

OREGON AGRICULTURAL EXPERIMENT STATION

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SOME FACTORS IN THE CONTROL OF SURFACE AND CHEESY FLAVORS IN BUTTER

(Recommended method of washing churns.)

by

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During the past six years the Oregon Agricultural Experiment Station has scored and analyzed 3000 samples of butter received from Oregon creameries. Considerable progress has been made by most of the participating creameries in improving the quality of the butter made. A few creameries have experienced the development of putrid or limburger flavor in their butter during the past few years. The defect usually occurs spontaneously and the flavor of the butter is often so bad that the butter is unsalable. We have previously on several occasions warned the creameries against the occurrence of the defect in butter and we have given suggestions for preventing it. Two of the creameries that send butter to the monthly scorings have experienced some difficulty during 1934 with the defect developing in their butter. Protein digesting bacteria were found in large numbers on the butter manufacturing equipment used in each of these creameries by a member of the staff of the Oregon Agricultural Experiment Station and the same type of organisms was also isolated from the city water which was used for washing the butter in one of these creameries.

The bacteria, when they gain entrance to the buttermaking equipment, may lodge in crevices, pits in metal linings, in the packing material, etc., and may live and multiply there if some organic matter and water are available. During the operation of the equipment, as when pumping or churning, when the equipment is under some stress, some of the organic matter containing the bacteria may be squeezed out and will then be present in the cream and in the butter. The bacteria grow rapidly in low-salt butter, particularly when this is made from low-acid cream, and when the butter is kept at a high enough temperature to favor their multiplication. They will grow well at ordinary ice box temperature such as 40° F. The bacteria belong to the group which causes a breaking down of protein. The curd in the butter is attacked by the organisms resulting in the development of an objectionable flavor.

The bacteria may come from a number of sources. One of the common sources is the water used. The butter making equipment is another source. The air may also be suspected. The organisms may be present on the insulating material in the cream vat and may gain entrance to the cream through a hole in the vat lining, and they may be present in stuffing boxes of vats and pumps, in outlet valves, in cream pipes, strainers, churns, butter packing utensils, butter moulds, and on the butter cutter. They may be particularly abundant in the cracks and crevices of old churns such as between the staves, in packing glands, cracks in doors and rollers, and in similar places.

Different methods for cleaning and sterilizing churns are used by the creameries, but the following method has been used by the Oregon Agricultural Exp. Station for the past several years and has been found effective in eliminating bacteria, yeasts, and molds from the churns used in the College dairy products laboratory. We can, therefore, recommend it to the buttermakers in the state. It has been possible to keep the churns in a first-class condition during this period. The wood is hard and is free from splinters. It is bright in color and has a desirable odor. No difficulty has been experienced with butter sticking to the wood.

#### Directions for Cleaning Churns

1. Add about 50 gallons warm water, temperature not exceeding 120° F., to the churn, revolve for a few minutes and drain. This removes remnants of butter. Water at a temperature higher than this may harden any curdy material which is present.
2. Add 50 to 75 gallons of hot water, temperature above 200°F. (use the thermometer to determine), to the churn, and to this add 3 gallons of a solution containing 2 pounds hydrated lime and 2 pounds of washing soda. The gritty material which settles to the bottom should be excluded. Revolve the churn in high gear for 15 minutes, drain and rinse out any remaining lime particles with water from a hose.
3. Place the doors on the churn and wash the exterior of the churn using soap and water. Rinse with hot water.
4. Add 50 to 75 gallons hot water to the churn, temperature above 200° F., and revolve in high gear for 15 minutes. Drain through doors and leave to drain for 5 minutes. Then, turn churn so that door openings face upward, and open the buttermilk gate.
5. Inspect the churn after one-half hour to see that it is clean and dry inside. Rust-proof screens may be placed in the door openings when the churn is not in use.
6. Before using the churn in the morning rinse it with 25 gallons hot water, followed by rinsing with 50 gallons cold water. If hot water is not available in the morning, a chlorine sterilizing solution may be used.

#### Note:

Do not heat the water in the churn by using a steam hose introduced into the churn. This causes vibration which may damage the churn. If the water must be heated inside the churn, a properly installed noiseless water heater may be used. Modern water and steam mixers, which will give water at any desired temperature are on the market.

Live steam should not be used for sterilizing wooden churns. Even when it is introduced carefully so that it does not strike the wood, this treatment is too severe. Churns which were in a good condition have been badly damaged by live steam, such as causing blistering of the paint, driving the grease into the wood, and causing the pitch from the wood to come to the exterior surface.