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THE USE OF CHLORINE SOLUTION IN CLEAN MILK PRODUCTION

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With the increased demand for dairy products and for improvement in their quality, it becomes more necessary that greater emphasis be placed upon sanitation at the very beginning of the milking procedure.

Market milk producers generally recognize and practice sanitary measures and these practices should be more widely used by other classes of producers.

The germicidal value of chlorine is recognized by health authorities and its use as a sterilizing agent has gradually increased in milk and dairy manufacturing plants and in the sterilizing of dairy equipment on farms. However, it is not generally used by dairyman in the udder wash water and in water used in rinsing teat cups between the milking of individual cows.

The use of chlorine in the udder wash water and in milking machine teat cup rinse water between the milking of each cow are sanitary measures that will help to control mastitis as well as aiding to produce clean milk. Contamination of milk begins with the milking process. Sanitary measures should begin with the milking process.

An experiment was conducted at Oregon State College to determine the value of chlorine in the udder wash water and the teat cup rinse water.

The number of bacteria in 490 samples of udder wash water was reduced an average of 93.8 percent when the wash water had a chlorine strength of 150 parts per million at the start of the washing and was used until reduced to 50 parts per million.

The number of bacteria in teat cup rinse water was reduced 42.7 percent when chlorine was used in the water.

The number of bacteria in the milk produced when chlorine was used in the udder wash water and in the teat cup rinse water was 34.2 percent less than when no chlorine was used. The milk was produced under Grade A sanitary conditions.

The amount of chlorine in the wash water decreases rapidly with the addition of organic matter. When the udders are very dirty the washing of one or two

cows may reduce the chlorine content 50 parts per million. The use of two buckets of wash water with 6 or 8 pieces of outing flannel cloth is a very good practice. The cloths, about 8 by 14 inches, are all placed in one bucket. One cloth, or as many as are needed, is used to wash each cow. The cloth is then placed in the second bucket. When all cloths are used they are rinsed in the second bucket and used one at a time, putting each used cloth back into the first bucket. This procedure allows the cloths time to sterilize between each use.

The use of individual cloths for each cow is desirable but sometimes not practical with large herds. The use of the two bucket system outlined is the next best procedure. The use of chlorine wash water, individual cloths and teat cup rinse water will aid materially in preventing and controlling mastitis and in producing a low bacterial-count milk.

The teat cup rinse water should be kept above 250 parts per million of chlorine for effective use. Three gallons of solution made up to contain 400 parts per million chlorine will usually serve for the milking of 36 cows. Milk rinsed into the chlorine solution will reduce the amount of available chlorine.

Paper towels were tried in the place of cloths. Yellow paper towels very rapidly destroyed chlorine value. They were more expensive than cloth. A minimum of two towels was required for each cow. Paper towels tended to fuzz off with the rubbing required to properly clean the udder. White towels destroyed some of the chlorine value but not as rapidly as yellow towels. The paper towels used were not as satisfactory as cloth.

Recommended Practices

1. Use chlorine in the udder wash water and milking machine teat cup rinse water.
2. Two and one-half gallons of warm water made up to 250 parts per million of chlorine will under average conditions wash about 15 cows before lowering to 50 parts per million or less chlorine.
3. The use of individual wash cloths about 8 by 14 inches is desirable.
4. The use of two wash buckets allowing cloths time to sterilize is a good practice.
5. Cloth used with the two-bucket method is preferable to the use of paper towels.
6. Milking machine teat cups should be rinsed before the milking of each cow by immersing cups in chlorine solution.
7. Teat cup rinse water should have not less than 250 parts per million of chlorine. Three gallons of water with 400 parts per million of chlorine will usually do for 36 cows.
8. Wash cloths thoroughly between milkings.

SUMMARY

Farm families of Oregon are striving to achieve a record in food production. To accomplish this goal in the face of less labor and less machinery, every ounce of energy will count. Energy and efficiency depend upon food.

One of the best sources of food for farm people is from the home farm itself. Farmers in the Willamette Valley of Oregon, as shown by this study have gone a long way toward supplying their own food from their own farms. It must be remembered, however, that usually farmers buy additional food in town and for this reason the figures given in this report represent only the foundation of their diets, - the food which the farmer himself produces for home consumption on the farm.

The results show, in summary, the following significant facts:

1. The 333 Willamette Valley farms studied in 1938 included 1,248 individuals, an average of 3.7 persons per household. Fifty percent of the total individuals were located on farms having over 4 persons, whereas 13 percent were on farms having 2 or less persons per household.
2. The average value at farm prices, of farm privileges (food produced on the farm and consumed by the farm family; cordwood used as fuel; and an estimated value for house rent) on the 333 farms was \$370. The value of food eaten per family amounted to \$193, while the average value of the food consumed per person was \$52. If this food had been purchased in town at retail prices it probably would have cost two or three times as much.
3. The typical farm family in the Willamette Valley produces for home use more milk and eggs than are recommended for a "liberal" diet. It is estimated that the amount of fruit and vegetables supplied by the farm is almost equal to that contained in a moderate-cost adequate diet. The pounds of farm-produced meat nearly fulfill the allowance suggested for the low-cost adequate diet. The butter supplied appears to be under the suggested allowance.
4. The larger families have less farm-produced food available per person than do the smaller families.
5. The average value of all farm dwellings in the study, as estimated by the farmers, was \$1,344. Fourteen percent of the 333 homes had furnace heat, and 69 percent were lighted by electricity. One hundred and sixty-two of the 333 farms or 49 percent had bathroom facilities. The average distance of the farm to the power line was one-half mile.
6. The larger families have more home conveniences per farming unit than do the smaller families.

CONCLUSIONS

It appears that the milk and egg recommendations for a liberal diet are being adequately met through farm production here in the Willamette Valley. Apparently farm-produced fruit and vegetables, in so far as total poundage is concerned, more than meet the standards set up for low-cost adequate diets, are almost equal to the moderate-cost diet allowance, but fall short of the liberal diet recommendation. The study does not reveal whether the varieties grown are the most desirable from the nutritional standpoint. It would appear from the results of the study that an increase in fruit and vegetable production for home consumption is desirable.

The farm-produced meat falls short of the moderate and liberal-cost diet recommendations, - the average family in the Valley producing for home consumption only 92 percent of the meat needed for a low-cost adequate diet. However, the abundance of milk and eggs offsets to a considerable extent a possible protein deficiency. The excess milk and eggs, when converted into meat protein, adds an equivalent of 45 pounds of meat to the average diet. This increases the quantity of "meat" available to 128 pounds, which is 142 percent of the low-cost adequate diet recommendation, and 83 percent of the moderate-cost diet. It is probable that additional meat is purchased by farm families, but it is suggested that farmers consider increasing the consumption of farm-produced meat, since meat produced on the farm is only half as much of an expense as meat purchased at retail prices.^{1/}

The data also indicate that there is a special need for large families to increase the production of foodstuffs, and to utilize efficiently the products which are already available. Possibly through participation of the children in individual garden plots, and care of a few units of livestock this increase in food could be accomplished with little added expense to the family.

Effective methods of storing and preserving farm products is an economy measure. During the summer fruits and vegetables may be abundant, and the excess should be canned or stored for use in the winter when such foods are at a premium.

It is suggested that meats also be stored during seasons when an excess is available. Canning, curing or a freezing locker may be satisfactorily used to preserve meats.

It is upon the farmers' shoulders that the adequate feeding of a nation depends, and this challenge is being met by their attempt to meet goals involving increases in the production of such products as milk, eggs, beef, hogs, etc. Along with this increased production, a wise suggestion might be for the farm families to also increase the amount of food available for home consumption so that an adequate diet for themselves be assured.

^{1/} "What the Farm Should Contribute Toward Family Living," Bulletin No. 163, Agricultural Experiment Station, Pullman, Washington, September 1941.