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THE RIPENING OF CHEDDAR CHEESE

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and

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### THE RIPENING OF CHEDDAR CHEESE.

### INTRODUCTION.

Arising from the general trend to improve and standardize dairy products, recent years have seen a movement towards the pasteurization of milk for cheddar cheese-making. From the observations of Atkinson (1) and Stevenson (2) the pasteurization of milk for cheese-making results in an increased yield of cheese, a more uniform product, and an improved quality more suited to longer periods of storage. Sammis and Bruhn (3) showed that pasteurization (Flash at 160°F.) reduced the variations in the quality of the cheese from day to day by nearly one half and in ninety-six percent of the cases under their observations the cheese from pasteurized milk scored higher than those made from raw milk. These results are substantiated by Price (4) who pasteurized at 145°F. for thirty minutes.

Other workers claim definite disadvantages for pasteurization. In the reports of the Department of Scientific and Industrial Research of New Zealand (5) the opinion is expressed that in using the "Holder Method" of pasteurization at a temperature of 150°F. a distinct influence was evident in the flavour of the cheese; the cheese did not mature in the ordinary way and at four months had a bitter taste. Moir (6) using the Flash Method at temperatures ranging from 165°F. to 185°F.

concluded that pasteurization produced a bitter flavour in the resulting cheese and the ultimate protein decomposition products were reduced. Atkinson (1) expressed the opinion that pasteurizing milk for cheese-making results in a slower maturing cheese than that made from raw milk.

These investigations have shown that only low temperatures of pasteurization were satisfactory for cheese-making; high temperatures of pasteurization were apparently detrimental to the resulting cheese.

Considering the disadvantages of high temperature pasteurization, it has seemed advisable to endeavour to obtain some data in regard to the influence of pasteurization on the microflora of the resulting cheese; and to determine whether or not the disadvantages previously mentioned can be attributed to differences in fermentation or to other changes, physical or chemical, resulting directly from the high temperatures of pasteurization, or from a combination of both.

## HISTORICAL.

Evans, Hastings and Hart (7), 1924, found that the predominating organisms at the different stages of the ripening of raw milk cheddar cheese were included in four groups,

Bacterium lactis acidi, Bacterium casei, Streptococcus, and Micrococuss, and that the flora of pasteurized milk cheese, with the exception of B. casei was similar to the types of organisms in the starter used in making the cheese. They state:

"The B. casei group is apparently responsible for the pungent

and pasteurized milk cheeses." Further they showed that when only B. lactis acidi was used as starter in making cheese from pasteurized milk, no cheddar flavour was obtained. However, when both B. lactis acidi and B. casei were added to pastuerized milk for cheese-making a sour flavour was produced during the early part of the ripening process. In conclusion they state: "It does not seem unreasonable to hope that starters may be obtained, which will give the characteristic flavour to cheese made from pasteurized milk."

To overcome lack of flavour in cheddar cheese made from pasteurized milk, Hastings and Sammis (8) 1920, used a special starter, which, in addition to the lactic acid bacteria characteristic of starters used in cheese-making, contained other organisms which they did not define, isolated from soil and faeces. The cheese developed flavour more rapidly than did the control cheese made from pasteurized milk with starter which did not contain these organisms isolated from soil and faeces.

Panfilov (9) 1928, in a study of the effect of pasteurized milk on the microflora of cheese, subjected batches of milk to temperatures of  $70^{\circ}$ C for twenty minutes,  $65^{\circ}$ C for thirty minutes, and  $63^{\circ}$ C for fifty minutes. At the lower temperature a greater percentage of the lactic acid organisms, especially <u>B. casei</u>, were to be found in the resulting cheese. Moreover, the cheese made from milk pasteurized at  $63^{\circ}$ C for

fifty minutes ripened more quickly than those made from milk pasteurized at the higher temperatures.

### METHODS OF PROCEDURE:

All milk used was obtained from the herd of the University of British Columbia, (chiefly Ayrshire). The milk of the previous night and of the morning of each day of cheese-making, was thoroughly mixed and divided between two vats. A series of six lots of cheese was made from milk treated as indicated in Table I.

TABLE I

Nov. 15/30	Lot 1	Raw milk.
Nov. "	Lot 2	Pasteurized 140°F 30 min.
Nov. 22/30	Lot 3	Pasteurized 150°F 30 min.
Nov. "	Lot 4	Pasteurized 160°F 30 min.
Nov. 29/30	Lot 5	Pasteurized 140°F 30 min.
Nov. "	Lot 6	Pasteurized 150°F 30 min.

The pasteurizer used was a glass-lined "Pfaudler" of the holder type with a capacity of sixty gallons.

### PROCESS OF MANUFACTURE.

The cheese were manufactured after the manner of the the cheddar process following in detail the usual procedure of the Dairy Department Laboratories- a process very similar to the Western Ontario method. Complete records of the process of manufacture are given in Table 11.

The starter, cheese color and rennet were the standard commercial products of the Hansen Laboratories. No attempt was made to determine the types of organisms present in these products. However, from the results of work done by students in the advanced course in Dairy Bacteriology under the supervision of Professor W. Sadler, on the types of organisms present in the starter, showed that only coccus types characteristic of cheese starter were to be found.

It is to be seen from Table 11. that the effect of the pasteurizing temperature on the cheese-making process did not become evident until the milk was heated to  $160^{\circ}F$ . When this temperature was used, however, a very soft coagulum was obtained requiring two hours to firm sufficiently for cutting. The curd on the rack was spongy, held moisture and difficult to mat.

## PROCESS OF RIPENING.

During the first fourteen days of ripening the cheese were held at approximately 62°F.; Subsequentaripening—wasscarried on at approximately 49°F. The constancy in temperature of the ripening rooms in which the cheese were held,

## CHEDDAR CHEESE RECORD OF PROCESS OF MANUFACTURE

EXPERIMENT

			MILK	м	iLK	1	STAF	RTER			1	MUK	AT. TOY	E RENNET				<del>-</del>										1			1	ABLE ]	<b>T</b>		
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	mado	Number	a.m., p.m	Weight (bs.	Fat %	Ity %		mount Ozs.	Time Added		Renne Test	lty Re	of onnet, rams	Amount of Rennet drams	Time	Temp.	*CUT TIME	Acid		Time Acid	Tim Finish	e	Final	Time	Acid- Heur ity from	s Tíme	Star Acid Ity		Time	Acid-	Time 1	ild.	Aold-	Ae	
Back 対策 しし Yes tacket be ♪	5/11/30	Ĺ	48 hrs	185	4.3	.82	12%	10	9/25			n	bs.	-				76				%	or.		% Sattir		%	%		%		6	%	Time ji	to
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EXPERIMENT

# CHEDDAR CHEESE RECORD OF PROCESS OF MANUFACTURE

		-	<u> </u>		MILLED					РОТ 1	TO PRESS		*TUF	NED	TURNED INTO FINE CLOTHS			1	GREEN	CHEESE	RiPE	CHEESE	1	Ī		J /A	BLE #L
	Saries Number	Hours from Setting	Tim	lro Te	n Aqu	rd Ci		Salt Oza	TI	mo		essure lbs.	Time	Pressure ibs.	Time Pressure	Pressure Off	Bandaged	essivished Comme Number Of	Date	Weight lbs. ozs.	Date	Weight ibs. oza	Shrink- age %				REMARKS
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may be seen when the figures giving the maximum and minimum variations are considered.

Table 111.
Temperature of Ripening Rooms.

	HIGH	ROOM				<u> Tow</u>	ROOM	
Monthly	Mean Temp.	Monthly F.	Max. OF.	Min.	Mean Temp.	Monthly OF.	Max.	Min. OF.
Nov. 130		61.5	64	58		50.8	59	43
Dec. 130		61.1	63	58		48.8	54	43
Jan. ! 31		60.4	63	58		48.6	59	44
Feb. • 31		63.0	66	60		47:1	<b>51</b>	43
Mar. '31		63•4	66	60		48.6	59	42

### BACTERIOLOGICAL EXAMINATION.

The cheese were sampled for bacteriological examination at the age of thirty days and again at seventy-three days.

Sampling: In sampling the cheese the surface was seared with a, hot iron and a bore was taken with a sterile trier and transferred to a sterile petri dish.

Dilutions: Representative portions of the bore amounting to one gram, were taken and transferred to a sterile grinder containing 9c.c. of water and thoroughly emulsified. From this grinder the required dilutions were made for the plate method of examination. The dilutions found most satisfactory in practice, using plates five and one half inches in diameter, were 1:100,000 for the first examination and 1:10,000 for

the second.

Media and Incubation Temperatures: The medium used in plating throughout the experiment was Peptonized Milk Gelatin, at a P.H. 6.0. All dilutions were plated in duplicate and incubated at room temperature (21°-23°c) for ten days.

Depending on the number of colonies on a plate. either a complete plate or a representative portion of a plate was picked. The colonies were transferred directly into litmus milk containing 0.15% yeast extract.\* and were incubated at 30°C. All cultures, as soon as clotted were removed from the incubator and held at room temperature. Slides were made of all cultures at twenty-four hours and were stained by Grams' method to determine the Morphological characteristics of the organisms. cultures were also inoculated into loc.c. quantities of milk and yeast-milk and incubated with controls, for fourteen days. coccus forms at 23°C. rod forms at 30°C. When incubation was completed, the cultures were titrated with N/4 sodium hydroxide using phenolphthalein as indicator: the titration of the controls deducted and the results worked out and recorded as grams lactic acid per mille. It can be seen, that in the manner of incubating, titrating, and recording of results we have followed procedure employed by Orla-Jensen.

<sup>\*</sup> Standard Products of the Digestive Ferments Co. Detroit. U. S. A.

### SCORING OF CHEESE.

The cheese at the age of three months were scored by a judge, \* who has several times taken part in Dominion competitions. These scores are submitted in Table 1.

TABLE 1V.

	SCOF	E OF CHE	DDAR CHE	ese.	Feb. 2	3, 1931.
No. of cheese Milk past. F.		l raw	2 140°F.	4 160°F.	5 140°F•	6 150°F.
Flavour.	45	43.5	43.25	43.25	44.25	43.0
Texture.	25	24.0	23.75	22.75	24.5	24.25
Closeness.	15.0	15.0	14.75	13.0	14.75	14.5
Color.	10	9•75	9•5	9•5	9.8	9•7
Finish.	5	5	<b>.</b>	5	5	5
Total.	100.0	97•25	96•25	93•0	98.4	96.65
Remarks.		Pasty.		Crumbly.		Bitter.

## EXPRESSION OF RESULTS.

The titrations of the cultures in loc.c. quantities of milk and yeast-milk respectively, are given in grams, per mille in Charts 1.--X. There is also to be seen a brief resume of the procedure followed throughout the determinations.

Tables V. and Vl. give a summary of the results of the bacterial examination of the cheese at thirty and seventy-three days respectively, and further give the number and percentage of coccus forms whose vital activity in \*A.P. Slade of A.P. Slade and Co., Vancouver, B.C. Canada.

TABLE 5

SUMMARY OF THE PREVAILING TYPES OF ORGANISMS AT 30 DAYS

Cheese No.	Date of Make	Date of Examin- ation	Date of Past, of 30 min.	Total Count per Gram	Colon- ies Picked		Morphology $^3$	0.10gy			Organisms Responding to the	Organisms Responding to the Addition of	Organisms Not Respond- ing to the Addition of	tsms espond- o the
						4	В	ච	А	岡	No.	X.H.	No.	Y.E.
	15/11/30 15/18/30	15/12/30	Raw	81,800,000	125	61.8	37.4	8 0	1		41	5.6	105	- 96.4
	15/11/30	15/11/30 15/12/30	3007T	52,400,000	127	72.7	22.3			Programme	4	5.1	122	6.96
4.	02/11/28	22/11/30 22/12/30	160°E	16,800,000	8 2	50.5	44.8	4.7			22.4	29.6	57	70.4
ò	29/11/30	29/11/30 29/12/30	1400F	10,200,000	96	_	72.9	0.9			88	58.1	47	61.9
ģ	29/11/30	29/11/30 29/12/30	150°E	21, 300,000	. 9 6	83 D O	8 2 2	613 607		1	13	21.1	2	78.9

A = Coccus forms in pairs.

B = Coccus forms in pairs and short chains.
C = Coccus forms in long chains.
D = Short rod forms.
E = Long rod forms.

SUMMARY OF THE PREVALLING TYPES OF ORGANISMS AT 73 DAYS TABLE 6

ate of Make	Cheese Date of Date of No. Make Examin-	Date of Past. of 30 min.	Total Count per Gram	Colom- ies Picked		. 100	Morphology %	<b>*</b> ∆8		Organis Respondi to the Addition	Organisms Responding to the Addition of	Organisms Not Responing to th	Organisms Not Respond- ing to the Addition of
					7	В	ర	Δ	B	No	Y.E.	Y GN	N. H.
5/11/30	15/11/30 27/1/31	Raw	1, 180,000	118	10.0	10.9	6 <b>°</b>	0.9 55.6	25 SS 6	જે જ	25.0	18	18 75.0
15/11/30	27/1/31	140°F.	000 <b>'</b> 008	08	37.8 54.0	54.0	හ. ග	i i	4	59	79.7	<u>2</u>  -	20.3
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9/11/80	29/11/50   11/2/51	150°F.	2,570,000	161	21.4 77.6	77.6	6.0			26	9.98	15	13,4

A = Goccus forms in pairs.

B = Goccus forms in pairs and short chains.
G = Goccus forms in long chains.
D = Short rod forms.

R = Long rod forms.

e Rod forms not included.

milk was increased by the addition of yeast extract. INTERPRETATION OF TABLES.

From an examination of Table 1V. it is to be seen that: (1) Cheese 5, pasteurized to 140°F. for thirty minutes, scored highest.

- (2) Pasteurizing temperatures had no direct correlation with the flavour scores of the cheese, due possibly to the fact that it was impossible to make all the cheese on the same day from the same milk.
- (3) Cheese 4, pasteurized to 160°F. for thirty minutes, had a faulty texture, this faulty texture may very probably be attributed to the temperature of pasteurization since, as is to be seen in the making of the cheese, Table 11., the action of the rennet was appreciably delayed, thus affecting the entire process of manufacture. This is in accord with the investigations of numerous other workers, who have shown that high temperatures of pasteurization affect the physical and chemical nature of the milk to the detriment of the quality of the resulting cheese.

Table V. shows that at thirty days, the organisms isolated from all the cheese were entirely coccus types
chiefly in pairs; comparatively high counts were obtained.
However, cheese 5 was an exception to this and had, at this
age, a lower count per gram, consisting chiefly of coccus
forms in pairs and short chains. Moreover, when the titrations
of the organisms isolated from this cheese are considered, it

is to be seen that a larger proportion of organisms, showing the yeast incidence were found. When the work of Sadler and Eagles (10) on the ripening of the Kingston Cheese is considered, the possibility suggests itself that the finding of a large proportion of organisms, at this age, showing the incidence of yeast extract might, in a measure, account for the high score.

It is to be seen from Table V1. that:

- (1) The total count per gram of all the cheese, was much less at seventy-three days than it was at thirty days.
- (2) At the second examination of the raw milk cheese the prevailing type found were rod forms; in all the other cheese, the prevailing type found were coccus forms in pairs and short chains.
- (3) Cheese 5, the highest scoring cheese, is distinct again, both in the number and types of bacteria found. Between the time of the first and second examinations the count per gram had decreased relatively less than that of any of the other cheese. Distinct from the picture presented in the case of cheeses No's 1,2,4,6, it is to be seen that among the organisms isolated from cheese 5 there were found an appreciable number which morphologically were large celled organisms in long chains, resembling those of commercial starter. Moreover, the number of organisms showing the incidence of yeast extract has relatively decreased rather than increased as in the other cheese. We also find indications of the appearance of rod organisms in this cheese.

This data would seem to suggest, that there may be three possible factors to one of which may be attributed the superiority of cheese 5.

- (1) The difference in the types of coccus forms found at the two examinations.
- (2) Rod organisms may have been present in appreciable numbers, sufficient to have influenced the ripening of the cheese, at the time the cheese were judged.
  - (3) Or a combination of both these factors.

But in order to determine to which of these factors the superiority of cheese 5 is to be attributed, it would
be necessary to examine the cheese more frequently over a longer period of time, to classify the organisms isolated, to
determine at the various examinations the amount of protein
breakdown in the cheese and to correlate this with the casein
splitting powers of the organisms isolated.

## CONCLUSIONS.

The pasteurizing temperature of 160°F. for thirty minutes had a decided detrimental effect on the rennet clot of the milk and on the texture of the resulting cheese.

Rod forms were the prevailing type at seventythree days in cheddar cheese made from raw milk.

Rod forms were not found to be present at seventy-three days in cheddar cheese made from milk pasteurized to  $150^{\circ}F$ . and  $160^{\circ}F$ . for thirty minutes.

(1) Atkinson, T.H.

1924 The pasteurization of milk for cheese manufacture.

Agr. Gazette of New South Wales, pp. 198-202.

(2) Stevenson. C.

1920 Pasteurization in Cheese Manufacture, pp. 5-9.

Jr. of Agriculture. New Zealand.

(3) Sammis, J.L. and Bruhn, A.T.

1912 The manufacture of cheddar cheese from pasteurized milk.

Wisconsin Agr. Exp. Sta. Res. Bul. No. 27.

(4) Price. W.V.

1927 The manufacture of Cheddar Cheese from milk pasteurized by the holder method.

Cornell University Agr. Exp. Sta. Mem. 105 1927.

(5) Report of the Department of Scientific and Industrial Research.

Dairy Research New Zealand. 1930.

(6) Moir, G.M.

1930 Pasteurized milk for cheddar cheese-making.

Reprint from Jr. of Dairy Research Vol.1, No.2.

(7) Evans, A.C., Hastings, E.Y. and Hart, E.B.

1914 Bacteria concerned in the production of the characteristic flavour in cheese of the cheddar type.

Jr. Agr. Res. 2, pp. 167-192.

(8) Hastings, E.Y. and Sammis, J.L.
1920.

Wisconsin Agr. Exp. Sta. Bul. 319.

- (9) Panfilov, S.B. 1928.
- (10) Eagles, B.A. and Sadler, Wilfrid.

  Cheese Ripening Studies.

  Canadian Journal of Research, 1933.

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We are indebted also, to Dr. N.S. Golding, for advise and assistance in the experimental work and to Dr. B.A. Eagles for his contributions in the arrangement of the material and the preparation of the paper.

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-						17	0.0	8.3	-	1	0.5	-					
					_	46	0.2	6.1		22	0.5	8.8					
						9	0.2	6.8		24	0.7	7.4					
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Oneses 5 (Past. 140°F) ture   Mare   Mo   No   No   No   No   No   No   No	194		100	1			100				S Media	A MAG			Tag			
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Age 30 days. 1		Examinéd	29/	12/:	30		19	0.0	0.2	6.	78	0.5	7.2		70	6.8	7.4	1.0
and rem inder at 50° .  Medium F.M.G. at FPH 5.0. 4/1 0.0 6.8 66 0.5 77 1 6.8 77  Incubate 1 21-25° 5 for 10 keys 1/4 0.0 6.8 66 0.5 79 47 6.8 77  Counts: iii. 1/100,000 28 0.0 70 61 1.1 77 63 70 6.5  One complete place place 27 0.0 70 38 6.5 6.5 76 70 6.6  Into yeast 1 timus mi k. Incubate 1 30° C. Fran 5- 17 0.0 72 93 6.5 6.5 58 70 6.8  for titritia. Incubate 3 00 7.7 8 6.5 6.5 58 70 6.8  for titritia. Incubate 3 0.0 7.7 8 6.5 8.9 83 70 70  11 00 77 31 6.8 6.8 90 70 70  11 00 77 31 6.8 6.8 91 70 70  11 00 77 31 6.8 6.8 91 70 70  11 00 77 57 6.8 6.8 85 72 6.8  37 0.0 8.1 64 6.8 6.8 91 70 70  42 0.0 77 57 6.8 6.8 84 72 72  40 0.0 8.3 73 6.8 6.8 84 72 72  40 0.0 8.3 73 6.8 6.8 84 72 72  40 0.0 8.3 77 6.8 6.8 84 72 72  40 0.0 8.3 77 6.8 6.8 84 72 72  40 0.0 8.3 77 6.8 6.8 70 96 72 8.1  70 0.0 8.6 37 6.8 70 96 72 8.1  71 0.0 8.1 64 6.8 70 96 72 8.1  71 0.0 8.3 77 6.8 6.8 84 72 72  80 0.0 8.3 77 6.8 6.8 84 72 72  80 0.0 8.3 77 6.8 8.8 84 72 72  80 0.0 8.3 77 6.8 8.8 84 72 72  80 0.0 8.6 77 6.8 70 97 77  80 0.0 8.6 77 6.8 70 97 77  80 0.0 8.7 70 6.8 70 97 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77		Age 30 d	ays.				to Sign		100				-			-		
and rem inder at 50° .  Medium F.M.G. at FPH 5.0. 4/1 0.0 6.8 66 0.5 77 1 6.8 77  Incubate 1 21-25° 5 for 10 keys 1/4 0.0 6.8 66 0.5 79 47 6.8 77  Counts: iii. 1/100,000 28 0.0 70 61 1.1 77 63 70 6.5  One complete place place 27 0.0 70 38 6.5 6.5 76 70 6.6  Into yeast 1 timus mi k. Incubate 1 30° C. Fran 5- 17 0.0 72 93 6.5 6.5 58 70 6.8  for titritia. Incubate 3 00 7.7 8 6.5 6.5 58 70 6.8  for titritia. Incubate 3 0.0 7.7 8 6.5 8.9 83 70 70  11 00 77 31 6.8 6.8 90 70 70  11 00 77 31 6.8 6.8 91 70 70  11 00 77 31 6.8 6.8 91 70 70  11 00 77 57 6.8 6.8 85 72 6.8  37 0.0 8.1 64 6.8 6.8 91 70 70  42 0.0 77 57 6.8 6.8 84 72 72  40 0.0 8.3 73 6.8 6.8 84 72 72  40 0.0 8.3 73 6.8 6.8 84 72 72  40 0.0 8.3 77 6.8 6.8 84 72 72  40 0.0 8.3 77 6.8 6.8 84 72 72  40 0.0 8.3 77 6.8 6.8 70 96 72 8.1  70 0.0 8.6 37 6.8 70 96 72 8.1  71 0.0 8.1 64 6.8 70 96 72 8.1  71 0.0 8.3 77 6.8 6.8 84 72 72  80 0.0 8.3 77 6.8 6.8 84 72 72  80 0.0 8.3 77 6.8 8.8 84 72 72  80 0.0 8.3 77 6.8 8.8 84 72 72  80 0.0 8.6 77 6.8 70 97 77  80 0.0 8.6 77 6.8 70 97 77  80 0.0 8.7 70 6.8 70 97 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77  80 0.0 8.7 70 6.8 72 76 79 77	V rames	Ripered	14_ d	ays	2t_6	5°F.	18	0.0	6.5		26	0.5	7.7	1	89	6.8	7.4	
Counts:		and rema	inde	r at	50°	₽.		1. 1. 1.1				Planting a dame	-					-
Counts:		Medium_P	.M.G	·_e.t	PH_	6.0	47	0.0	6.5		27	0.5	7.7		. 1	6.8	77	
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One complete to plake to plake 29 00 70 38 6.6 6.5 76 70 6.5 into yeast 15 timus milk. Incubated 30 °C. Frans- 17 0.0 72 93 6.5 6.5 58 70 6.8 for milk and yeast milk 34 0.0 72 4 6.6 6.8 67 70 6.8 for thir fig Incubated 30 °C. Frans- 17 0.0 72 32 6.5 6.5 58 70 6.8 for thir fig Incubated 43 0.0 72 4 6.6 6.8 67 70 6.8 for thir fig Incubated 43 0.0 72 32 6.6 70 62 70 70 70 70 84 23°C for 4 days. 43 0.0 77 8 6.5 6.8 9.8 83 70 70 70 70 70 70 70 70 70 70 70 70 70							14	0.0	6.8		66	0.5	7.9		47	6.8	7.7	
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Into yeast Ittms milk. Incubated 30 Co. Frans- ferred to 10 co tubes of milk and yeast milk  34 0.0 72 4 6.5 6.8 67 70 6.8  For titritian. Incubated at 23°C for 14 days.  6 0.0 7.7 8 6.5 9.8 83 70 70  11 0.0 77 31 6.8 6.8 91 70 70  37 0.0 77 36 6.8 6.8 91 70 70  42 0.0 77 57 6.8 6.8 85 72 6.8  37 0.0 8.1 64 6.8 6.9 60 7.2 70  15 0.0 8.3 73 6.8 6.8 94 72 72  40 0.0 8.3 77 6.8 6.8 84 72 72  2 0.0 86 13 68 70 96 72 8.1  7 0.0 8.6 39 6.8 70 94 74 72  12 0.2 0.5 79 6.8 70 9 77 72  69 0.2 8.6 49 6.8 72 95 77 77  51 0.5 1.8 71 6.8 72 75 77  8 6.8 72 72  8 70 6.8 72 75 77  8 70 6.8 72 75 77  8 70 6.8 72 75 77  8 70 70 70 70 70  8 70 70 70 70  8 70 70 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70 70  8 70		One comp	le te	กไล	te n	oke d	20	00	~-	1		1						
Incubate   30 °C. Frans-   17   0.0   72   93   6.5   6.5   55   7.0   6.8   ferred to 10 ce tubes of milk   34   0.0   72   4   6.6   6.8   6.7   70   6.8   for milk and yeast milk   34   0.0   72   32   6.5   70   62   70   70   at 23°C for   4 days.   43   0.0   72   32   6.5   70   62   70   70      11   0.0   77   31   6.8   6.8   90   70   70     11   0.0   77   36   6.8   6.8   91   70   70     42   0.0   77   57   6.8   6.8   85   72   6.8     37   0.0   8.1   64   6.8   6.8   85   72   72     40   0.0   8.3   73   6.8   6.8   84   72   72     40   0.0   8.3   77   6.8   6.8   84   72   72     2   0.0   8.6   13   6.8   70   96   72   8.1     7   0.0   8.6   59   6.8   70   96   72   8.3     48   0.2   8.1   92   6.8   70   9   77   72     69   0.2   8.6   49   6.8   72   72   75   79     24   0.5   4.7   80   6.8   7.2   35   8.1   8.1     87   0.5   5.2   81   6.8   7.2   35   8.1   8.1	-	into year	3t-1	tmu	s mi	Lk.	21	0.0	7.0		58	6.5	6.5	1	76	7.0	6.5	. 2
Served to 10   Sec tubes   77   Sec 5   Sec		Incubate	1 30	PC.	Fran	s- 1	17	1.0	722	ŀ	0-							1 1.2
of milk and peast milk for titritical. Incubated at 23°0 for 14 days.  6 00 77 8 6.5 8.8 83 70 70  11 0.0 77 31 6.8 6.8 90 7.0 70  39 0.0 77 36 6.8 6.8 91 70 70  42 0.0 77 57 6.8 6.8 85 72 6.8  37 0.0 8.1 64 6.8 6.8 60 7.2 70  15 0.0 8.3 73 6.8 6.8 84 72 72 72  40 0.0 8.3 77 6.8 6.8 84 72 72  2 0.0 86 13 68 70 96 72 8.1  7 0.0 8.6 39 6.8 70 94 74 72  12 0.2 0.5 79 6.8 70 6.8 70 97 72  48 0.2 8.1 92 6.8 70 9 77 72  69 0.2 8.6 49 6.8 72 95 77 77  51 0.5 1.8 71 6.8 72 76 79 77  24 0.5 4.7 80 6.9 72  31 6.8 7.2 36 8.1 8.1		ferred to	0.10	CC	n he	s		0,0	1.2		73	6.5	6.5		58	7.0	6.8	2
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at 23°C for 14 days.		for titra	tri o	- T	2011 br	ted	37	2.0	· · · · ·			6.5	6.8	-	6/	7.0	6.8	
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39       0.0       27       36       6.8       6.8       91       70       70         42       0.0       27       57       6.8       6.8       85       72       6.8         37       0.0       8.1       64       6.8       6.8       60       72       70         15       0.0       8.3       73       6.8       6.8       72       72       72         40       0.0       8.3       77       6.8       6.8       84       72       72       72         2       0.0       8.6       13       6.8       70       96       72       8.1         7       0.0       8.6       59       6.8       70       94       74       72         12       0.2       0.6       79       6.8       70       68       74       74         50       0.2       72       88       6.8       70       9       77       72         69       0.2       8.6       49       6.8       72       95       77       77         51       0.5       1.8       71       6.8       72       75       79       77						5,31	11	00	7.7		31	6.8	6.8	1.	90	7.0	70	
42       0.0       77       57       6.8       6.8       85       72       6.8         37       0.0       8.1       64       6.8       6.8       60       72       70         15       0.0       8.3       73       6.8       6.8       72       72       72         40       0.0       8.3       77       6.8       6.8       84       72       72         2       0.0       8.6       13       6.8       70       96       72       8.1         7       0.0       8.6       39       6.8       70       94       74       72         12       0.2       0.5       79       6.8       70       68       74       74         50       0.2       72       88       6.8       70       97       77       72         69       0.2       8.6       49       6.8       72       95       77       77         51       0.5       1.8       71       6.8       72       75       79       77         24       0.5       4.7       80       6.8       72       75       79       77	, F										1				1-1-			
42       0.0       27       57       6.8       6.8       85       72       6.8         37       0.0       8.1       64       6.8       6.8       60       72       70         15       0.0       8.3       73       6.8       6.8       72       72       72         40       0.0       8.3       77       6.8       6.8       84       72       72         2       0.0       8.6       13       6.8       70       96       72       8.1         7       0.0       8.6       39       6.8       70       94       74       72         12       0.2       0.5       79       6.8       70       94       74       72         12       0.2       2.5       79       6.8       70       30       74       8.3         48       0.2       8.1       92       6.8       70       97       77       72         69       0.2       8.6       49       6.8       72       95       77       77         51       0.5       1.8       71       6.8       72       75       79       77 <t< td=""><td></td><td></td><td></td><td></td><td>  </td><td></td><td>39</td><td>0.0</td><td>77</td><td></td><td>36</td><td>6.8</td><td>6.8</td><td>ļ. · ·</td><td>91</td><td>7.0</td><td>7.0</td><td></td></t<>							39	0.0	77		36	6.8	6.8	ļ. · ·	91	7.0	7.0	
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ن انت	Exemine (	1-29/	12/	30.		16	0.0	0.2		76	6.5	6.5		42	6.8	7.0	900	54	7.2	7.7						11(1)			
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Characterist of					WD.	40	0.0	3.4		161	0.2	3.6		31	0.5	3.2		135	0.5	5.4		89	6.8	7.2			1	-	
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à plate	pick	ed i			261-	64	0.0	-			-		1. 1	30	0,0	3.4		144	0.5	5.4		92	6.8	7.2					
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incubeto Trenere:	1007	1114 4 7	7.7	,		9	0.0	3.6		34	0.2	3.8		54	0.5	3.4		156	0.5	5.4		47	7.0	7.0				1	100
tuben of	Clm13	lt nn	d 12	200	et	21	0.0	3.6		50	0.2	3.8		149							-		100	-		-	<del> </del>	-	
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		-			ув.	00	0.0	3.6		72	0.2	3.8		119	0.5	3.6		36	0.5	6.9									
			-			67	0.0	3.6		117	0.2	3.8		126	0.5	3.6		141	0-5	5.9									
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