For manufacturing maraschino cherries it is important that the fresh cherries be picked at the proper time. As the fruit begins to ripen and the blush appears is the best stage for picking. When the blush has extended over the larger part of the surface and the flesh softens, there is generally considerable bruising and injury to the surface of the skin. This injury causes a brown blemish in the bleached cherry which cannot be removed.

The cherries should be picked with the stems. The removal of the stems before bleaching causes brown discolorations to appear in the flesh where the stem was attached. This is not removed by the bleach. Furthermore, it permits the strong bleach to enter the cherry causing softening. All inferior fruit should be removed before barreling.

Containers for bleaching are fir barrels which have been coated with paraffine. The head is removed and the exact amount of cherries is weighed into the barrel. The weight we have found to be the best under all conditions is 240 pounds for the standard 52 gallon barrel. The use of more fruit causes too large an expansion, which brings on cracking of the fruit.

### SOLUTIONS FOR BLEACHING CHERRIES

A large variety of bleaching combinations have been tried, all of which use either sulfur dioxide \((SO_2)\) gas or sulfite of soda in solution as the bleaching agent. To these solutions a number of compounds have been added for the purpose of hardening the cherry and for prevention of checking and cracking of the fruit while in the bleach. A number of these combinations give a superior product as far as toughness and absence of cracks are concerned, but which affect the proper absorption of dye and final color of the finished cherries. Other combinations have given an excellent brilliant finished fruit but have not prevented cracking in the bleach solution. At present only a few bleaching combinations can be recommended until further study has been made.

A bleach solution made by using a 1 1/2% \(SO_2\) (sulfur dioxide) solution to which 3.09 pounds of hydrated lime is added per barrel of cherries, has been found very good. It requires approximately 200 pounds of bleach solution for each barrel where 240 pounds of cherries are used.

Another bleach solution of 1 1/2% \(SO_2\) gas in water with the addition of 8 pounds of hydrated lime and 1 1/2 pounds of alum per 100 gallons is very good.

The sulfur dioxide \((SO_2)\) solutions are prepared by bubbling the compressed gas into water through a lead pipe perforated with small holes and placed in the bottom of the tank. By noting the loss of weight of the gas cylinder the approximate strength can be estimated before the final test is made.
This can be done best by measuring the volume of liquid in the tank and computing the weight. Keep the cylinder of SO₂ (sulfur dioxide) on a scale and the loss in weight can be checked very readily.

TESTING THE BLEACH SOLUTION

After checking the loss in weight in the cylinder so that it approximates 1 1/2% SO₂ strength, the following test should be made to be sure the sulfurous acid is sufficiently strong to give 1 1/2% SO₂ (sulfur dioxide). Take a 500 cc Erlenmeyer flask and add 1/4 to 1/2 inch of water. Then fill a 25 cc pipette by suction with standard iodine solution. This should be slightly above the mark. Quickly place the finger tip over the pipette stem before the liquid level drops to the line, then by raising the finger tip very slightly, allow the level of the iodine solution to drop slowly to the point where the bottom or curved liquid surface is just even with the mark. Now transfer the pipette to the Erlenmeyer flask and allow the iodine to drain into it. As soon as the iodine has run down, touch the tip of the pipette to the side of the flask to remove the drop on the tip.

Next prepare a starch solution as follows: To 1/2 pint of cold water add as much corn starch as can be heaped on a dime. Place on a hot plate or stove and heat to boiling with constant stirring to prevent lumping of the starch. This solution may be kept in a bottle but should be made up fresh every few days as it may mold or become unfit for use if kept too long.

Add to the iodine solution in the flask about 1/2 teaspoonful of the starch solution. Now fill the 10 cc measuring pipette with the bleaching solution and bring the level of the liquid to the zero mark. Then allow the bleaching solution to run slowly from the pipette into the flask containing the iodine solution with occasional rotating of the flask to keep the solution well mixed. As the reaction nears completion the color of the iodine solution becomes purple. At this point add the bleaching solution very slowly and at the point where one drop dispels all color from the iodine solution place the finger tip tightly on the pipette stem to stop the flow and read the volume used, remembering to always read to bottom of the curved surface of the solution in the pipette.

Now refer to the chart to obtain the strength of the bleach solution. Move your pencil point to the right from zero on the base line of the chart until the number of cubic centimeters (cc) of bleach solution used in the test is reached. Then move upward from the bottom of the chart until the curve is met. From this point of intersection move the pencil point horizontally to the left until the edge of the chart is reached. Then read the strength of the bleach solution from the vertical reference line at the left edge of the chart.

For example, suppose that 9.4 cc of solution are required to react with 25 cc of iodine. It is found that the line from the point on the base representing 9.4 cc intersects the curve at the point which corresponds to 1.7% strength of bleach. Likewise, where 15.2 cc are used, it is found that the strength is 1.05%.

A quart of standard iodine solution together with the two pipettes and flask required for the test may be obtained from a commercial chemist or wholesale drug firm or the outfit will be furnished for $2.50 by the Department of Agricultural Chemistry of the Oregon Agricultural Experiment Station.
A METHOD OF MIXING SOLUTIONS

When sulfur dioxide solution has been made and tested for the proper strength it should be mixed with the other ingredients necessary to properly harden the tissue of the cherry. This can best be done in a separate tank where the hydrated lime or hydrated lime and alum can be kept agitated while filling the barrels. Unless constantly stirred an excess of hydrated lime will be added to certain barrels which will prevent the proper action of the sulfur dioxide resulting in bacterial spoilage. If a tank with a capacity slightly greater than the tank for making the sulfur dioxide solution is used, better mixing can be obtained.

CARE OF CHERRIES AFTER BARRELING

After the solution has been placed on the fruit and the barrel stored away, it should be carefully observed. The barrel should be rolled at intervals of at least once or twice a day to prevent the lime settling out on the bottom of the barrel. The spoilage previously mentioned will occur in many instances if this is allowed to take place. Oftentimes only a portion of the barrel may be involved. After a period of ten days the rolling can be discontinued but the barrel should be observed and kept filled with liquid.

STORAGE OF BARRELS

Where cool storage rooms such as basements protected from the heat are available, these can be advantageously used for the storage of the cherries until ready for further handling in the preparation process.

STEMMING AND PITTING

The fruit is removed from the barrels and rinsed with water to remove the bleach liquor. Stems and pits are then removed, taking care to break the fruit no more than necessary to remove the pit. Pitting and stemming may be carried out either before or after leaching.

LEACHING THE CHERRIES

The first step in the process of preparation is leaching. It is very important that much of the soluble materials used in bleaching and hardening process be removed before the fruit is dyed. The presence of some of these chemicals causes darkening and off color conditions in the finished fruit.

The best way to leach is after first pouring off all the old bleach solution, place the end of a water hose in the bottom of the barrel and allow the water to run into the container continuously for 12-18 hours. The leaching process if properly done is very beneficial if good results are to be obtained. If leached before pitting and stemming, a longer time is necessary.

ADDING COLOR TO THE FRUIT

The type of color most commonly used for good results where the cherries are used for both bottling and fruit salad purposes is Erythrosine. To use this color the fruit must be made slightly alkaline, otherwise the color will precipitate out. The first step, therefore, is to neutralize the remaining acid present in the fruit by adding 7 ounces of sodium bicarbonate or baking soda to each 100 pounds of fruit used. When handling the fruit in the dyeing process we found that for every 100 pounds of fruit used a like weight of water should be added to the fruit when placed in the kettle for dyeing.
Many operators prefer to dye their cherries by the continuous boiling process. Where this is done the soda should be added to the fruit, then after boiling a few minutes add the dye. The dye is added at the rate of 1 ounce of Erythrosine per 100 pounds of liquid.

The operation of dyeing need not be a continuous one. In fact an intermittent process seems to be preferred by many. All that is necessary with such a method is to boil the fruit a very short time with the soda and dye, then stand aside in either stainless steel, copper or monel metal containers till the following day, at which time they can be reheated and again placed aside.

When the dye has completely diffused through the cherry it is ready to be set. This is done by heating the cherries in their dye liquid with 1 pound of citric acid per 100 pounds liquid. After boiling a few minutes set aside for 24 hours. After standing, drain off the colored liquid and start the candying process.

**CANDYING PROCESS EMPLOYED**

Before starting the candying process it is well to wash the dyed cherries in cold water to remove any of the dye which can be removed easily. Make up a sugar solution of a strength of 30 degrees Balling which requires 30 pounds of sugar for each 70 pounds of water. Acidify this sugar solution with just enough citric acid to turn blue litmus red. Place the fruit in the kettle, add enough of this acidified syrup to cover. Bring to a boil and boil for five or ten minutes. Pour cherries and syrup into containers as before mentioned for dyeing and allow them to remain till the following day.

On the following day the syrup should be drained off and strengthened by the addition of sugar till it tests 5 degrees higher. Add this syrup to the cherries and again allow to stand until the following day. Repeat the operation until the fruit has been brought to the density desired. For complete candying the density should be 65° Balling.

Many operators use the fruit for fruit salad purposes. Where it is used for this purpose it need not be built up to a point as high as that used for candied fruit.

**FLAVORING THE CHERRIES**

Cherries for bottling should be carefully sorted. Sizing usually takes place when the cherries are pitted. The candying process may blurnish some of the fruit, therefore it is necessary to hand sort when bottling.

To the fruit placed in bottles a fresh syrup of a density equal to the density of the last syrup should be applied. This syrup should be flavored with either a prepared maraschino extract or almond flavoring. Such flavors can be obtained from extract manufacturers or they can be compounded from private formulas. The amount of flavor applied depends entirely upon its strength and should be tried by each operator.

After bottling the bottles should be sterilized in water held at a temperature of 180°F. for from 30 minutes to 1 hour, depending upon the size of container.
USE OF BENZOATE OF SODA

Where benzoate of soda is used as a preservative in the manufacture of maraschino cherries, not more than one-tenth of one per cent by weight should be used. It must be specified on the label as indicated by the pure food law.

CAUTION

When making up maraschino cherries do not use any container made of iron. Contact of this metal with the fruit causes discoloration. Copper is the metal which is preferable for handling after the fruit is removed from its wooden containers.
Percent SO₂ in solution

cc. of SO₂ solution required for 25cc Iodine