Final
1	50) 95)120 215)	-15) 35) 27 60)	-5) 0) 22 70)	-10) -10) 5 35)	-210) 0)-57 40)	-35) 20) 3 25)			80) 95)103 135)	-45) 80) 43 95)		
2	10) 20) 23 40)	-15) 0) 7 35)	-10) 10) 8 25)	-55) -85)-90 -130)	-55) -5) 2 65)	-70) -135)-117 -145	-80) -40)-38 5)	-50) -170)-132 -175)	0) 60) 68 145)	-30) -80)-87 -150)	45) 90) 90 135)	5) 80) 58 90)
3	5) 40) 72 170)	30) 35) 55 100)	85) 90) 98 120)	-50) 35) 22 80)	30) 40) 50 80)	-40) -40) -60 -100)	20) 30) 75 175)	-180) -70)-107 -70)	-70) 0)-20 10)	-125) -130)-128 -130)	5) 55) 43 70)	-80) -60)-33 40)
4		-110) -100)-63 20)	-35) -5)-12 5)	NOT STEADY		-85) -45) -37 20)	-70) 20) 7 70)	NOT STEADY		-50) -5) -12 20)	-25) -25) 27 130)	NOT STEADY
5		-110) -95)-98 -90)	80) 150)128 155)	-125) -20)-17 95)	-85) -50)-22 70)	-65) -30) -23 25)	45) 45) 57 80)	-120) -120)-117 -110)		-50) -20) -13 30)	60) 70) 70 80)	-25) -40)-40 -55)
6	25) 55) 60 100)	-5) 15) 13 30)	50) 55) 70 105)	10) 50) 37 50)	10) 10) 17 30)	-15) -5) -5 5)	40) 60) 60 80)	10) 35) 38 70)	115) 120)135 170)	25) 65) 63 100)	130) 155)147 155)	60) 80) 93 140)
7	35) 50) 48 60)	-65) -50)-48 -30)			30) 35) 38 50)	-40) -5) -10 15)			25) 55) 67 120)	0) 30) 38 85)		
8	50) 55) 73 115)	-85) -15)-22 35)	40) 90) 82 115)	-70) 5) -2 60)	10) 40) 35 55)	-90) -10) -30 10)	5) 15) 18 35)	-140) -105) -88 -20)	0) 25) 32 70)	-95) -30) -40 5)	30) 35) 40 55)	-140) -105)-88 -20)
9	-25) 65) 35 65)	-60) 50) 23 80)	100) 125)120 135)	-10) 60) 38 65)	-105) 0)-18 50)	-50) 20) 0 30)		0) 65) 50 85)	15) 20) 28 50)	5) 20) 25 50)		-155) -60)-65 20)

TABLE I. (cont.)

LEG NO.	SEMIMEMBRANOSUS POTENTIAL				QUADRICEPS FEMORIS POTENTIAL				BICEPS FEMORIS POTENTIAL			
	PART A		PART B		PART A		PART B		PART A		PART B	
	After 1 hr.	Final	After 1 hr.	Final	After 1.hr.	Final	After 1 hr.	Final	After 1 hr.	Final	After 1 hr.	Final
10	15) 70) 55 80)	-40) 40) 23 70)		-160) -70)-82 -20)	-150) -75)-82 -20)	-215 -120)-148 -110)		-110) -80)-85 -65)	-15) 55) 55 125)	-70) 40) 25 105)		-50) -10)-10 30)
11	-135) -35)-73 -50)	-160) -70)-100 -70)	70) 70)100 160)	-40) 5) -8 10)	-20) 5) 2 20)	-120) -45)-52 10)	55) 65)68 85)	-30) 40) 33 90)	-40) 25) 30 105)	-75) -40) -8 90)	50) 70) 73 100)	-25) 40) 22 50)
12		-80) -25)-35 0)	40) 70) 72 105)	0) 30) 53 130)		-90) -50) -47 0)	10) 30)53 120)	-80) -30)-33 10)		-65) -55)-23 50)	50) 50) 55 65)	-115) -50)-68 -40)
13		-150) -45)-75 -30)				-110) -110)-73 0)				-90) 0) 0 90)		
14		-20) -20)-12 5)				-215) -155)-165 -125)				40) 45) 67 115)		
16		0) 125) 55 40)		-120) 75) -5 30)		-65) 20) -10 15)		-55) 0)-18 0)		50) 90) 83 110)		50) -35) 13 25)
17	60) 100)112 175)	-35) -115) 2 155)			85) 100)102 120)	-60) -30) -3 80)			110) 110)125 155)	-75) -45)-35 15)		

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lefon Fasan 9815

SLAGTERI- og KONSERVESLABORATORIET
Den kgl. Veterinær- og Landbohøjskole
Howitzvej 13, København F

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10th European Meeting of Meat Research Workers

Reception at the Danish Meat Products Laboratory

12th August 1964

SLAGTERI- og KONSERVESLABORATORIET
Veterinær- og Landbohøjskolen
Howitzvej 13, F

Møde 12. august 1964

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Danish Meat Products Laboratory.

Purpose

Insuring good quality of Danish meat products.

Method

1. Conducting quality control through examination of samples, organolepticals and in laboratory and direct plant inspection.
2. Carrying out experiments to improve organoleptical and objective control methods and, in cooperation with the Danish Meat Research Institute, experiment on such manufacturing problems that are closely related to meat quality.
3. Advisory service to assist industry with product improvement.

SLAGTERI- og KONSERVESLABORATORIET
Veterinær- og Landbohøjskolen
Howitzvej 13, F.

Møde 12. august 1964

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Quality control systems.

Existing arrangements.

1. Canned meat for export.

2. Canned meat for domestic consumption.

3. "Dana" brand canned meat.

In preparation

4. Frozen food

5. Sausages for overseas export.

SLAGTERI- OG KONSERVESLABORATORIET
Veterinær- og Landbohøjskolen

Eksportkødkonserves

Kontrolbedømmelse nr. 29

Fortroligt

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29. kontrolbedømmelse den 7. august 1964.

Løbe-nr.	Netto-vægt	Karakterer: Afsv. udseende	konsistens	lugt & smag	gele/jævn	Bemærkninger
Svinekød						
2454	279U	10	6	7	7	rigeligt fedt udskilt, store spækterninger.
Pork luncheon meat						
2323A	1828	8	7	7	7	afsværtning fra naten, egnet.
2323B	1810U	10	6	7	7	misfarvet overflade, egnet.
2323C	1805U	8	7	7	7	afsværtning fra naten, egnet Partiet egnet til eksport.
2445	338U	10	7	6	6	dejget, svampet, klistret.
2456	340	9	5	7	7	rigeligt gult fedt udskilt.
2461	205	10	4	7	7	for meget fedt og gele udskilt, bensplint, uegnet på grund af for meget fedt og gele udskilt.
2469	348	10	7	8	7	bleg.
2472	1826	10	6	7	1	mange sener, sur, uegnet til eksport på grund af smagen.
2481	201	10	6	6	6	fedtfyldt hul, dejget fedtet.
2492	340	5	6	6	6	afsværtning fra naten, misfarvet overflade, svampet, klistret.
2493	196U	9	6	7	7	rigeligt gele udskilt.
2496	340	10	5	6	7	meget gele udskilt, hård.
Mixed luncheon meat						
2464	348	10	5	8	7	bruskstykke
Chopped pork						
2446	1810U	10	5	5	7	meget gele udskilt, bruskstykke blød rand, gele 3,5%.
Chopped pork & ham						
2508	167U	10	6	7	7	dåsen dårligt fyldt ud, mange sener, gele 5,8%.
Chopped ham & pork						
2442	170	10	7	7	7	1.dåse: 13,8% gele, 2.dåse: 9,4% gele.
2483	199	10	4/5	8	7	meget fed, gele 11,6% godkendelse afhænger af analyse for fedt.
2494	202	10	6	7	7	rigelig gele udskilt, grove sener, 1.dåse: 12,0% gele, 2.dåse: 12,4% gele.

Karakterskala: 10 meget fin, 8 normal og tilfredsstillende, 6 mangler, 4 væsentlige mangler, 2 udtalte fejl eller mangler, 0 store fejl eller mangler.
U ved nettovægtangivelsen betyder, at prøven er undervægtig.

S 4849

Eksportkødkonserves
Kontrolbedømmelse nr. 29
7. august 1964

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Løbe-nr.	Netto-vægt	Karakterer: Afsv.	udseende	konsistens	lugt & smag	gele/sovs	Bemærkninger
Skinke							
2452	455	10	7	6	7	5	trevlet, tør, geleen klumpet, svind 24,8%.
2489	901U	10	7	8	8	8	svind 22,3%.
Canadian style bacon							
2471	1358U	10	5	7	8	8	misfarvet af udkogt fedt og skum, grov sene, svind 7,2%.
2491	447U	10	8	6	6	8	hård meget tør, svind 20,4%.
Tunge							
2470	179	10	8	8	8	8	
2509	2730	10	8	8	8	7	
2510	2722	10	7	7	8	8	meget fede.
Pølser							
2450	228	-	7	7	7		
2467	240	-	7	6	5		meget salte, afsmag. bløde.
2490	145	-	7	8	8		snavs fra røgovnen.
Sliced bacon							
2449	460	-	7	6	6		sejgt, tørt, smagløst.
2453	233	-	7	8	8		
2455	455	-	6	7	7		ret fedt.
2468	465	-	7	7	6		afsmag, meget fersk.
Leverpostej							
2465	116	10	8	7	7		

Bedømmelsen er foretaget af ingeniør H. Sørensen, driftsleder Poul Hansen, fabrikschef J. Jacobsen og husholdningskonsulent frøken Elly Madsen.

Hjemmemarkedskødkonserves
Vægtkontrol nr. 28
Fortroligt

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Vægtkontrol på hjemmemarkedskødkonserves bedømt ved 28. kontrolbedømmelse den 4. august 1964.

Løbenummer	Deklareret: nettovægt i g	Deklareret: drænet nettovægt i g	Deklareret: kødvægt i g	Deklareret: antal	Fundet: nettovægt i g	Fundet: drænet nettovægt i g	Fundet: drænet nettovægt i %	Fundet: kødvægt i g	Fundet: kødvægt i %			Fundet: antal	Fundet: antal per 100 g, ca.	Fundet: længde i mm	Fundet: vægt per stk. i g
Sylte															
694	340				364										
Corned beef															
707	340				355										
Forende							gele								
701	454				457	350	22,4								
Garniturboller															
696															
704		227		80	457	178	*38,9					82	46		2-3
706		480		-	852	550	64,6					128	23		3-6
		130		30-35	231	130	56,3					40	31		
Gule ærter								medist.		ærter.					
684	454		90		481	183	40,3	98	21,6	95	20,9				
Bøf															
692	850	350		5	918	376	44,2					5			72-79
Forloren hare															
697	450	200			460	198	44,o								
Hachis															
686	454	204			501	213	46,9								
Hjerter															
691	340	120			366	138	40,6	hjerter		svesk.					
702	340	120			363	148	43,5	136	40,0	12	3,5				
Gullasch										guler.					
688	870		310		900	465	53,4	385	44,3	80	9,2				
Beuf stroganoff										champ.		løg			
0709	454		145		459	212	46,7	*120	26,4	53	11,7	39	8,6		
Bayerske pølser															
689															
690		620		10	14/0	694						10		165-170	69-70
698		227		8	513	240						8		130-140	29-32
699		300		6	671	321						6		160-185	52-56
705		227		10	474	245	2 revnede pølser					10		105-115	24-26
		227		8	468	236	1 revnet pølse					8		130-140	ca.30
Frokostpølser u/skind															
685		370		6	889	399						6		ca. 125	64-70
Pølser, ristede															
703		370		6	896	377						6		165-195	57-68
Leverpostej															
687	200														
693	113				200										
695	115				125										
700	115				117										
708	63				113										
					65										

§ Engelsk tekst.
* Undervægt.

SLAGTERI- og KONSERVESLABORATORIET
Veterinær- og Landbohøjskolen
1. juni 1961
Revideret 19. november 1963

Hjemmemarkedskødkonserves
Specifikation nr. 11

Specifikation.

Betegnelse:	Gullasch med gulerødder.
Indhold:	Oksekød, sovs og gulerødder.
Dåse eller glas:	Skal være mærket med fabrikationsdato, eventuelt i kode.
Etikette:	Den totale nettovægt samt vægten af kød i gram eller kilo skal deklareres, og en ingrediensfortegnelse anføres.
Nettovægt:	Dåsen skal mindst indeholde den deklarerede nettovægt.
Drænet nettovægt:	Den drænede nettovægt skal mindst udgøre 45% af den deklarerede totale nettovægt, og bestå af: mindst 35% kød og højst 10% gulerødder. Der må højst være 20% overvægt på sovsen.
Kødets udseende:	Skal være oksekød uden sener. Kødet skal i det væsentligste ligge i hele ensartede stykker.
Sovsens udseende og konsistens:	Normal farve og konsistens.
Forslag til ingrediens-fortegnelse:	Oksekød, gulerødder, (løg), mel, kulør, salt, krydderier.

Ovenstående specifikation er fastsat af bestyrelsen for Kødkonservesfabrikernes Eksportsammenslutning januar 1964.

SLAGTERI- og KONSERVESLABORATORIET
Veterinær- og Landbohøjskolen
11. juni 1964

LEVNEDSMIDDELLOVGIVNING - UK
Eksportkødkonserves
Information nr. 3/64

Uddrag af nye bestemmelser vedrørende vægtangivelse til UK (Weights and Measures Act. 1963).

Det fastsættes blandt andet, at emballagen til færdigpakkede varer skal mærkes med en angivelse af den indeholdte varemængde og med en angivelse, der gør det muligt at identificere pakkerne.

Disse nye bestemmelser træder i kraft per 31. juli 1965. I betragtning af at "The Food Labelling Order" for tiden er til revision, kan der muligvis blive tale om yderligere forandringer.

Uddrag:

1. Vægtangivelsen skal være klar, let læselig og iøjnefaldende. Angivelsen skal stå på en fremtrædende plads hvor den let kan læses, og den må på ingen måde skjules (dækkes af plakat eller lignende).

2. Minimumhøjden af vægtangivelsens mindste bogstaver eller tal, fremgår af følgende skema:

Bogstav eller talstørrelse	Beholderens største *dimension
1/16 inch (ca. 1,6 mm)	2 inches (ca. 50,8 mm)
1/8 " (ca. 3,3 mm) .....fra	2 til 6 " (til ca. 152,4 mm)
3/16 " (ca. 4,8 mm) ..... "	6 " 12 " (til ca. 304,8 mm)
3/8 " (ca. 9,9 mm) ..... "	12 " 18 " (til ca. 457,2 mm)
1/2 " (ca.12,7 mm) ..... "	18 " 24 " (til ca. 609,6 mm)
1 " (ca.25,4 mm) ..... "	over 24 inches (over ca. 609,6 mm)

* dimension = højde, længde, bredde eller diameter.

3. Vægtangivelsen skal anbringes i umiddelbar nærhed af varens betegnelse eller navn, og angivelse skal fremtræde på ensfarvet baggrund i let læselig og tydelig farvekontrast (for eksempel mørke bogstaver og tal på en lys baggrund).

4. Vægten skal angives efter "Imperial system", men må dog efterfølges at vægtangivelse efter det metriske system.

5. Ounce må ikke benyttes for at deklarere vægt over eet pund (for eksempel 20 oz. skal angives som 1¼ lb. eller 1 lb. 4 oz.).

6. Når den angivne vægt betegner nettovægten skal den enten angives alene (for eksempel 8 oz.), eller ledsaget af ordene: "net" eller "net weight", eller "minimum net weight", eller "contents".

7. Når den angivne vægt betegner bruttovægten, skal dette anføres, for eksempel "1 lb. gross" eller "1 lb. gross weight" eller "1 lb. including container".

SH/BL

The Danish Meat Products Laboratory use scores from 10 to 0 and the different scores correspond to:

10: very fine
9: fine
8: satisfactory and normal
7: hardly satisfactory
6: defects
5: essential defects
4: and below: substandard (different degrees)

With a score of 6 or below remarks must be given.

For approval of a sample, at least one score must be above 5, and no scores must be below.

The samples are tested for appearance, which includes outer appearance and the appearance of the cut surface. Further for texture and for flavour. Only one score is given for flavour. This score includes saltiness, too.

Each taster tests individually on the enclosed scoring sheets.

The Danish Meat Products Laboratory — Canned meat for export

357

Scoring sheet

Judge no. — Date

Sample no.	Blackening	Appearance	Texture	Flavour	Jelly Sauce	Remarks

Represented firm — Sign.

The Danish Meat Products Laboratory — Export Hams

Scoring sheet — 352

Judge no. Date:	Sample no.	
The type of ham:	Market:	
	Remarks	Scores
	Surface	I
Dust/dirt Blackening		
	Outer appearance	II
Shape		
Trimming		
Sewing		
Tendons		
	Appearance of the cut surface	III
Quality of the ham		
Fat depots		
Rounding		
	Colour	IV
Colour		
	Flavour	V
Taste-odour		
	Sliceability	VI
Shank		
Center		
Collar-bone		

Approved/rejected

B-K form. 80 (1-64)

represented firm — sign.