

EVIDENCE OF THE NECESSITY FOR A BACTERIOLOGICAL STANDARD FOR GRADE "A" MILK.

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THE following paper contains a discussion of the results of the bacteriological examinations of samples of Grade "A" milk from two farms numbered V and VI.

At present two varieties of milk may be produced and sold under license, viz. Grade "A" and Grade "A" (Certified) milk.

It may be of advantage to indicate at the outset the main points relating to the production and distribution of these two types of milk.

CONDITIONS OF LICENSE.

Both Grade "A" and Grade "A" (Certified) milk must be derived from cows which have been certified by a qualified veterinary surgeon to have passed the tuberculin test.

Before a license can be granted, the farmer (or dealer) must satisfy an inspector that he is in possession of the necessary buildings and equipment, and employs the methods in the production and handling of the milk which are laid down in the score card issued by the Ministry of Health.

These requirements are briefly that the buildings must be so constructed or adapted that it is possible to keep the animals clean—that they are provided with adequate natural and artificial light, that the ventilation, air space and drainage are good—that there are facilities for cooling the milk, washing the cows and sheds, and for cleaning and sterilizing the dairy utensils.

A maximum score of five hundred points is obtainable and no license can be granted unless a minimum of three hundred points, of which two hundred and fifty must be for methods, is obtained.

In the above respects the regulations governing the production of Grade "A" and Grade "A" (Certified) milk are almost identical.

Grade "A" (Certified) milk must, however, be despatched from the farm in sealed bottles which have been sterilized by steam. On the other hand Grade "A" milk may be delivered to the wholesaler or retailer in churns or any sealed vessel.

Further, Grade "A" (Certified) milk is subject to official bacteriological examination and must not contain more than 30,000 colonies of bacteria per

1 cubic centimetre or *B. coli* in each of two tubes of 1/10 c.c. at any time within 48 hours of the time of production.

There is at present no bacteriological standard for Grade "A" milk. It will be shown in this paper that there is a real need for such a standard.

METHOD OF TAKING THE SAMPLES AT THE FARM.

The samples collected at Farms V and VI were taken from the churns immediately after the milk had passed over the cooler by means of sterile dippers and poured into sterile bottles. They were taken to the laboratory and tested bacteriologically within one to two hours of milking.

The bacteriological counts obtained from them may therefore be taken as representative of the condition of the milk as it left the farms.

BACTERIOLOGICAL CONDITION OF THE MILK BEFORE DESPATCH FROM FARMS V AND VI.

The results of these examinations are shown in Table I.

Table I.

No. of colonies per 1 c.c.	Farm V		Farm VI	
	No. of samples	No. of occasions when lactose fermenting organisms occurred	No. of samples	No. of occasions when lactose fermenting organisms occurred
1,000 or less	13	2	0	0
5,000 "	33	4	9	1
10,000 "	11	2	7	3
30,000 "	10	1	27	8
Over 30,000	5	1	32	29
	72	10	75	41

In the case of Farm V 72 samples were examined between 4. v. 20 and 18. xi. 21 and in that of Farm VI 75 samples were examined during the same period.

If 30,000 colonies of bacteria per 1 c.c. be adopted arbitrarily as a standard, it is seen that there is a marked difference in the general bacteriological quality of the milk from the two farms.

On five occasions out of 72, or 7% in the case of Farm V, the counts exceeded 30,000 per 1 c.c. as compared with 32 out of 75, or 42½% in the case of Farm VI.

A consideration of the number of occasions when lactose fermenting organisms were found shows that, whereas the samples from Farm V gave positive results on 10 occasions, or 14%, those from Farm VI gave positive results in 41, or 54.6% of examinations.

It is interesting to compare the bacteriological condition of this milk with Grade "A" (Certified) milk of much greater age.

COMPARISON OF GRADE "A" MILK (1-2 HOURS OLD) WITH
GRADE "A" (CERTIFIED) MILK (18-22½ HOURS OLD).

Table II gives a comparison of the results of the bacteriological examinations of samples from Farms V and VI with those of samples from two Grade "A" (Certified) Farms I and IV.

Table II.

Period of examination	Farm V 4. v. 20—18. xi. 21		Farm VI 4. v. 20—18. xi. 21		Farm IV 27. ii. 20—23. ix. 21		Farm I 28. xi. 16—30. v. 18		
	No. of colonies per 1 cc.	No. of samples	No. of samples	No. of occasions when lactose fermenting organisms found	No. of samples	No. of occasions when lactose fermenting organisms found	No. of samples	No. of occasions when lactose fermenting organisms found	
1,000 or less	13	2	0	0	31	3	52	4	
5,000 "	33	4	9	1	29	9	15	1	
10,000 "	11	2	7	3	2	2	4	2	
30,000 "	10	1	27	8	4	1	—	—	
Over 30,000	5	1	32	29	7	2	2	1	
Total		72	10	75	41	73	17	73	8

Seventy-three samples were examined from each of the two last farms. Those from Farm I between 28. xi. 16 and 30. v. 18 and from Farm IV between 27. ii. 20 and 23. ix. 21. In both cases the age of the milk varied from 18-22½ hours, and the temperature at the time of examination from 38° F.-76° F.

Two counts out of 73 or 2.7 % in the case of Farm I exceeded 30,000 per 1 c.c. In that of Farm IV the percentage of counts in excess of this figure was 9.6 %.

If, as in Table III, the figures for Farms V and VI be combined and compared with the combined figures for Farms I and IV it is seen that the standard of 30,000 per 1 c.c. was exceeded in the former case on 37 occasions out of 147, or 25 % as compared with nine occasions out of 146, or 6 %, in the latter case.

Table III.

Farms	Total No. of samples	No. over 30,000	Percentage over 30,000	No. of occasions when lactose fermenting organisms were found	Percentage of occasions when lactose fermenting organisms were found
V and VI	147	37	25	51	34.7
I „ IV	146	9	6	25	17

Lactose fermenting organisms were present on 51, or 34.7 % of occasions in the case of the milk from Grade "A" farms in comparison with 25, or 17 %, in that from the Grade "A" (Certified) farms.

It would appear, therefore, that the bacteriological quality of the milk from the Grade "A" farms at an age of only 1-2 hours did not in any way approach that of milk from Grade "A" (Certified) farms which was from 18-22½ hours old at the time of examination and had been subject to wide fluctuations in temperature whilst travelling to the laboratory in bottles by rail.

CONCLUSIONS.

The results demonstrate that Farms V and VI were producing milk of very different types, although both were working under the same system of licensing. In neither case did the results compare with those obtained on Grade "A" (Certified) farms. Similar results have been found to occur on Grade "A" (Certified) farms when they first undertook the production of this type of milk. They are due to the fact that the workers on the farms have to be trained in the methods which are necessary for success. The Grade "A" (Certified) farms have in the past been few in number and have been under the control of those who are very anxious to produce a satisfactory result. These facts, coupled with the fact that there is an official bacteriological standard to which the milk must attain, have made it possible to secure efficiency as time went on.

There is no official bacteriological standard for Grade "A" milk; that stimulus to better production is therefore lacking, and should be provided.

In view of the difficulty which is sometimes found in bringing the standard of labour on a farm up to the required level, we feel that evidence that milk of the required standard of cleanliness is being produced should be made a condition of licensing. If this be not done there is a danger that milk which is not of the necessary cleanliness may be sold as Grade "A." In that case the consumer may find that the keeping qualities of this milk are no better than those of the milk which had been previously purchased. If this occurs grave harm may be done to the milk industry, which is endeavouring to supply the public with a milk of uniform quality. It is, therefore, in the interests of the milk industry that such a standard as has been suggested shall be set up for Grade "A" milk.