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CHEESE MAKING IN THE HOME

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Save the Milk

MILK CONTAINS many valuable food elements that are not so abundantly and freely available in any other article of diet commonly used in the home. Upon these elements, health and bodily growth, in some mysterious, but unmistakable way, depend. The matter of conserving milk, therefore, by its conversion into cheese, is more than a mere matter of the time and convenience of cheese making. It is a matter of saving these food values, either for use in one's own home or in a form for sale.

As this bulletin says, better cheese can be made in the factory than in the home. Many homes are, however, far from factories, so that cheese making must be done at home if the milk is to be saved by this method.

Whether near to a cheese factory or far from it, no one should waste, thoughtlessly, a pint of milk. Much should be consumed in the diet, and the remainder used in some other way.

For many important suggestions contained in this bulletin, Mr. Cammack, the writer, acknowledges his debt to H. R. Lochry, dairy manufacturing specialist of the Western Dairy Division, United States Department of Agriculture.

CHEESE MAKING IN THE HOME

By F. R. CAMMACK
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INASMUCH as there are localities in Idaho at inconvenient distances from good markets, in which considerable quantities of milk are produced, and from which it is difficult to get the butterfat to market, it is thought perhaps much food might be conserved if the milk could be made into cheese in the homes. On account of such conditions, these instructions are prepared.

In many parts of the state it is possible to sell the milk to cheese factories; where this is possible, it should be done, by all means, and no attempt made at home manufacture. Cheese equal to factory-made cheese, in quality or cheapness, cannot be made in the home. But if good milk is used and the instructions are followed carefully, a good quality cheese can be made.

APPARATUS REQUIRED

1. Milk Vessel—A good vat, one that can be kept clean and sweet and that is large enough to hold whatever milk is to be used at one time, is a necessity. There are small vats sold by the creamery supply companies that are very good. Where small quantities of milk are to be made up, utensils usually found around the home can be used. Vessels that are very well adapted are a metal wash boiler, wash tub or any other large vessel in which the milk can be heated. These will answer the purpose very well.

2. Thermometer—If the best results are to be obtained, a thermometer of some kind is necessary. A floating dairy thermometer is the most convenient and is very inexpensive, altho any thermometer will answer the purpose if it will register temperatures between 50 and 120 degrees Fahrenheit.

3. Knives—Some kind of contrivance for cutting the curd is necessary. Regular curd knives come in pairs, one with a number of vertical blades, the other with horizontal blades. If a curd knife is not available, a piece of galvanized woven wire netting, about 6 by 15 inches, with a half-inch mesh, can be used. Draw it first lengthwise of the vat and then cross-

wise, cutting the curd into half-inch cubes. A long, thin-bladed knife may be used, cutting the curd lengthwise and then crosswise, making strips out of the curd about a half-inch thick, extending from the top to the bottom of the vessel. Now slant the knife at an angle of about 45 degrees and cut the curd lengthwise of the vessel a few times. This procedure will not produce cutting as uniform as the wire netting or the regular cheese or curd knives will make.

4. Measuring Cup—Some kind of measuring cup is needed. An ordinary measuring glass, graduated into ounces, is all right and can be secured at any photo supply shop.

5. Cheese Hoops or Molds—Some kind of mold or hoop for giving shape to the cheese and containing the cheese while being pressed, is needed. A square print can be secured from the supply houses that will make a five-pound cheese when filled and pressed. This is a very convenient form when it comes to cutting and serving the cheese. If no commercial hoop or mold is at hand, a syrup or lard pail, if the sides are straight, will make a very good mold. Cut the rim off the top and punch the bottom and sides full of holes, so the whey will be able to get away. (Always punch the holes outward, keeping the inside surface smooth.) A wooden follower must be made that will exactly fit inside of the pail.

6. Press—Some means of applying pressure must be devised. Lard, fruit or cider presses can be used very easily. A home-made press can be contrived by thrusting one end of a long plank under a cleat or support, so that the free end may serve as a weight, to which can be added a bucket of water or other substance to get the pressure needed. An automobile jack has served the purpose in many cases very well.

7. Cheese Bandage—The cheese should be protected by a bandage made of cheese cloth or some other kind of cloth that is not too heavy. If the cloth used is too heavy, there will be trouble experienced in getting it to stick well to the cheese. The bandage should be made so it will fit close on the inside of the mold or hoop. It should be long enough that it will reach over the top and bottom of the cheese about an inch. Circular pieces should be cut large enough to cover all the cheese which the bandage on the sides does not cover. These circles are put on the top and bottom of the cheese.

8. Rennet and Color—Rennet, for coagulating the milk, can

be obtained either in liquid or tablet form, from local drug or grocery stores, or dairy supply houses. Tablets are the more convenient form, as they keep their strength longer than the liquid, under average conditions. Color is not necessary, but generally is used to give the cheese the rich yellow tint. Color also can be secured from the drug or grocery stores in either liquid or tablet form. The liquid is perhaps the more convenient to use and will keep much better than the rennet in the same form.

9. Other Equipment—A cover will be needed, made of cloth, preferably heavy duck or canvas, large enough to cover the vat used. This is very necessary to keep the heat in the vat or tub, which in turn keeps the curd from cooling off. It is very important that the temperature be not allowed to cool after it has once started to go up, as a drop in temperature of two degrees will cause the acid development to be slowed up or perhaps stopped entirely. A board will be needed, on which to set the mold while the cheese is being pressed. Several grooves should be cut in the surface to carry away the whey, which can be used for hog feed.

10. Paraffin—Paraffin, a wax used to coat the cheese after it has come out of the mold and become dry, also can be purchased at grocery stores.

METHOD OF MAKING CHEESE

For one not accustomed to making cheese, it is very hard to take a printed set of directions and make good cheese by using them. Until the maker becomes experienced by practice his success from following such directions cannot be guaranteed, but some principles and rules can be given that will be of very great assistance for one wishing to experiment and learn how to make a cheese on the farm. Such directions also will supplement information obtained at cheese-making demonstrations.

Any quantity of milk may be used, but for convenience in figuring the amount of re-agents to be employed, 100 pounds, or about 11½ gallons, will be used as a basis. If a proportionate part of this quantity is used, the same proportion of color, rennet, salt, etc., should be taken.

The night's milk should be cooled to as low a temperature as possible immediately after it is drawn, and kept cool until ready to be made into cheese. After the morning's milk has

been drawn, it should be mixed with the night's milk. It is necessary to have fresh, sweet milk but the quality of the cheese made depends on the development of acid in the cheese during the making process. Usually the development of the acidity in the night's milk is sufficient. If only morning's milk is used, it will be necessary to add three or four pounds of good, clean, sour milk or clabber (strained) to every 100 pounds of milk to be made up. This sour milk or starter may be used at all times, as it will hasten the making process very greatly. The milk always should be strained before the cheese-making process is started. The quality of milk used will affect the quality of the resulting cheese.

Heating the Milk—After all the milk to be made up is mixed, it is heated to a temperature between 86 and 88 degrees. Care must be exercised to keep the temperature from going too high, for cooling the milk at any time will tend to stop the action of the acid development and prolong the process of making the cheese. The heat may be applied by placing the vessel containing the milk on the back of the stove or, better, on an oil stove. An oil stove is preferable because the temperature can be more easily regulated, by turning the flame up or down or out if need be. After the temperature is once started upward, see that it never goes down until the process is completed.

Adding the Color—After the temperature is raised to a point between 85 and 88 degrees and the starter has been added, it is time to add the color. The amount of color to be used will depend on the time of year and the shade of color desired. If tablets are used, usually from one-fourth to one-half of one tablet is enough for 100 pounds of milk. The color should be dissolved in a little of the milk, or better a cup of lukewarm water, before it is added to the milk. After the color is added, the milk should be stirred until the color is well mixed with all the milk. If liquid color is used, the usual amount for 100 pounds of milk is about 54 drops.

Adding the Rennet—If rennet tablets are used, dissolve one tablet in a cup of *cold* water, for each 100 pounds of milk, and stir it well into the milk. It is well to stir the milk for three or four minutes (not longer) after the rennet is added to keep the cream from separating out and being lost in the whey. If liquid rennet is used, dilute 2-5 of an ounce in 20 times as much

cold water before it is added to the milk. The stirring should be done the same for either kind of rennet used. After rennet is stirred in, cover the vessel containing the milk to keep it from cooling. This is important. Make a note of the exact time the rennet is added and then watch the milk closely and when it starts to thicken, make a note of the time. Multiply the number of minutes it took the milk to start to thicken by $2\frac{1}{2}$ and it will give approximately the time from the adding of the rennet until the curd will be ready to cut. For example:

Rennet added to milk at.....9:30 A. M.
Thickening began9:45 A. M.

Minutes it took to begin, 15; 15×2.5 equals 37.5 minutes, until time it should be ready to cut, or it should be ready to cut at about 10:15 o'clock. It is always best to let the curd stand about five minutes longer than seems necessary.

Cutting the Curd—One of the best ways to tell when curd is ready to cut is to insert the thermometer at an angle of about 45 degrees and gently raise it. If the curd breaks clean ahead of the thermometer, it is ready to cut. This test usually is made by using the finger instead of the thermometer but the new method is found to be much more satisfactory. Another method is to lay the back of the hand gently on the curd near the side of the vat and gently try to draw the curd away from the vat. If it comes away from the vat clean it is ready to cut. If the woven wire netting is used, draw it thru the milk lengthwise and then crosswise. This will serve to break the curd up and start the whey to coming from the curd. If the knife is used, cut the curd lengthwise and then crosswise, cutting it into strips about half an inch wide. Now cut it both ways, holding the knife at an angle of about 45 degrees. This will cut the curd into small pieces of fairly uniform size.

Cooking the Curd—After the curd has been cut, it must be kept stirred to keep it from collecting into large lumps or masses in the bottom of the vessel. This stirring must be done very gently at first, to keep from breaking the pieces up finer and thus losing much of the butterfat. The stirring can be done best with the hands. After the curd has been stirred for 5 or 10 minutes, heating may be started. The heat should be applied very slowly at first. After the first 10 minutes of heating, the heat may be applied faster, so that 30 or 40 minutes

will be taken to bring the temperature to 104 degrees. After the first 15 minutes, the stirring may be more vigorous, a large spoon or paddle being used if desired, but need not be more than sufficient to keep the curd from matting in the bottom of the vat. The exact time for raising the temperature cannot be given, since that depends on the condition of the milk. If the milk is of good quality, it should take at least 30 minutes. One of the most important things to watch in this step is to see that the temperature does not get too high and also that it is kept at 104 degrees. Cooling of the cheese after the temperature is once raised has a decidedly bad effect on the production of the acid that the cheese maker is desirous of producing. Cooling two or three degrees will stop this acid production and it may be several minutes before it can be started again. Keep the thermometer in the vat at all times during the cooking and if there is the least tendency for the temperature to drop, apply a little heat and keep it up. It usually takes from an hour to an hour and thirty minutes after the curd is cut until the whey is ready to be removed.

Drawing the Whey—As the cooking progresses, it will be noticed that the curd shrinks and becomes firmer. It will be noticed also that the curd seems to lose its tendency to mat and stick together. This is due to the development of acid. When the cheese maker can pick up a handful of the curd and after applying pressure for a moment and then releasing the curd, find that it comes apart readily, it is ready for the whey to be removed. Remove the whey as quickly as possible, and pile the curd up in one side of the vat. Pile it as deep as possible, up to about five or six inches. Keep the vat covered now, so that the curd will not cool, for the acid still is developing, and it is *very important* that the temperature be kept up to the cooking temperature until the curd is almost ready to go into the press.

Matting the Curd—After the whey has been drawn and the curd is piled in one end of the vat or boiler, raise the end of the vessel containing the curd so the whey still running out will go to the other end. After 10 or 15 minutes cut the curd in strips about four inches wide and turn them over. This will assist the extraction of the whey that remains. This turning should be done about every 15 minutes. Be sure that the temperature is kept up. Keep the thermometer sticking in the curd and if the temperature tends to drop, apply a little heat to the low

end of the vat, keeping the cover on it. This will raise the temperature of the air in the boiler and keep the curd from cooling.

Milling the Curd—When the curd has become smooth and, when chewed, has a little squeak, it is ready to be milled, or cut into little cubes again. The cover now can be removed from the vat, and all heat removed. Take the knife and cut the curd into small pieces—about $\frac{1}{2}$ -inch cubes. Spread them out well, so they will cool.

At this point, another method may be employed—namely, the stirred curd method—which will save time, but the resulting cheese often will not develop as satisfactorily. Under this method, instead of matting the curd, one keeps it in the whey for about 15 minutes longer and then the whey is drawn and the curd salted, pressed, etc., in the usual way. Altho this method has been followed successfully, the longer method is recommended for the best results.

Salting the Curd—When the temperature of the curd has dropped to near 90 degrees, it is ready to receive the salt. For 100 pounds of milk, use about nine ounces of salt. About half of the salt should be spread evenly over the curd and then the curd well stirred and the rest of the salt added and the curd stirred again.

Pressing the Curd—After all the salt is dissolved and the curd is free from grittiness and the temperature has dropped to near 85, it is ready to be pressed. The mold or hoop should be lined with the cheese cloth or muslin, then the circular cloth should be placed in the bottom, then the curd placed in the mold. The pressure should be applied gradually in order to get the curd into a solid cake. If the pressure is applied too rapidly, it is likely to press out the fat, which will be lost. After the cheese has been in the press for an hour or so, it should be taken out and the bandage pulled up and made smooth. Then the cheese should be put back into the press and considerable pressure applied. The cheese should be left in the press at least 24 hours, and 48 will be all the better. After 24 or 48 hours the cheese is taken out of the press and placed in a cool, dry place and left for several days.

Paraffining the Cheese—After the bandage has become thoroly dry, usually in not less than four days, the cheese is ready to receive a coat of paraffin. This may best be applied

by dipping the cheese in hot paraffin (220 degrees Fahrenheit) or if it is not convenient to dip the cheese the paraffin may be heated in a small receptacle and then poured over the surface of the cheese. The paraffin tends to keep down the mold and also to keep the cheese from cracking and drying out. Butter or lard might be used, as they were in the early days of cheese-making, but paraffin is much more satisfactory. It is quite necessary that the paraffin be very hot or it is likely to scale off when it becomes cold. Paraffining the cheese before it is thoroly dry will also cause it to scale off.

Curing the Cheese—By curing the cheese is meant ripening or mellowing the cheese so it becomes more easily digestible. This should be done in a room where the temperature is between 60 and 70 degrees, and as constant as possible. A basement or cellar is satisfactory, if not too damp. A good circulation of air in the room is very desirable, as this will help to keep down the molds. The cheese also should be turned about twice a week. Usually a period of from one to six months is required for curing the cheese. If the cheese is properly made, it should improve until it is six to nine months old, but it may be eaten at any time.

REFERENCES

For persons interested enough in farm cheese-making to want to buy a reference book, one of the following books is recommended:

The Science and Practice of Cheese Making, by Van Slyke and Publow.

Cheese Making, by Decker.

There are also bulletins published by the several experiment stations and the United States Department of Agriculture. If these bulletins are in print, they can be secured by writing to the experiment stations or the United States Department of Agriculture.

Bulletins marked thus (*) are available at the Extension Division, State House, Boise, Idaho.

- Farm Dairy Cheese*.....Minn. Special Bul. 12
Directions for Making Cottage Cheese on the Farm.....
Mass. Extension Cir. 55
 **Neufchatel and Cream Cheese: Farm Manufacture*.....
Farmers' Bul. (U. S.) 960

- **Cheese and Its Economical Use in the Diet*.....
Farmers' Bul. (U. S.) 487
- **How to Make Cottage Cheese on the Farm*.....
Farmers' Bul. (U. S.) 850
- Cheese Making on the Farm*.....Farmers' Bul. (U. S.) 166
- **Marketing Cheese by Parcels Post*....Farmers' Bul. (U. S.) 930
- Organization and Construction of Cheese Factories*.....
Wis. Bulletin 244
- Organization and Construction of Cheese Factories*.....
Montana Bulletin 53

Other bulletins available on dairying at the University Extension Division, State House, Boise, Idaho, are:

Dairy Production

- No. 748 A Simple Steam Sterilizer for Dairy Farm Utensils.
 No. 976 Cooling Milk and Cream on the Farm.
 No. 642 Four Essential Factors in the Production of Milk of Low Bacterial Content.
 No. 623 Ice Houses and the Use of Ice on the Dairy Farm.
 No. 790 Contagious Abortion of Cattle.
 No. 578 Making and Feeding Silage.
 No. 743 Feeding Dairy Cows.
 No. 689 Plan for Small Dairy House.
 No. 602 Production of Clean Milk.
 No. 1019 Straining Milk
 No. 855 Homemade Silos.
 No. 777 Feeding and Management of Dairy Calves and Young Dairy Stock.
 No. 473 Tuberculosis, the Disease in Cattle.
 Circ. 54 Tuberculosis Eradication under the Accredited Herd Plan.
 Milk Record Sheets.
 Herd Record Books.
 Dairy Score Cards.
 No. 102 Management of the Dairy Herd.
 No. 825 Pit Silos.

Dairy Marketing

- No. 690 Marketing Practices of Wisconsin and Minnesota Creameries.
 No. 639 The Market Milk Business in Detroit 1915.
 No. 456 Marketing Creamery Butter.
 Circ. 1 Suggestions for Marketing Cottage Cheese.

Miscellaneous

- Leaflet "Delicious Products of the Dairy".
 Circ. 109 Cottage Cheese Dishes.
 Circ. 743 Butterfat and Income.
 A. 1. 18 Ways to Use Cottage Cheese.
 A. 1. 22 Buttermilk—A Food Drink.
 No. 603 A Study of Share Rented Dairy Farms.
 No. 993 Cooperative Bull Associations.
 No. 926 Some Common Disinfectants.
 A. 12 Chemical Testing of Milk and Cream.
 A. 1. 17 Simple Directions for Making Cottage Cheese on the Farm.
 No. 920 Milk Goats.
 A. 1. 21 Food Value of American Cheese.
 Circ. 9 Advanced Registry Testing.

- No. 1069 Tuberculosis in Livestock.
Circ. 235 Food Values and Dairy Products.

Dairy Manufacture

- No. 876 Making Butter on the Farm.
No. 559 Accounting Records for Country Creameries.
No. 661 The Manufacture of Cottage Cheese in Creameries and Milk Plants.
No. 608 Varieties of Cheese.
AA1. 19 The Manufacture of Casein from Buttermilk or Skim-milk.