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Canning Food That Keeps

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The hot water bath method of processing canned foods has been given a nod of approval by research workers. Scientists, a bit skeptical that food processed in the hot water bath would keep successfully, set about to study the method. Results of the study serve as a guide to homemakers in 1943 as the food situation threatens to become even more serious than in 1918.

Three canning studies* conducted at Iowa State College show that the hot water bath method is satisfactory, provided these precautions are followed:

1. Process foods a sufficient length of time.
2. Process vegetables as soon as possible after gathering from the garden.
3. Follow through the canning steps as rapidly as possible.
4. Boil vegetables and pack while hot into glass jars.
5. Use new caps for non-acid vegetables.

the condition of caps and rubber caps had a definite effect on canned food spoilage. No spoilage occurred in 24 pints of beans that had new alumi-
inum and zinc caps. Twelve pints with rubbers used the preceding year did not spoil. But when caps from jars of beans that had spoiled the year before were used on 24 pints, and the beans were processed 2 and 2½ hours just as were those with new lids, more than one-sixth of those processed 2½ hours spoiled. One-fourth of those processed 2 hours spoiled. The spoilage occurred despite the fact that the old lids were washed well and boiled 5 minutes before being used.

Storage temperatures also had a decided effect on the keeping qualities of canned beans. Those stored at temperatures under 75 degrees F. showed no spoilage. But temperatures ranging from 99 to 131 degrees F., resulted in spoilage of from 66 to 100 percent. This indicates that sterility was not obtained, but the process time was sufficient to yield canned food that would keep when stored at lower temperature.

The addition of acid to non-acid vegetables increased the probability of their keeping when processed a shorter length of time. For ordinary home canning, lemon juice is recommended in the following amounts and processing times:

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Tsp. lemon juice per pint</th>
<th>Processing time (Pints Quarts)</th>
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<tbody>
<tr>
<td>Asparagus</td>
<td>1½ tsp.</td>
<td>2 hrs. 2 ½ hrs.</td>
</tr>
<tr>
<td>Snap beans</td>
<td>1</td>
<td>1½ hrs.</td>
</tr>
<tr>
<td>Swiss chard</td>
<td>2</td>
<td>2 ½ hrs.</td>
</tr>
<tr>
<td>Corn</td>
<td>2</td>
<td>3 hrs.</td>
</tr>
</tbody>
</table>

One-fourth teaspoon of soda added to a pint of corn as it was heated for its pasty consistency. A loose pack and a high starting temperature in home canning of corn should give best results. Corn packed hot reached processing temperature 30 minutes sooner than that packed warm or cold.

In general, medium packs are more desirable than either loose or hard packs in both convenience of packing and appearance.

Taste was purposely omitted from the study, because it is an undesirable and unwise test for canned food. The cooker must be operated properly. For one thing, unless the air is let out of the cooker before the petcock is closed, a lower temperature exists in the cooker than is indicated by the pressure gauge. To assure complete absence of air, the petcock should be left open for at least 7 minutes after steam appears.

Looking for Spoilage

A third phase of the canning research dealt with indications of spoilage. While chemical, bacteriological and physical tests were used, physical evidences indicated spoilage more frequently than either of the others. Since only physical tests for spoilage are practical at home, they will be considered here.

Physical evidence was a good sign of spoilage in asparagus, beans, chard, tomato and beef, but not as good in corn and pork. Of the three physical tests—odor, appearance and suction—odor seemed to be the most common sign of spoilage. In beef, however, spoilage was indicated by changed appearance in more jars than by the odor. Appearance also was a good sign of spoilage in beans and chard.

Taste was purposely omitted from the study, because it is an undesirable and unwise test for canned food until it is boiled 10 minutes.

Appearance is naturally the first home test with these conditions indicating spoilage: (1) Gas production as shown by bubble formation; (2) bulged caps or broken seals; (3) cloudiness of the liquor; (4) sediment; (5) color; (6) consistency and disintegration, and (7) formation of patches of growth.

The suction or vacuum, a second physical test, was made by quickly pulling the rubber from beneath the zinc cap with a pair of pliers. A sharp sound due to inrushing air is taken to indicate a satisfactory vacuum. A spurring of the liquid from the jar indicates pressure from the inside, and an absence of sound also is taken to mean an unsatisfactory vacuum. When a satisfactory seal is obtained, the zinc caps will be drawn in by suction due to a partial vacuum. Any raising or bulging of the caps indicates pressure from within, or an unsatisfactory seal.

The third physical test was the odor noted when the cap was removed.

The Agricultural Extension Service of any state makes available to all the citizens in the state canning directions suited to local conditions. Following those directions closely will prevent spoilage in a year when maximum food production and preservation are necessary.