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Frozen Vegetables

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“MY BEANS that I put in the cold storage locker are tough. Can you tell me what's the trouble with them?”

More than any other complaint about the storage of vegetables in locker plants is this one about beans. We are a little puzzled here at the Iowa Station when that question is thrown at us, because in 3 years of work in storing vegetables in two different commercial locker plants, we never have had tough snap beans.

But the answer, we think, is that the beans were tough when they were frozen and put in the locker. No matter how we have packed or stored the beans in our trials—whether packed dry, with brine, in various kinds of containers and held at different temperatures—under any and all circumstances, we have never had trouble with tough beans. We have made sure that the beans were in the proper stage when they were frozen and have not wasted our time and locker space on snap beans that were past the right maturity stage.

One of the things which too few people realize with lockers is that the product you take out will be no better than the one you put in. If snap beans go in that would be tough if cooked, they'll be tough when they come out. Freezing—no matter how it's done—won't make them tender again. With peas, if you wait until they are past the best stage for the table and then suddenly decide “those peas are getting away from us so we'd better pick them and put them in the locker” you are pretty likely to be disappointed in the way they taste.

The same rule holds with the other vegetables commonly stored—asparagus, sweet corn, spinach, carrots and others.

What is the right stage of maturity for putting the various kinds of vegetables in the locker? There is one rule that works—put them in the cold storage locker at the stage when they would taste best if cooked right then.

A lot of people seem to be concerned about whether they have the right variety for storage in the locker. In general, if the variety is one that tastes good on the table, it probably will be good when frozen and stored in your locker. In other words, our experience indicates that the variety is not nearly so important as many people believe. If you have a variety that you like on the table, it will probably be all right in the locker—providing, of course, that you put it in at the right time and do the other necessary things.
An ordinary refrigerator basket is excellent for use in scalding corn or spinach. Note the long hook-in handles to avoid burning hands, the large 15-gallon wash boiler, the teakettle for supplying extra boiling water and the cooling pan (at the woman's left). Scalding properly is one essential.

The work we have done in freezing foods indicates that the season may be more important than the variety. For example, last year (1940) was a cold, wet spring in Iowa. Peas and spinach thrive with that kind of weather, but asparagus doesn't. Asparagus was rather tough and not of good flavor.

The peas and spinach which we stored last year are exceptionally fine, but the asparagus is a disappointment. It is one of the convincing proofs that the product you take out of a cold storage locker will be no better than the one you put in.

This experience with last year's vegetables raises another question: If the season is just right for certain vegetables, why not store an extra quantity of them and store very few or none of the vegetables that the weather hasn't favored? Our asparagus stored in 1939 is much better than that we stored in 1940.

How long can one keep these vegetables satisfactorily? We don't know for sure. We are holding some for 18 months to test that length of storage. While it appears that some vegetables can be held that long very well, we are not for the present, at least, recommending holding any longer than a year.

The stumbling block for many a locker renter seems to be the processing and packing of vegetables. One of the common and serious mistakes that people make is to fail to scald (blanch) the vegetables before they are frozen, or to fail to do the scalding as it should be done. All common vegetables, except rhubarb, we have found require a short scalding process.

It is essential in scalding vegetables to have the water boiling and that enough water be used so that it does not stop boiling. That means far more water in proportion to the amount of vegetable being scalded than is commonly used. A 6 to 7-gallon canning kettle of aluminum or enamelled ware is satisfactory for many of the vegetables. It should contain 4 to 5 gallons of rapidly boiling water before the vegetables are placed in it. The level of the boiling water can be maintained by having a teakettle ready to add more boiling water.

About 1 pint of vegetables is enough to scald at one time in this 4 to 5 gallons of water.

It may sound ridiculous that you can't scald more than a pint of vegetables in 4 to 5 gallons of water, but our experience indicates that is enough if the job is done right. Of course there is no reason why you can't have two kettles going at the same time to speed the processing. For such vegetables as spinach or sweet corn, a 15-gallon tin-plated wash boiler works satisfactorily. In it should be 10 to 12 gallons of water.

A small wire basket of fine mesh with a bail handle works nicely for holding the vegetables inside the canning kettle. In the wash boiler, a long refrigerator basket works well. It may be necessary with spinach and greens to line the basket with two layers of cheesecloth to prevent the loss of leaves. The refrigerator basket can be held up with wires that hang on the sides of the boiler. The wire basket in the canning kettle can be set at a convenient height on the wire rack which comes with the kettle. It is important to keep the vegetables completely under water while in the scalding process. Move spinach or leafy greens up and down so that all the leaves are reached well with the boiling water.

People often make the mistake of either under-scalding or over-scalding. From our tests we have worked out a schedule for scalding (shown at top of next page).

As soon as the vegetable is removed from the boiling water, cool
it as quickly as possible by putting it into cold water. If you have running cold water, that is best. If you don't, you can use well water, or if the water is not real cool, you can use ice with it. For best results the water should stay below 60 °F. At least 3 to 4 gallons of water should be used for cooling the vegetables.

Cooling vegetables after scalding them assists in preserving color and in immediately stopping the scalding or pre-cooking process. The attractive color of frozen vegetables is retained largely because the vegetables receive the short scalding treatment followed by plunging them into cold water. Off-flavors and off-colors develop when folks try freezing vegetables without first scalding them.

It usually is not necessary to keep vegetables in the cooling water as long as in the scalding. As soon as they are cool, remove them. You can determine whether they are cool by biting into one of the peas or beans or whatever vegetable you are working with. It has been found that over-scalding or over-cooling results in loss of vitamin C and sugar, so the time needs to be watched carefully.

Folks often raise the question as to whether they should dry the vegetables after they are cooled and before they are packed. The answer is no. You can place them in a collander to drain off, but that's sufficient.

Now what to pack them in. There is no ideal container for frozen locker food that we know of. But several kinds give satisfactory results. They should be liquid-tight, rigid enough to support the product from crushing and as nearly water-vapor proof as possible to prevent the product drying out. Heavily waxed fiber board containers and those having an inner liner of parchment or cellophane are usually satisfactory. Glass jars sealed with rubber and tin cans sealed with a sealing machine and those sealed with friction covers all have been used successfully.

Glass jars and tin cans have the advantages of being air-tight, can be used several times and are easily sterilized. But glass jars don't stack in a locker well and must be handled carefully. One runs risk of disappointing flavors if he attempts to use paper containers more than once, because they can't be adequately cleaned or heat sterilized. Plain tin cans can be used for vegetables, but for fruits and rhubarb, cans should be lacquered on the inside.

We advise a brine pack for vegetables, although for spinach, corn and lima beans, a dry or straight pack seems about as satisfactory. When containers are not air-tight, brine packing will reduce drying out. If the locker room temperature runs above 0° F. brine packing probably is an aid to preservation.

The brine solution we recommend is very weak, usually a 2-percent solution made by dissolving 2 teaspoonfuls of salt in a pint of water. For those who prefer an even weaker solution, a 1 or 1½ percent solution can be used. The brine is added after packing the container. A space of 3/8 inch should be left in pint containers and 5/8 inch in quart for expansion during freezing. Enough brine should be added to just cover the product. If the brine added is cold, it will help keep the product cool while it is being delivered to the locker plant and the sharp freezer.

One of the common errors which folks makes is to delay too long after vegetables are processed and packed before getting them frozen and in the locker. The sooner you can get them to the freezer after they are ready the better. If you pick peas, beans or other vegetables at night for the locker and don't plan to take them to the plant until the next day, keep them in a refrigerator and don't scald them until the next day. After they have been scalded and packed, then get them to the locker as soon as you can.

A string on the bail of the wire basket containing the vegetables helps avoid danger of burning hands.

Though one should scald only about a pint of beans, peas and the like at a time in 4 to 5 gallons of water, you can use two kettles at a time. Cooling the vegetable quickly after scalding is very essential. A string on the bail of the wire basket containing the vegetables helps avoid danger of burning hands.