*Commodity Fact Sheet*

# Processing Tomatoes

***Information compiled by the California Tomato Growers Association, Inc.***

**How Produced** – Tomato plants are planted in the field as seeds or as young plants, called seedlings. If sowing seeds directly into the ground, the producer sows seeds in late January or early February. If planting by seedling, plants are grown in greenhouses until they are hardy enough to be planted outside in the spring.

Tomatoes are ready for harvest between ealry July and mid-October. To avoid the daytime heat, tomatoes growers often harvest the crop after sunset. Mechanical harvesters move through the fields picking the entire tomato plant and shaking the tomatoes off the vine. Specially designed electronic sensors on the harvesters sort the ripe, red tomatoes from the vine and transfer them into a gondola pulled by a tractor following alongside. The tomatoes are immediately transported from the fields by trucks, which can hold approximately 50,000 pounds of tomatoes. Trucks haul the crop to a nearby state-controlled grading station to be graded, then on to a tomato processing plant where they are peeled, sliced, diced, or sauced into the familiar canned tomato products seen on store shelves.

**History** – The first tomatoes can be traced to the South American Andes Mountains where they grew wild as cherry-sized berries. Padres following the Spanish conquistadors most likely sent the first seeds to Spain in the early 1500s. The fruit gained little attention in Spain, but soon traveled to Italy—a country that embraced tomatoes with great passion and developed numerous recipes which are still popular today. By the mid-sixteenth century, tomatoes made their return to America via English colonists. They did not become an important part of the American diet, however, until after World War I. Today, tomatoes are grown in every state except Alaska.

**Varieties** – There are more than 2,750 genetic varieties of fresh market and processing tomatoes at the Tomato Genetics Stock Center at the University of California, Davis. These varieties have been developed to suit the various growing conditions around the state, taking into account soil type, climate, and disease. Processing tomatoes have been selectively bred for more than 50 years to differ from fresh market tomatoes. The varieties designated for processing have a thicker skin and firmer consistency than fresh market tomatoes. These qualities enable the mechanical harvester to pick the fruit when it is ripe without damaging the fruit and ensure tomatoes can survive transportation. The processors prefer the "meatier" character of the processing tomatoes because it provides consumers with more of the tomatoes' essence.

**Commodity Value** – California is the nation's leading producer of processing tomatoes. In 2013, California's processing tomato growers grew approximately 12 million tons on 259,000 acres throughout the state. California farmers produce more than 95 percent of the nation's processed tomatoes and nearly one-third of the world's total processed tomato tonnage. The state's crop value reached $853 million in 2013.

**Top Producing Counties** – Fresno County leads production followed by Kings, Yolo, San Joaquin, Merced, and Kern counties. However, nearly the entire state is involved in producing processing tomatoes, with some being grown as far south as Kern County and as far north as Colusa County.

**Nutritional Value** – Processing tomatoes are are a nutrient dense food. One, four-ounce tomato supplies about one-third of the recommended daily allowance for vitamin C, plus contains beta-carotene, potassium, folic acid, and other B vitamins, iron, and fiber. Tomatoes are a naturally low-calorie food.

Studies show processing tomatoes are the leading source of lycopene in the American diet. Lycopene, the ingredient that makes tomatoes red, is an antioxidant that blocks cellular damage and is highly effective in preventing cancers. Tomatoes do not lose their health benefits as they are processed and cooked. In fact, lycopene in cooked and processed tomatoes (sauce, paste, salsa, canned tomatoes) is more easily absorbed than fresh tomatoes. This fact, along with their popularity, makes tomatoes a leading nutritional source in the American diet.

**For additional information:**

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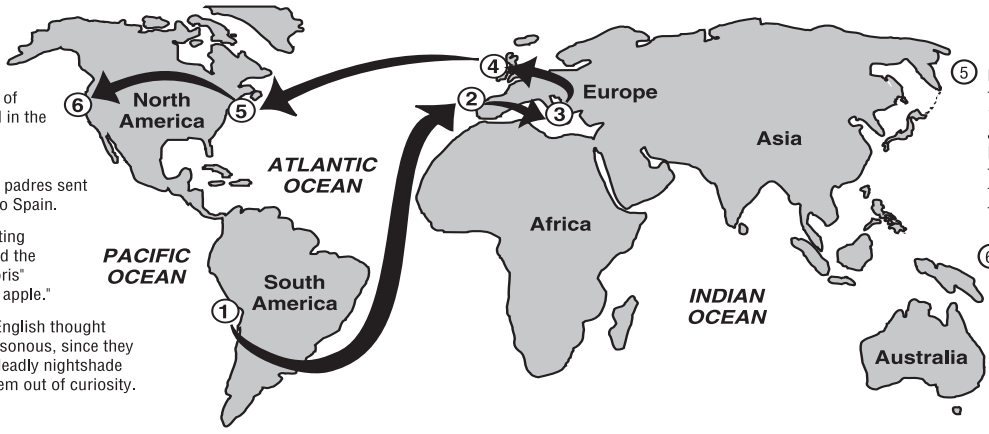
# Processing Tomatoes Activity Sheet

## The Tomato's Journey to North America




1. Tomatoes, the size of cherries, grew wild in the Andes Mountains.
2. In the early 1500s, padres sent the tomato seeds to Spain.
3. Italians enjoyed eating tomatoes and called the tomato "poma amoris" which means "love apple."
4. In the 1600s, the English thought tomatoes were poisonous, since they are related to the deadly nightshade plant, and grew them out of curiosity.
5. English colonists brought the tomato to America in the mid-1700s. In 1820, Robert Gibbon Johnson stood on the steps of a New Jersey courthouse, ate a tomato, and lived. Americans finally believed tomatoes were tasty and not deadly.
6. In the 1950s, mechanical harvesters were developed. Scientists began developing tomatoes with tougher skins, fewer seeds and less juice. They also were more rectangular in shape, and greater in yield.

### *Lesson Ideas*

- Label and color the top seven counties in California for processing tomato production.
- Make a collage made from labels of various processed tomato products.
- Make a Venn diagram which compares processing tomatoes to fresh market tomatoes.
- Find out why a tomato is scientifically a fruit but is also known as a vegetable.
- Create a class cookbook which includes favorite student recipes using a tomato product.
- Research nightshade. What crops are related to this family of plants?
- Research the Spanish exploration movement of the 1500s. What other "treasures" came from the New World?
- Locate your nearest tomato processor. Where do the tomatoes they process come from?

### *Fantastic Facts*

1. Which state leads the nation in processing tomato production?
2. How are processing tomatoes harvested?
3. Why do processing tomatoes have thicker skins than fresh market tomatoes?
4. How many different varieties of tomatoes are there?
5. True or false? Tomatoes were once thought to be poisonous.
6. Name one vitamin or mineral processing tomatoes are rich in.
7. The first tomatoes originated in the South American Andes and were berries the size of _____.

1) California 2) By machines 3) So they can be mechanically harvested and successfully transported 4) 2,750 5) True 6) Vitamin A, vitamin C, potassium, folic acid, beta-carotene, iron, B vitamins, fiber 7) Cherries

### *Lesson Plan: pH Perfection*

**Introduction:** When food is preserved, the microorganisms causing food spoilage are destroyed or slowed down. This is done by using extreme temperatures, changing the moisture level, or altering the acidity of the foods. The temperature of canning is extremely important for safety reasons. Foods with a pH higher than 4.6 must be canned at 240ºF or greater. Foods that are more acidic, having pH measurements less than 4.6, may be preserved at 212ºF. This difference in temperature can affect food taste and cost. In this experiment, students will determine at which temperature tomatoes should be canned.

**Materials:** Lemon, pear, carrot and tomato juice, litmus paper which shows varying pHs, six paper cups or test tubes, forceps.

**Procedure:**

1. Discuss reasons and ways people preserve food. Talk about the importance of acidity and heat in canning. Explain what pH is and how scientists determine the pH of a substance. Talk about the indicator litmus and how it will be used.
2. Pour an equal amount of each substance to be tested into a cup or test tube.
3. Using the forceps, have the students dip one piece of litmus into one substance and record its pH. Repeat this procedure for each juice.
4. Discuss which foods could be preserved at the lower temperature and which need to be canned at the higher temperature. Where do tomatoes fall in this test?
5. What could be done to the foods to change their pHs? When do you think scientists should check the pH of the item to be canned?

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This is one in a series of fact sheets composed by the California Foundation for Agriculture in the Classroom (CFAITC). For additional educational materials: CFAITC, 2300 River Plaza Drive, Sacramento, CA 95833-3293 (916) 561-5625 ✤ (800) 700-AITC ✤ Fax: (916) 561-5697
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