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## Utilization of Surplus Milk in the Small Dairy Plant: 3. Old Fashioned Sage Cheddar Cheese

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# Utilization of **Surplus Milk** in the Small Dairy Plant

P. A. DOWNS



## 3. Old Fashioned Sage Cheddar Cheese

THE EXPERIMENT STATION OF THE UNIVERSITY OF NEBRASKA  
COLLEGE OF AGRICULTURE W. V. Lambert, Director; E. F. Frolik, Associate Director

## FOREWORD

The purpose of this series of publications is to describe how a variety of products can be prepared in plants where surplus milk is a problem. Each type of product is described in detail, methods of manufacturing outlined, and the equipment and supplies needed are listed. As far as possible similar equipment is used for several products.

In this publication the preparation of a type of old fashioned sage and other flavored cheddar cheeses is presented.

## CONTENTS

	Page
Foreword .....	2
Introduction .....	3
Equipment .....	4
Method of Making Cheddar Cheese .....	4
Old Fashioned Sage Cheese .....	4
Packaging for Consumer .....	9
Other Flavored Cheese .....	11
Caraway Flavored Cheese .....	11
Garlic Flavored Cheese .....	11
References .....	11

# Utilization of Surplus Milk in Small Plants

## III Old Fashioned Sage Cheddar Cheese

P. A. DOWNS<sup>1</sup>

### INTRODUCTION

**T**HE manufacture of cheddar cheese may not seem a profitable outlet for surplus milk because of competition from the large cheese producing areas. For that reason the production of something slightly different than the common type of cheese will be found desirable.

The type of sage cheese described in this publication is different both in flavor and appearance. It has been well received by the consuming public when made at the Nebraska Station, and offers another opportunity to utilize surplus milk of the plant. The product can be stored and, when suitably ripened, should be readily salable, especially during the holiday season.

The addition of dried sage leaves to the curd of cheddar cheese was carried out by the old cheese makers. However, the leaves turned yellow when held for long curing as reported by Michels (*1*) in 1903. In the days of farm cheese making, sage cheese was produced by farmers who had green sage flavored particles of curd scattered through the uncolored cheese.

Sammis, in his book, "Cheese Making," refers to sage cheese as an American cheese with a green speckled color and sage flavor. He describes the color as coming from a harmless paste or tea made from corn, clover, or spinach leaves and the flavor from either sage tea or sage extract sprayed on the curd just before salting.

If this type of cheese is to be produced today a suitable source of color and flavor must be readily available. After considerable experimentation and study of available supplies, oil of sage (Dalmatian) was decided upon as a source of flavor.

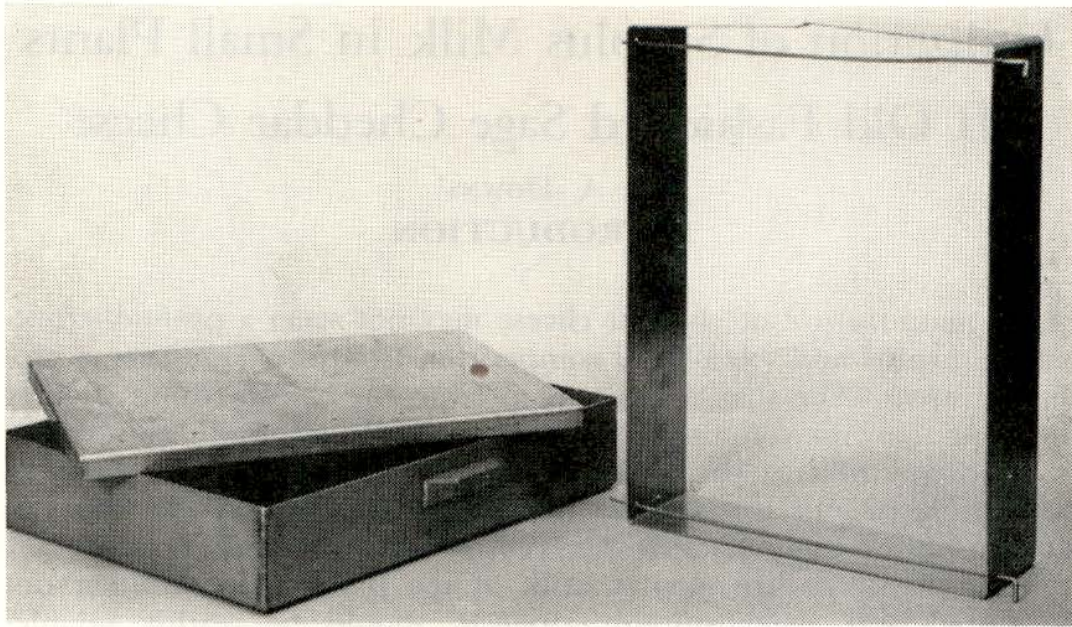
A satisfactory green color was obtained by blending certified colors F. D & C yellow No. 5—85%, and F. D & C blue No. 1—15%, in water equal to 15 times the weight of the dye.

This mixture was found to be stable and did not reduce to a colorless compound during aging, as was the case with some colors. The mixture can be stored for reasonable periods of time in the plant. The shade of color can be varied by changing the percentage of the yellow dye.

No suitable vegetable color was found that could be readily obtained. The few vegetable colors found carried undesirable flavor as well as lack of color range desired.

By the use of the materials mentioned a uniform flavor and color

<sup>1</sup> P. A. Downs is Dairy Husbandman, Nebraska Agricultural Experiment Station.



**Plate 1. Wilson hoop complete with bottom, liner, rods for holding liner when filling, and lid.**

can be produced without resorting to the home production of flavor and color as described by Sammis (2).

### **EQUIPMENT**

Pasteurizing equipment found in dairy plants is suitable for pasteurizing the milk. Cheese vats found in most plants for making cheese will be satisfactory.

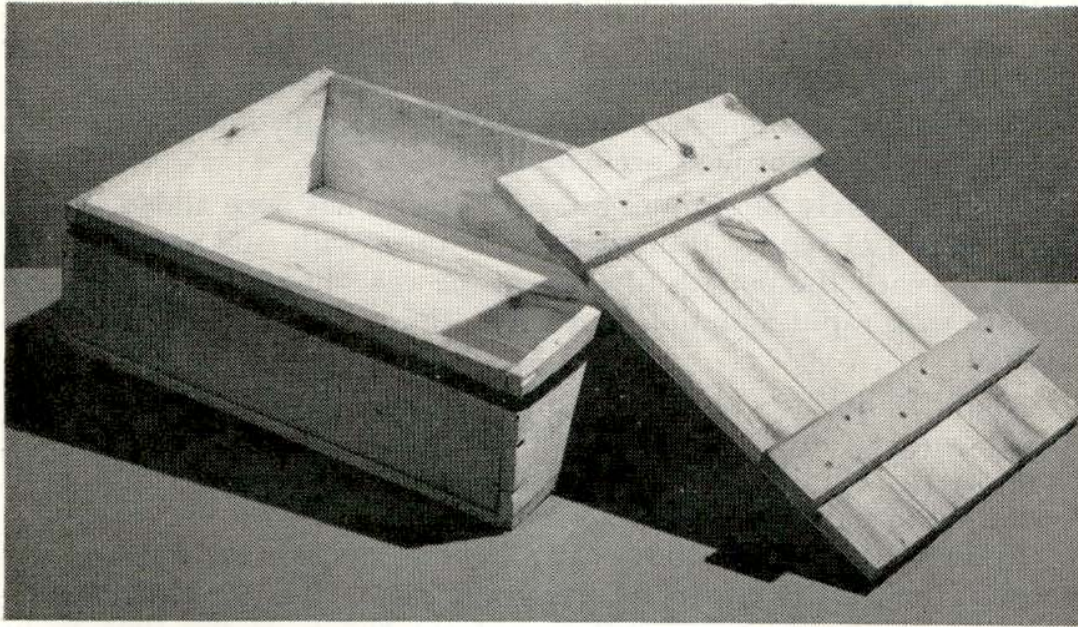
A suitable curd mill should be provided to cut the cheddared curd. Cheese hoops of the 20-pound Wilson type (Plate 1) have been found to be very useful in the small plant. Some type of press should be available for pressing the cheese in the hoops. Suitable boxes for aging the cheese should be available (Plate 2).

Equipment normally used in the making of cheddar type cheese is all that is required. Other types and sizes of cheddar cheese hoops can be used. However, the 20-pound Wilson hoop seems to fit into the operation of the small plant.

### **METHOD OF MAKING CHEDDAR CHEESES**

#### **Old fashioned sage cheese**

In making the cheese described in this publication a separate independent lot of pasteurized milk is colored, flavored and handled the same as the uncolored portion. After the curd is matted the milled curd is blended, salted and hooped. The resulting cheese has a marbled appearance as shown in Plate 3. It is a bicolored, biflavored cheese which has eye appeal as well as a distinct contrast in flavor between the flavored portion and the natural cheese. Proportions of approximately one part of flavored curd to five parts of unflavored curd give satisfactory results.



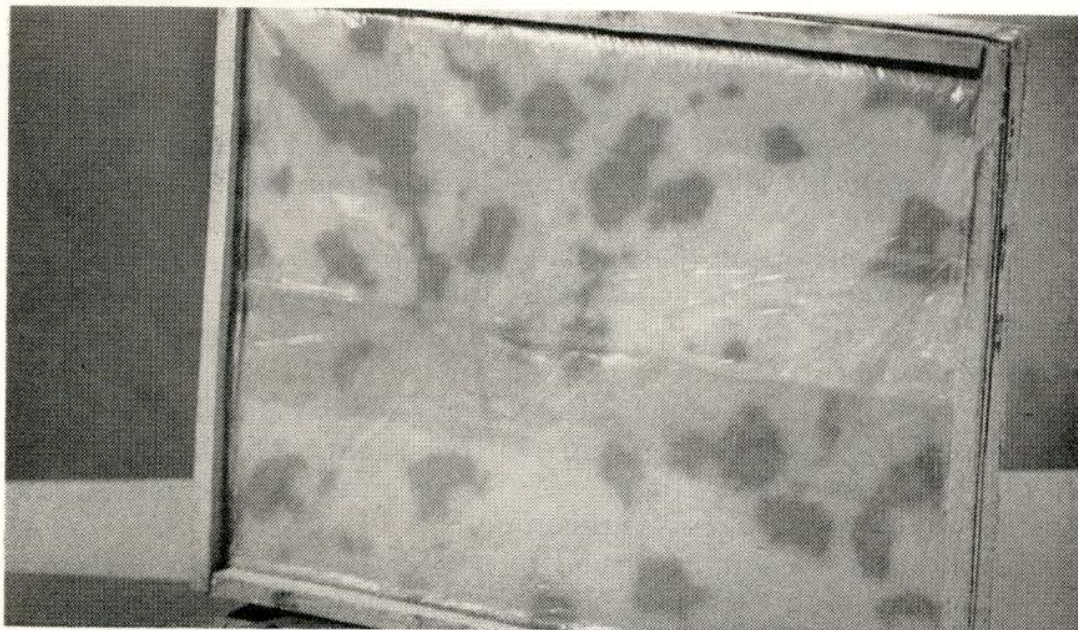
**Plate 2. Wooden box used for final pressing of 20-pound cheese.**

Both vats of milk are carried through the making process until the curd is ready to mill, at which time the flavored curd is blended with the natural colored cheese curd.

The detailed method of making cheddar cheese from pasteurized milk has been described by Wilson (3) 1942; Price (4) 1944, and Downs (5) 1948.

Fresh pasteurized milk of the desired quantity is placed in the cheese vat at a temperature of approximately 86° F. (Usually slightly more than 100 pounds of milk for each 10 pounds of cheese desired.)

One per cent of a freshly prepared lactic starter is added to the



**Plate 3. Green and white block of sage cheese ready for curing room.**

milk and the mixture thoroughly stirred. At this time approximately one sixth of the milk in the vat is transferred to another vat to be colored and flavored. Two to two and one half ml. of green coloring and one to one and one half ml. of sage oil are added per 100 pounds of milk. Both vats of milk are handled as follows:

Approximately 30 minutes after the starter has been added, 12 ml. (4/10 ounce) of rennet, diluted 40 to 50 times with cold water, is prepared for each 100 pounds of milk in the vat. The solution is added quickly with rapid agitation and then allowed to stand quietly until curdled.

About 30 minutes after the rennet is added the curd will be ready to cut with  $\frac{3}{8}$  inch curd knives. After reducing the curd to small cubes by the use of both the vertical and horizontal knives the curd is allowed to stand a few minutes before stirring begins.

Approximately 15 minutes after cutting and stirring has been in progress the heat is turned on the jacket of the vat. It should be adjusted so the temperature will raise from 86° F. to 98°-100° F. in about 30-35 minutes.

The curds and whey are maintained at this temperature for approximately one hour. During this time the curd firms in consistency and the titratable acidity of the whey should increase around 0.02 per cent.

When the curds have reached the desired firmness and the acidity has developed satisfactorily the whey is quickly drawn, leaving the curd pushed back in the vat in a layer 6 to 8 inches in depth.

A trench is cut out of the center of the curd mass to aid the whey in getting away from the curd. As the whey drains the curd will mat together. After about 10 to 15 minutes the curd is cut into portions 8 to 10 inches wide. These are given a quarter turn and separated to aid draining.

The vat is covered and kept at a temperature of 100° F. during the next two to two and one half hours. The curd blocks are turned every 15 to 20 minutes. Blocks are piled two deep after they have been turned on all sides and during the last hour can be piled three high.

After the cheddaring period has passed (two to two and one half hours after draining) the whey acidity should be 0.45 per cent or more. At this time the curd is ready to mill or cut into small pieces to facilitate salting.

The curd blocks are now run through a regular cheddar curd mill and stirred vigorously to prevent matting again. The flavored curd blocks which have been prepared in a separate vat are milled and mixed into the regular curd at this time.

Water from the hose, adjusted to a temperature of approximately 65° F., is run onto the milled curd in the vat with the valve closed until the curd is covered. With continued stirring, the water is drained

off and the curd piled along the sides of the vat to aid draining. As soon as the excess water is gone four pounds of salt per 100 pounds of curd is added and the curd stirred until it has dissolved—usually 15 to 20 minutes.

TABLE 1. Typical Example of Making Procedure

Operation	Time		Temperature	Acid	Remarks
	<i>Clock</i>	<i>Elapsed min.</i>	<i>degrees F.</i>	<i>%</i>	
Add starter	9:15	0	87° F.	0.17	1%
Add rennet	10:00	30	87° F.	0.18	3-4 oz./ 1000 lb. milk
Cut curd	10:30	60	87° F.	0.115	$\frac{3}{8}$ " x $\frac{3}{8}$ "
Begin heating	10:45	75	87° F.	0.115	
Finish heating	11:45	135	99° F.	0.12	
Begin dipping	12:00	150	99° F.	0.13	
Mill	2:00	270	90° F.	0.40-0.60	
Wash	2:15	285			65° F. water
Salt	2:30	300			4 pounds/ 1000 lb. milk

Total time from adding starter to milling is 2½ hours. From milling to hooping is 2¾ hours.

At this time the curd has cooled and is ready to be packed in the hoops of the desired shape and size for pressing.

Although any size hoop can be used, the No. 14-5P Wilson type Multiple Hoop has proved very satisfactory in the small plant. (Plate 4) It is convenient and lends itself to the problems of the small plant. Experience has shown that approximately 22½ pounds of curd should be placed in each hoop to produce a 20 pound cheese in the box after

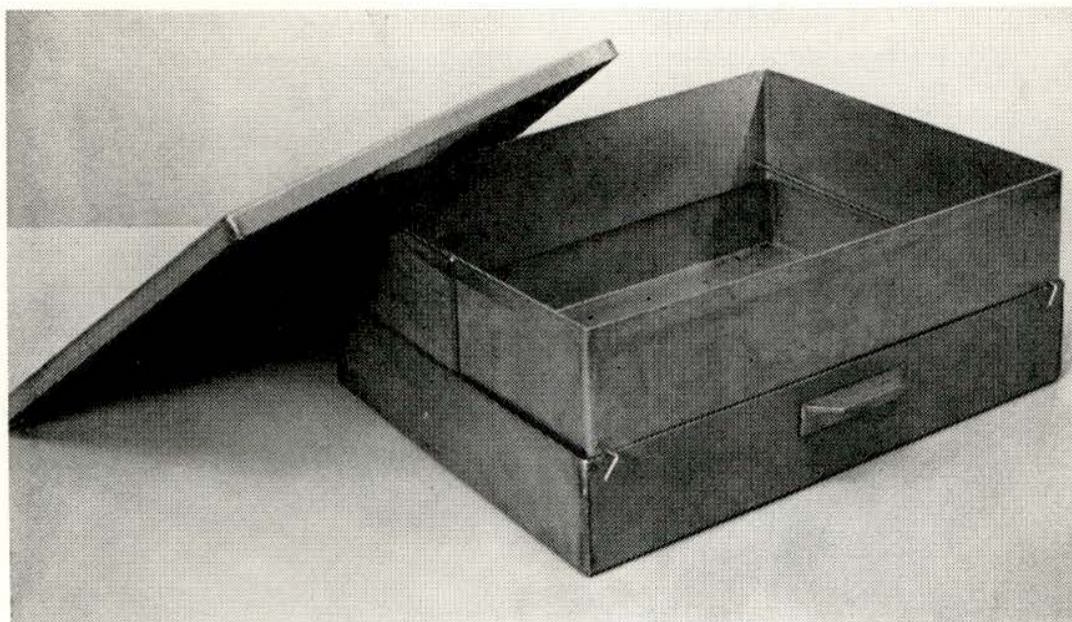
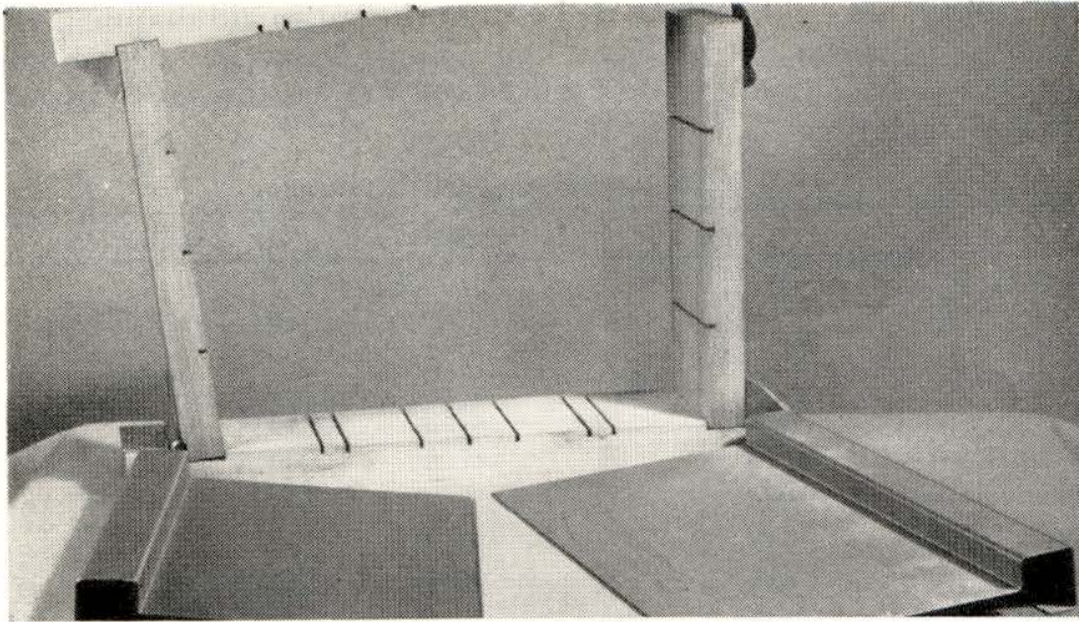


Plate 4. Liner in place, supported by pins which are removed before placing in press.

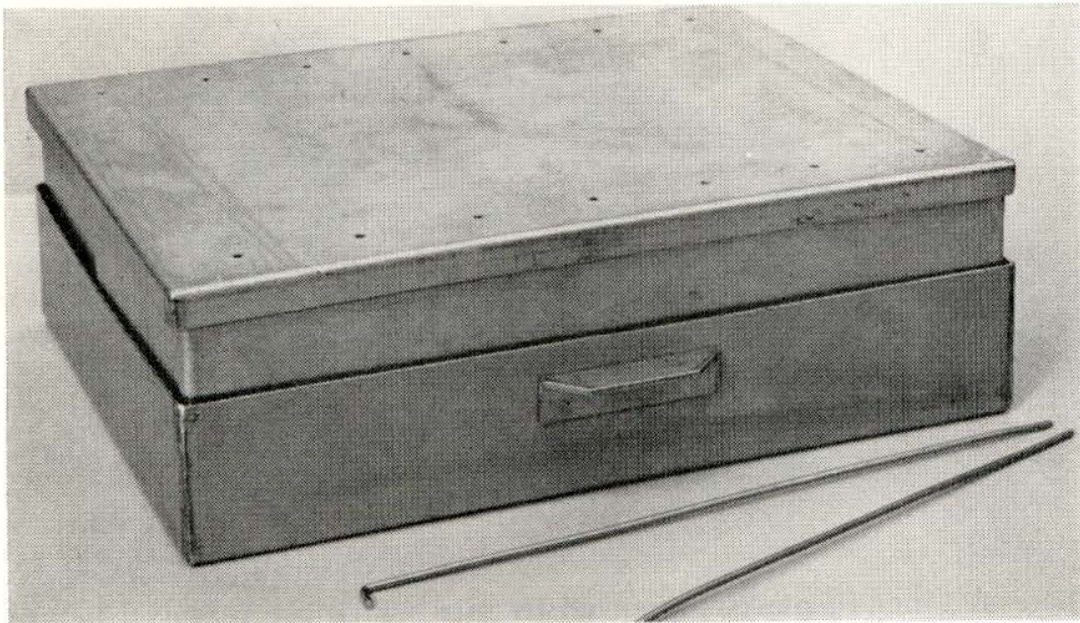




**Plate 5. Cutting frame and knives.**

curing. Blade cutters are available so that the 20 pound cheese can be readily cut into desired sizes as small as one pound each. (Plate 5). This makes it convenient for the small unit.

After the curd has been packed and pressed in the hoop (Plate 6) for approximately 30 minutes it is removed and dressed in muslin cloth which has previously been boiled in a 15% salt solution. It is then returned to the press and pressed over night. In the morning it is removed from the press, the cloth removed and the curd then re-wrapped in 40 G A.N.I. Pliofilm, Saran Film, or equivalent, before the surface of the cheese dries.



**Plate 6. Hoop with curd ready for press.**

Fasten the film wrap with short pieces of Scotch tape. Overwrap the film covered cheese with glassine paper. Place the wrapped cheese in special wooden boxes  $11\frac{1}{8}'' \times 14\frac{1}{16}'' \times 3\frac{5}{8}''$ . (Plate 2). The boxes are made with a flat metal strap around the large dimension to prevent spreading. The slip in lid allows pressure to be exerted on the cheese to press the covering close to the surface of the cheese and exclude air.

The boxes are returned to the press with light pressure for several hours and then stored at  $70^{\circ}$  F, for three to four days to help seal the surface. After that it can be cured as desired.

The boxes are stacked at room temperature for at least four days. Where storage is available it has been found satisfactory to cure at  $60^{\circ}$  F. for six weeks and then at  $40^{\circ}$ - $50^{\circ}$  F. until used. Otherwise curing at  $40^{\circ}$ - $50^{\circ}$  F. will be satisfactory. A satisfactory cheese flavor should develop in four to six months although cheese that is a year old will have a flavor greatly desired by many.

### Packaging for Consumer

The 20 pound cheeses are larger than the average consumer desires. Convenient methods of packing small units have been developed by the use of suitable cutters and frames. A typical unit as shown in Plate 5 will produce packages of the following sizes: 10, 5,  $2\frac{1}{2}$ , and 1 pound. In order to use it successfully the following procedure is suggested by the use of a suitable cutter made for the purpose:

1. After the cheese has ripened to the desired amount the unopened box is held for 24 to 48 hours at room temperature or slightly above. Keep boxes so that the air can freely circulate around them.

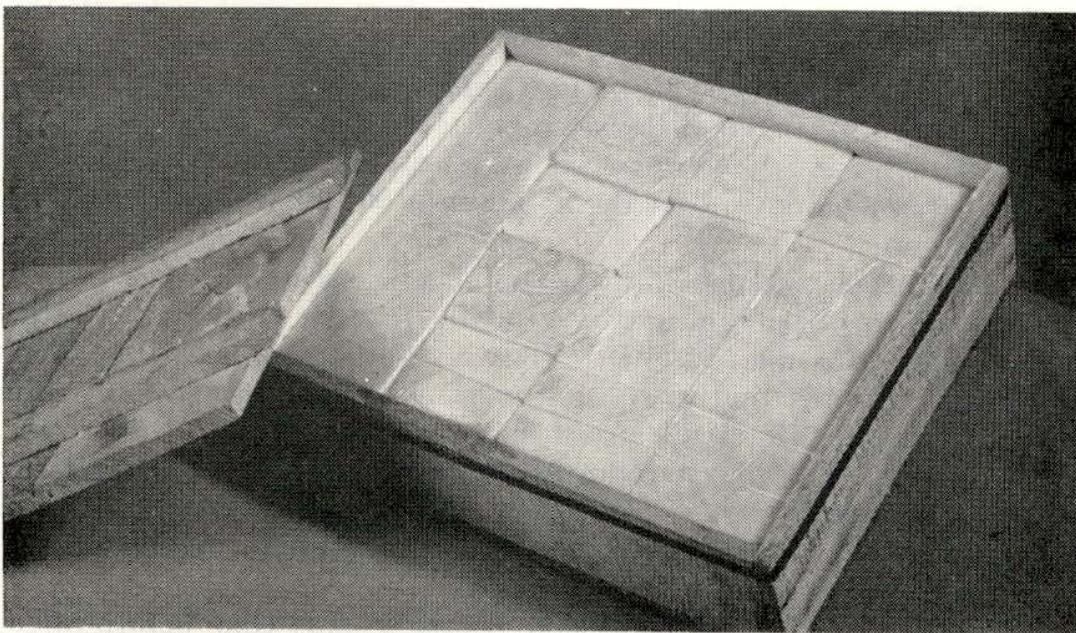


Plate 7. Twenty-pound cheese cut into different sizes after wrapping and repressing.



**Plate 8. Small units of cheese ready for the consumer.**

2. After the desired time remove cheese from box and remove paper and film.

3. By the aid of the cutter, divide the 20 pound loaf into the desired sizes and determine their weight.

4. Before the cheese has a chance to dry, wrap each piece with thin (40 ga.) film. The surface can be smoothed by passing over a flat surface, but the package is not sealed.

5. An outer cover of heavier film (80 ga.) is placed upon the wrapped package. This can be partially sealed by a hot surface.

6. The pieces should be returned in their original order to the press box which has been lined with heavy paper to make them fit tightly. Pressure should be upon all sides of each piece. Hold under light pressure for one-half day at room temperature. Plate 7.

7. Place boxes of wrapped pieces in storage under refrigeration for at least 24 hours to cool them. Store at 50° F. or below until removed for sale.

8. Label each package with type of cheese and weight.

The object of packaging cheese in this manner is to have a small unit of cheese for the consumer. Plate 8. The problem is to package it in such a manner that it will not mold. The application of the thin film next to the cheese with pressure on each surface seals the surface of the cheese. Holding at room temperature allows the butterfat to melt and help seal the package. When oxygen is reduced mold growth is retarded. Always package cheese in an atmosphere that is as free from mold spores as possible.

It would be desirable to package cheese a short time before offering for sale, and it should be refrigerated at all times. If properly packaged it can be kept for several months under the above conditions.

## OTHER FLAVORED CHEESE

Old fashioned sage is only one flavor that can be prepared. The flavoring of the salted curd offers an opportunity to obtain greater variety. The curd of a single batch can be divided, flavored, and hooped if its is desired.

The following suggested flavors should be of interest to the manufacturer and consumer.

### Caraway Flavored Cheese

A cheese with caraway seed distributed throughout can be produced by adding two to three ounces of dry caraway seed to each hundred pounds of curd or approximately 1,000 pounds of milk.

The caraway seed should be fresh and as free as possible from mold or other contamination. It is advisable to sterilize the seed just prior to using. This may be done by heating in oven to a temperature of 300° to 325° F. for two hours and allowing to cool before using.

The sterilized seed is sprinkled over the salted curd just before placing it in the hoops.

### Garlic Flavored Cheese

A very pleasing garlic flavored cheese can be prepared by sprinkling one-fourth to one-half ounce of garlic flour over each hundred pounds of curd. This should be added when the curd is salted and should be well mixed before being placed in the hoops for pressing. The amounts mentioned may be increased if a more pronounced garlic flavor is desired.

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