

# PISTACHIOS



*Presented by*



**WIFSS**  
Western Institute for  
Food Safety & Security



# PISTACHIOS

This production summary provides an overview of growing, harvesting, packing, and holding practices. There are some common practices that many large commercial growers use when producing pistachios, and though there are variations in these practices, having an understanding of the most common methods used will be helpful when carrying out regulatory activities.

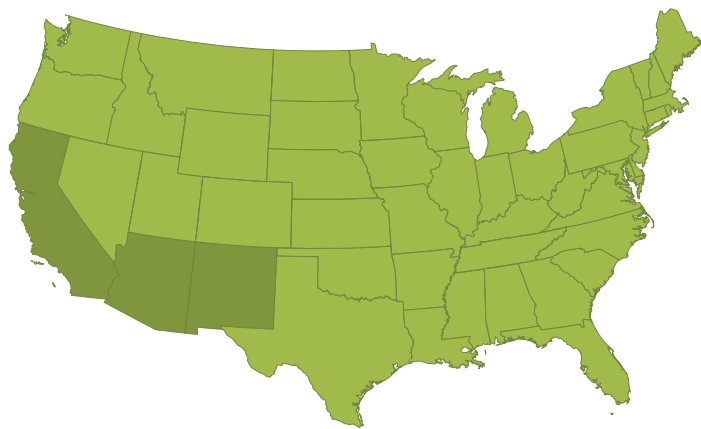
## By the end of this summary, you will be able to:

1. List several varieties of commercially produced pistachios.
2. List the top producing regions in the U.S. for pistachio production.
3. Identify the most common farming practices used in the production of pistachios.

### INTRODUCTION

Many cultivars or varieties of pistachios are grown commercially. However, 'Kerman' is the most common female cultivar and 'Peters' is the predominant pollinating male cultivar.

The United States is the world's leading producer of pistachios accounting for approximately 40% of world production. Commercial U.S. pistachio production takes place almost exclusively in the San Joaquin and Sacramento valley regions of California. Each year, California growers produced nearly 300,000 tons of pistachios! Pistachios are also produced in Arizona and New Mexico but to a much lesser extent (Fig 1).



**Fig 1 - Top Pistachio Producing States in the US**

### GROWING

Pistachios thrive in deep uniform loam soils consisting of clay, sand, humus, or other organic material. This type of soil is sufficiently permeable while being able



to adequately hold moisture. When preparing to plant a new orchard, growers cultivate the soil to loosen clods and grade the orchard. It is common practice to use a chisel attachment to dig deep down and break up any hardpan below the soil surface to help newly planted trees establish a deep root system. Specialized equipment is used to form raised beds or individual mounds on which trees will be planted. Irrigation lines are installed.

Pistachio trees start as grafted transplants. The grafts are started on a root stock system that is best suited for the orchard site. Root stocks are selected based on which is hardier and more resistant to pest infestations.

Pistachio trees are 'alternate bearing' meaning that an entire tree alternates between a high production year followed by a year of low production. Both male and female pistachio trees are required for pistachio production and usually one male tree is planted for every eight to 24 female trees. Young pistachio trees take five to six years to produce nuts.



California pistachio orchards can last for 70 to 100 years as long as the trees are cared for properly. Most trees will reach maximum production levels around 20 years and will continue to produce at this high rate for many seasons.

The pistachio growing season begins in late March when buds formed the previous summer begin to swell. Blossoms open in April. Pistachio trees can be successfully wind pollinated, unlike other fruit and nut trees that require honey bee pollination.



During May, the shells expand inside the hull. By June when the shells have reached full size, they begin to harden, and completely fill with the nut by July. As the nut enlarges, it causes the shell to split naturally.

Young pistachio trees require sizable water consumption – about 50 gallons of water per tree per day from late July to late August. Much of this water is administered by drip irrigation. Most newer pistachio orchards use microirrigation systems, which allow growers to more precisely control the quantity and timing of orchard irrigations. The frequency of water application during the growing season depends on the age of the orchard, the levels of precipitation in the region, and other weather conditions. Pistachio shell splitting is particularly sensitive to irrigation deficits. Growers carefully maintain soil moisture levels to maximize shell splitting, while ensuring the orchard rows will be dry enough to support harvest equipment.

Growers gauge the need for various fertilizers through soil and leaf analysis throughout the year. Fertilizers are typically applied to the root zone when the tree is able to use it efficiently. Fertilization of trees may be done in the winter while the trees lay dormant or in the late spring after the foliage of the trees has developed and the fruit is beginning to grow. Common elements needed include

nitrogen, phosphorus, and potassium. These are applied in varying proportions depending on element availability in the soil.

Orchards are tended all year round to ensure the health of the trees. Weeds are removed. Trees are pruned and sprayed to help manage pests and disease that can damage trees and effect crops. Selection of specific root stock that is resistant to certain types of pests can reduce susceptibility of trees and reduce the need for certain pesticide applications.

#### HARVESTING

Pistachios are harvested starting in late August or early September. The crop is ready for harvest when the shells begin to split and the hull (the protective covering over the shell) removes easily when pinched. Pistachios are harvested by mechanically shaking the trees. Pistachios fall onto a 'V' shaped catch frame. The harvested nuts are then collected on a conveyer belt and transferred to a plastic bin or directly into a gondola trailer.



Pistachios are subject to shell staining if they remain on the tree too long or if the hulls remain in contact with the shells for an extended period of time after harvest. Because of this, the industry concentrates its harvesting efforts around the clock for six to eight weeks during the harvest season.

#### PACKING

Although hulling can take place in the field, most growers transport harvested pistachios to a contract processor to have hulls removed and nuts stored.



At the processor, nuts are unloaded from trailers and field materials such as branches, leaves, and twigs are removed. Next, hulls are removed using an abrasive peeler. Water is used to aid in the removal of the hull. Following hull removal, pistachios are conveyed to a float tank where blank shells are separated from shells containing nuts. Good quality nuts will sink and are moved out of float tank to a heated drier.



The nuts are dried to a moisture level of between 12 to 13%. Once pistachios have been hulled, they are moved to a silo to complete the drying process. The nuts will remain in the storage silos until they reach a moisture level of 4 to 6%. The nuts may be fumigated to protect the crop from insect damage.



After drying, pistachios may be subject to a mechanical process whereby nuts are separated based on whether the shells are split or not. This separation process involves nuts entering a drum containing slender needles. The rotating drum captures nuts that have already split while the closed-shell nuts pass through the drum. Naturally split shells command a premium and are graded on size and shell color. Non-split shells are mechanically cracked and the meat is separated from the shells. After pistachios are separated into bins, the bins are stored at 40° to 45°F until the nuts are ready to be packaged.

## CONCLUSION

**Having a basic understanding of the way pistachios are grown, harvested, sorted, dried, and packed will provide the basic background information that will be helpful to regulators when completing inspections or investigations in the field.**

*The agricultural practices described in this production summary are common on most large commercial farms like those found in major pistachio producing regions in the United States. There are undoubtedly variations in these practices depending on the region, operation size, and individual grower preferences. This is especially true of farms outside of the U.S.*

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