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Abstract
Cheese eating would be greatly increased in the United States if the value of this food were generally understood. Pound for pound cottage cheese, for example, contains more protein, or tissue building material, than the various meats; it contains from one-third to three-fourths as much of the energy supplying materials as meat. The value of cheese has long been recognized in Europe. While in 1913 the people of the United States ate only 3.45 lbs. of cheese per person, the people of England ate 5.19 lbs. per person. In Holland, 8.07 lbs. per person was eaten in 1911. Its use would undoubtedly increase if the economy of cheese were more generally known for some of the soft cheeses appeal especially to American taste.

Keywords
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Disciplines
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IOWA AGRICULTURAL EXPERIMENT STATION
DAIRY SECTION

Soft Cheese Making

By R. W. Brown and M. Mortensen

Cheese eating would be greatly increased in the United States if the value of this food were generally understood. Pound for pound cottage cheese, for example, contains more protein, or tissue building material, than the various meats; it contains from one-third to three-fourths as much of the energy supplying materials as meat. The value of cheese has long been recognized in Europe. While in 1913 the people of the United States ate only 3.45 lbs. of cheese per person, the people of England ate 5.19 lbs. per person. In Holland, 8.07 lbs. per person was eaten in 1911. It's use would undoubtedly increase if the economy of cheese were more generally known for some of the soft cheeses appeal especially to American taste.

The food value of cottage cheese is estimated as follows by the United States Department of Agriculture:

For supplying protein, one pound of cottage cheese equals:

<table>
<thead>
<tr>
<th>Item</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.27 lbs. surloin steak</td>
<td>1.44 lbs. smoked ham</td>
</tr>
<tr>
<td>1.09 lbs. round steak</td>
<td>1.58 lbs. loin pork chop</td>
</tr>
<tr>
<td>1.37 lbs. chuck rib beef</td>
<td>1.31 lbs. hind leg of lamb</td>
</tr>
<tr>
<td>1.52 lbs. fowl</td>
<td>1.37 lbs. breast of veal</td>
</tr>
<tr>
<td>1.46 lbs. fresh ham</td>
<td>1.37 lbs. breast of veal</td>
</tr>
</tbody>
</table>

On the basis of energy supplied, one pound of cottage cheese equals:

<table>
<thead>
<tr>
<th>Item</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 1/2 oz. sirloin steak</td>
<td>5 oz. smoked ham</td>
</tr>
<tr>
<td>11 1/4 oz. round steak</td>
<td>6 oz. loin pork chop</td>
</tr>
<tr>
<td>11 1/4 oz. chuck rib beef</td>
<td>7 1/2 oz. hind leg of lamb</td>
</tr>
<tr>
<td>10 3/4 oz. fowl</td>
<td>12 3/4 oz. breast of veal</td>
</tr>
<tr>
<td>5 1/2 oz. fresh ham</td>
<td></td>
</tr>
</tbody>
</table>

Most of the soft cheeses may be made readily, either in the home or in the dairy factory. The Iowa Agricultural Experiment Station gives herewith instructions for varieties which can be best recommended.

NEUFCHATEL CHEESE

For making Neufchatel cheese none but sweet whole milk free from odors and taints should be used. Temper the milk to 72 deg. F. and add one and a half to two ounces of good starter (fresh sour buttermilk or clean flavored clabbered whole or skim milk) to ten gallons or one to one and a half teaspoonsfuls to each gallon of milk. Rennet extract is now added at the rate of 2 to 2 1/2 cubic centimeters (about 1/2 teaspoonful) to ten gallons or 4 to 5 drops to each gallon of milk. Rennet should always be diluted 20 to 40 times in cold water before using. Mix it with the milk by gentle stirring for two or three minutes. Junket tablets may be used, in which case consider one tablet as equal to 15 to 20 drops of rennet extract. The milk should be set in pails holding about 20 pounds. At intervals of 15 to 20 minutes for 1 to 1 1/2 hours after adding the rennet the milk should be stirred gently over the surface (1 inch deep) to keep the fat from rising. The temperature should be maintained throughout the setting period. This is best done by placing the cans in a tub or vat of water at the proper temperature. The cans are covered and left standing undisturbed for 16 to 18 hours, at which time the milk should be curdled. At this time also a small amount of whey should have separated from the curd which is sour to taste.

Spread muslin draining cloths over some sort of shallow pans or mixing bowls and transfer about 10 pounds of curd into each cloth. (Cut the draining cloth 27 inches square, hem the edges and sew tape on the corners.)
In transferring the curd from the pails to the cloths it is best to use a long-handled, sharp-edged ladle giving same a cutting motion so as to break the curd as little as possible. Tie the corners of the cloths, forming a sack, and hang up to drain in a clean cool place. At short intervals open out the cloths and scrape down the dry curd from the outsides and thoroughly mix with the softer in the center.

When the loose whey has drained off and the curd has begun to firm, wrap the cloth tightly around the curd, place a board on top and apply pressure. Ordinary pails filled with water will serve the purpose quite well. At intervals the weights should be removed and the curd worked over with a paddle. Continue this process until the curd is sufficiently dry. Salt is now added at the rate of 1 ounce to 4 or 5 pounds of cheese. When this is mixed in well and dissolved the cheese is ready to use.

Neufchatel cheese is used as a base for making the next four varieties described.

**PIMENTO CHEESE**

This is a very popular variety of soft cheese. The method used in making differs from the Neufchatel method only in that a small amount of cheese color is usually added to the milk at the time of setting, about 5 c. c. for ten gallons, or 7 to 10 drops for one gallon. In all other details the curd is handled the same up to the time of salting as in making Neufchatel cheese. When the salt is applied, add ground pimentos (Spanish red peppers) at the rate of one ounce per pound of cheese. It is well to use a small meat mincing machine to grind the pimentos. Put them thru twice if necessary so that large pieces will not show up in the cheese. At this time also add a pinch or two of cayenne pepper and mix the curd thoroughly, to produce a uniform color.

**OLIVE CREAM CHEESE**

Remove the stones from green olives (ripe olives may be used) and grind fine thru a meat mincer. Add these to Neufchatel cheese to suit the taste. From one to two ounces per pound of cheese is the usual amount. If a richer cheese is desired, add rich cream (40 to 50% fat) at the rate of one to two pounds to 10 pounds of cheese and mix thoroly.

**SANDWICH NUT CHEESE**

Grind fine, equal parts of English walnuts and almonds or any desired mixture of nuts and add these to Neufchatel cheese at the rate of one to two ounces per pound of cheese. The skins are easily removed from the almonds after steaming, or by placing same in boiling water for a few minutes. Rich cream may be added as in the olive cream cheese. The nuts and cream should be thoroly mixed with the base curd.

**CREAM CHEESE**

To eight or ten pounds of Neufchatel, add from one to two pounds of rich cream (40 to 50% fat). Care should be taken to have the cheese and cream thoroly cooled before being mixed as otherwise the body of the finished product will be pasty and sticky. Also avoid mixing too much, as this will cause a sticky product. If a higher color be desired, a small amount of cheese color should be added to the milk when set.

Cream cheese is also made by the following method:

Take about 10 pounds of clean, sweet, thin cream, containing from 10 to 15% fat. Add one or two teaspoonsfuls of fresh sour buttermilk or clean clabbered whole or skim milk, and stir, then bring the cream to a temperature of 80° F. Dilute 20 to 25 drops of rennet extract in about an ounce of clean cold water. Add the diluted rennet to the cream and mix well.

Cover the vessel with a cloth to retain the heat and set aside until coagulation or curdling has taken place, which should be in from four to five hours. When the cream has thickened firmly, ladle it into a cotton cloth and hang up to drain in a cool place. It is advisable not to put more than 10 pounds of curd into one cloth as it
will make drainage difficult and the curd will likely develop too much acid before drainage is complete.

A few hours later, open the cloth and scrape the curd from the sides with a case knife to facilitate draining, then hang up again. Repeat this operation at intervals of about two hours until the curd is fairly firm. Slight pressure may be necessary to complete drainage. This is applied by wrapping the cloth tightly around the curd and putting same between two boards of convenlene size, placing a small weight on the top board for pressure. When the curd is dry enough salt is added at the rate of one ounce to four or five pounds of curd and mixed in by kneading. The cheese is then ready for use.

CLUB CHEESE

This is a very tasty variety of soft cheese made by mixing ripened cheddar cheese (common full cream cheese) and fresh butter. Remove the rind from cheddar cheese, cut it into pieces small enough to go into a meat mincer. Secure one part of fresh butter to about six parts of cheese. This is also cut up and both cheese and butter are put thru the meat mincer, distributing the butter evenly with the cheese. After the first grinding mix the mass well with a paddle, adding a pinch or two of cayenne pepper, and again run all thru the grinder. The butter should be mixed evenly with the cheese at this time if a paddle was used after the first grinding. It is then ready for use.

COTTAGE CHEESE

Sweet skim milk which is free from odors and taints should be used for making cottage cheese.

The milk is brought to a temperature of 72° F. The setting temperature is varied somewhat according to room temperature.

It is important that the temperature be maintained throughout the setting period. Starter (fresh sour buttermilk or clean clabbered whole or skim milk) is added at the rate of one quarter of one per cent, (4 oz. per 100 lbs. milk or two teaspoonfuls for each gallon.)

The rennet extract is now added at the rate of 1.3 cubic centimeters per 100 lbs. milk. A c. c. is equal to from 15 to 20 drops. Before it is added to the milk, however, the rennet should be diluted in from 20 to 40 times its volume of cold water. Stir the milk gently for two or three minutes after adding the starter and rennet to ensure an even distribution of these materials.

The vessel containing the milk is now covered and allowed to stand undisturbed, for 14 to 18 hours. The milk should be set some time during the afternoon and allowed to stand until morning.

It should then be firmly coagulated with a small amount of whey separated around the sides and over the top of the curd. Medium weight muslin cloth should be provided and this is spread over some form of draining rack. Instead of using a draining rack cloths 27 inches square may be used and these hung up to drain containing about 10 lbs. of curd. The curd should be ladled as gently as practicable into the draining cloth to break it up as little as possible. When using a draining rack and the loose whey has drained off the cloths should be raised and lowered at the corners and sides, first one corner, then the other, to peel the curd from it, thus allowing the whey to escape.

To complete the drainage process it is usually necessary to apply slight pressure. This is easily accomplished by having the drain cloth large enough to allow of it being folded over the curd, a board or a rack made from narrow slats is then placed over the mass upon which are placed several pails of water for weight. These should be removed occasionally and the curd worked over with a paddle to insure uniform expulsion of the whey and to prevent the curd becoming too dry next to the cloth.

When the curd is reduced to from 16 to 18 lbs. per 100 lbs. milk it is sufficiently dry and is then salted. Salt may be applied to taste or about 1 ounce to four pounds of cheese. When this is worked in thoroughly the cheese is ready for use.
In making these various kinds of soft cheese good results are obtained by the use of raw milk if same is produced under good conditions, form healthy cows and handled in a sanitary way. However pasteurization of all milk and cream used in making soft cheese is advisable where ever it is practicable to do so. To pasteurize the milk it is heated to 145° F. and held at that temperature for 30 minutes and then cooled rapidly to setting temperature. Pasteurization properly done ensures uniformity in quality and lengthens the period thru which the cheese may be kept.

RAW SOUR BUTTERMILK CHEESE
Buttermilk cheese is made from raw sour cream buttermilk, by simply heating the buttermilk directly from the churn to 135° or 140° F. and holding it at that temperature for one hour or so before draining off the whey. The buttermilk should be stirred during the heating and holding only long enough to secure a uniform firming of the curd. This is done so as to break up the curd as little as possible. If the whey does not show clear by heating to 140° F. the heat should be brought up to 150° or slightly higher if necessary. After allowing the heated buttermilk to stand for about one hour the whole mass should be run or dipped into a muslin cloth which is spread over some form of draining rack. A rack is easily made by tacking quarter inch mesh galvanized wire on a shallow box in place of the bottom. When the curd has drained sufficiently dry it is salted to taste, or about one ounce of salt to four pounds of curd.

The best cheese is produced when a considerable amount of starter is used in the cream. If this is not done a small amount added to the buttermilk before applying heat, will help out the coagulation.

SWEET BUTTERMILK CHEESE
When sweet cream is churned it is necessary to add a small amount of starter to the buttermilk and ripen it at 85° to 90° F. for about one hour before raising the heat to 135° or 140° F. in order to get the curd to separate from the whey.

SOUR PASTEURIZED BUTTERMILK CHEESE
Buttermilk cheese can be successfully made from pasteurized buttermilk by first neutralizing the buttermilk completely with caustic soda solution and secondly acidulating with hydrochloric acid before heat is applied. (Bulletin 239, Wisconsin Exp. Sta.) The alkali and acid used will cost from 8c to 10c per pound of cheese. The caustic soda is first dissolved in an equal weight of water. Add the dry alkali to the water rather than the reverse. The acid is also diluted in an equal volume of cold water. In neutralizing the buttermilk first determine the per cent acid contained, to find the amount of alkali solution required. Forty parts by weight of the dry alkali will neutralize ninety parts by weight of lactic acid. For example 1000 pounds of buttermilk of 75-100 per cent acidity contains 7.5 pounds of lactic acid. Then for neutralizing 7.5 lbs. of lactic acid it will require 3.3 lbs. of caustic soda, or 5.6 lbs. of the caustic soda solution made as above mentioned. If the buttermilk shows a permanent pink color when a few drops of phenolphthalein indicator are added to a small amount in a cup enough alkali has been used. Now it will require two and a half to three times as much dilute acid as alkali used. To determine if enough has been added take a small amount of buttermilk in a shallow pan or dipper and hold it for a few minutes in water at about 145 to 150° F. If the whey separates clear enough acid has been added. If not more acid should be added in small amounts until a clear separation of whey is obtained before the whole mass is heated. When this is accomplished the buttermilk is heated to 135° or 140° F. and held at this temperature for about one hour. The curd is then placed in the draining rack. When sufficiently dry, salt is added at the rate of one ounce to four pounds of curd and worked to well.