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## Canning Qualities of Strawberry Varieties\*

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The plant and fruit characters of numerous varieties of strawberries have been studied for many years by the Division of Horticulture, but these studies do not show the value of the varieties for canning and preserving. As the value of varieties for such uses might appreciably affect their fresh fruit value on the market, it seemed desirable to study the canning and preserving qualities of the common varieties raised in Minnesota. These studies were begun in 1924 in co-operation with the Division of Home Economics, and were repeated in 1925.

### METHOD\*\*

The fruit for these studies was obtained mostly from the variety plots at University Farm, but the supply was supplemented at times with certain varieties grown at the State Fruit Breeding Farm, Excelsior. So far as possible the berries for canning were picked at the height of the season for each variety. Average samples were used, and efforts were made to avoid using berries softened by wet weather. The picked berries were delivered immediately for canning.

As the crates of berries were received they were placed in a cool room at a temperature of approximately 60°F. If the crates were afternoon deliveries to be canned the following day, the boxes were removed and set in rows to allow free air circulation about the berries.

In preparing the berries for canning, approximately two quarts were placed in a colander, washed gently by dipping into water, hulled, and the green tips removed if present. When the quantity of berries was sufficient, they were sorted for uniform ripeness. To secure a trial sample of some of the newer varieties, all the usable berries were picked, ranging in maturity from under-ripe to fully ripe. A record was made of their condition and the berries were canned without sorting.

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\*\*The experimental work was carried on by Mrs. Holbrook Working, Mrs. Frank Balmer, Mrs. Jean Brewbaker, and Mrs. Agnes Erkel.

Since there are no records of work upon the relative merit of the three standard canning methods when applied to strawberries, the water bath, the pressure cooker, and the open kettle methods were used. From the varieties of which there was a sufficient quantity, two groups were canned by all three methods, thereby providing a check. Each morning the jars of the day before were stored in a dark fruit cellar at a temperature of approximately 60°F.

In preparation for the day's canning, all the jars were washed at once. Those for the pressure cooker and water bath processes were tagged and weighed and the weight recorded in record books and also upon the jars. The jars for the open kettle process were kept in boiling water.

The berries for the pressure cooker and water bath methods were packed into the jars. The first layers were worked into place with a wooden spoon, the upper ones by taking the berries in the fingers and gently fitting them into place. No bruising resulted from this method of handling and the closest possible pack was obtained. This process becomes very rapid with a little experience. After weighing each jar for the weight of the berries, they were filled with syrup, the cover was adjusted and a third weighing made to obtain the weight of the syrup. The jars were then ready for processing.

#### SYRUP

The syrup was made in quantity sufficient for the day's canning. A proportion of a cup and a half of sugar to one cup of water was used. The mixture was heated slowly to boiling and stirred until the sugar was dissolved. The temperature was then taken (214°F), and this temperature was kept constant.

#### WATER BATH METHOD

The jars were placed in the water bath, with the water covering the jars to a depth of approximately one inch. The cover was placed on the kettle, and the temperature of the water was raised to boiling as rapidly as possible. It was found, with a little experimenting, that the more rapidly the water was raised to boiling, the more tender and plump the berries seemed to be. With care there was no breakage and approximately no loss of juice in the water bath. Fifteen minutes after the water began to boil, the jars were removed, the tops tightened, and the jars inverted to be sure they were liquid tight. They were then labeled, placed right side up, and left to cool.

#### PRESSURE COOKER METHOD

The jars to be processed by the pressure cooker method were placed in the pressure cooker, which had about half an inch of hot water in the bottom. The top was adjusted and the flame turned high to secure the desired pressure quickly. The jars were processed at 5 pounds pressure (228°F.) for ten minutes, after which the gas was turned out and the jars were removed as soon as the pressure gage registered zero.

## OPEN KETTLE METHOD

The open kettle method required slightly different procedure. To obtain the weight of berries necessary for the number of jars (usually four) the average weight of berries of the same variety required to fill a jar processed by either of the other methods was multiplied by the number of jars. These berries were weighed, and to them was added the weight of syrup used in the other methods. The berries and syrup were then heated gently to prevent undue evaporation. The hot jars were made ready and as soon as the berries were heated until they would flatten when pressed with a spoon, the jars were filled, dividing the quantity of berries and syrup evenly between the jars. If there was a space at the top, it was filled with boiling syrup from a quantity of known weight. The amount used was calculated and added to the weight of the syrup in which the berries were cooked. A record was made of the average weight of berries and of syrup in each jar.

## STANDARD

In order that the judging might be as uniform as possible, a standard canned strawberry was described as follows:

A desirable canned strawberry should have a liquid which is a clear, bright, sparkling red, and has a good strawberry flavor. The berry should be plump, of good shape, and of firm texture, have a bright red color and the natural flavor of the berry.

## EXPERIMENTAL WORK IN 1924

Twenty varieties of berries were canned in the summer of 1924, and a record of these was carefully kept. The condition of the berries at the time of canning—size of seed, outside and inside color and texture—was included in this record.

## JUDGING

After the berries had been stored three months in a dark cool storeroom, they were judged by members of the Divisions of Home Economics and Horticulture, according to the following score card:

## SCORE CARD FOR CANNED STRAWBERRIES

Proportion solid to liquid.....		10
Liquid .....		15
Color .....	(5)	
Clearness .....	(5)	
Sweetness .....	(5)	
Berry .....		75
Color .....	(15)	
Flavor .....	(30)	
Texture .....	(15)	
Shape .....	(10)	
Size of seed .....	(5)	
Total .....		100

The combined scores of those judging gave the following

ratings of the twenty varieties canned:

Excellent: Minnesota, Easypicker, Lovett.

Very Good: Best, Haverland, Belt, Bun Special.

Good: Stevens Late, Marshall, Mascot, Chaska, Collins, Dunlap, Eaton, Success.

Poor: Nokomis, Lupton, Parsons Beauty, Oswego, Minnehaha.

It should be noted that the three varieties, Minnesota, Lovett, and Easypicker, which gave the most satisfactory canned berries, were all smooth and regular in shape, free from deep ridges, deep red in color throughout, firm, and juicy. Among the berries rated as "good" there is one exception, the Belt. This berry was exceptionally large and coxcomb shaped. It was also dry and of light color, but the flavor was very good. Quite opposite to the Belt was the Dunlap, which has the appearance of an exceptionally nice berry, regular, deep red, firm, and juicy, yet its flavor was such as to rate it very low. Among the "poor" canning berries, all but the Parsons Beauty had light or almost white centers and appeared dry and stringy. These berries seem to give a pulpy, colorless and flavorless canned product in contrast to the richer color and more solid berry of the other group.

Ten months after the berries had been canned, samples were again judged. The berries had been kept in a dark storage cellar with temperature ranging from 45°F. to 33°F. There was no spoilage and as far as the judges could see, the color had not changed and the berries were judged of the same quality as when first canned.

#### EXPERIMENTAL WORK IN 1925

In June, 1925, 32 varieties of strawberries raised in Minnesota were canned according to the methods used the previous summer. Certain varieties canned in 1924 were not available. Other varieties were added, including four of the everbearing varieties; Duluth, Ideal, Lucky Boy, and Peerless. The canned berries were stored as in 1924, in a dark cool storage cellar.

Three months after the berries were canned, they were judged as in the previous season and were rated as follows:

Excellent: Best, Minnesota, Ideal.

Very Good: Premier, Eaton, Lovett, Bun Special, Belt.

Good: Delicious, Dunlap, Duluth, Marshall, Lucky Boy, Dr. Burrill, Gibson, Lovett, Marvel, Prize.

Poor: Nokomis, Haverland, Magic Gem, Minnehaha, Mascot, Success, Lupton, Bitterroot.

Easypicker and Chaska were canned and placed in storage but an accident prevented the scoring of these. However, at the time of canning, appearances indicated that in color and texture these varieties would rate approximately as in 1924. Samples were examined a second time in early March. No changes were noted as to the quality of the varieties or as to color.

## CONCLUSIONS

1. The general conclusion thus far made is that a berry satisfactory for canning would seem to be one of medium size, smooth and regular, rich red in color throughout, firm and juicy, and with small seeds.

2. As to method of canning, both in 1924 and 1925, there appeared to be practically no difference between berries canned by pressure cooker, water bath, or open kettle methods.

3. From the two seasons' investigations, the following varieties are considered superior for canning: Minnesota, Easy-picker, Lovett, Best, Ideal, Haverland, Belt, Bun Special, Premier, and Eaton.

4. From the two seasons' investigations, the following varieties recommended for commercial planting in Minnesota were considered poor for canning: Nokomis, Minnehaha, and Lupton.

The work on canning is to be checked during the summer of 1926 and studies begun upon preserving and placing with sugar in cold storage.

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**Communities Can Take Steps to Eliminate the House Fly.**—The importance of concerted, organized effort to get rid of flies on the part of whole communities, not only cities, but suburban and rural neighborhoods as well, can not be overemphasized, according to the Bureau of Entomology, United States Department of Agriculture. By the most painstaking care one may prevent all fly breeding on his premises, but it will avail him little if his neighbors are not equally careful. Some sort of cooperation is necessary. One of the first and most important elements in any antily crusade is a vigorous and continued educational campaign. It has been the experience of those who have undertaken such crusades that people generally regard the fly as a somewhat harmless nuisance and that the first work of the campaign was to bring the people to a realization of the dangers from flies and the possibility of getting rid of them.

The antily crusade is a matter of public interest and should be supported by the community as a whole and engineered by the health officers. But health officers can do little toward the necessary work of inspection and elimination without funds, and therefore the support of the campaign must manifest itself in increased appropriations for public health work. Very often it is lack of funds which prevents the health officers from taking the initiative in the antily crusades, and there must necessarily be much agitation and education before they can profitably take up the work. Here lies a field for the best energy, initiative, and leadership of civic associations, women's clubs, boards of trade, and other community organizations.