

Carrots Are Not Just for Rabbits

When most people think of the carrot, they automatically associate it with the color orange. However, carrots are not naturally orange; it has taken thousands of years of selective breeding to develop the color associated with carrots today (W.C.M.). The common carrot has two main varieties; one commonly grown in the east known as *Daucus carota* subspecies *atrorubens* and the other grown in the West is known as *Daucus carota* subspecies *sativus*. The carrots grown in the West have orange, white and red colors, whereas those grown in the East have more dark hues, such as purple and red and even black. The full story of the carrot involves its history, how it is farmed, the way it is distributed, the economic value it holds, and a significant impact on today's society. The carrot is not just another average commodity, rather it is a part of many people's everyday lives.

The history of carrots begins in the botanical family Apiaceae where they originated, which also includes other plants such as celery and parsley. They have been cultivated since long before the time of ancient Greece (Grieve). They are not native to California and are known to have been domesticated in the Middle East during the 10th century, from there they spread to Spain and then America with the help of the colonists who then sent them to California with the settlers that were moving westward (W.C.M.). Carrots became important to California agriculture because it was a place with plenty of fertile growing land, something that carrots require. The climate is also ideal for carrot farming, allowing California to grow carrots year round. Northern California is able to produce them in the summer whereas Southern California is able to produce carrots in the winter. California alone is responsible for growing about 85% of the carrots that are consumed in America on about 70,000 acres of land, with the farmer averaging about \$6,000

per acre of Carrots (Nuñez). Based on these numbers alone, it is clear that carrots are not an occasional snack or option, but they are actually high in demand.

Carrots tend to be grown in colder climates because the optimal temperature for their cultivation is between sixty to seventy degrees Fahrenheit. At this temperature, the roots are able to achieve the ideal color that society knows as bright orange. Carrots can tolerate frost to a certain extent; however, if the temperature is too low, the root and the leaves will grow too slowly. (Naeve) On the other hand, if the temperature is too high then the leaves grow too fast and the root will acquire a strong taste that would ultimately lower the carrot's market value. The seed of the vegetable is planted $\frac{1}{4}$ - $\frac{1}{2}$ inches into the soil. The type of soil matters because it needs to be light without any barriers so that the root can grow easier. Heavy ground will cause a growth of damaged root which would make the product less desirable by the consumer. Carrots require a consistent water source because if the ground is too dry, the root might split. But if it is too wet or overwatered, the carrots will not be able to develop a good color and may even become diseased. Carrots are grown deep in the soil, which gives them the ability to extract nitrogen from the soil. Research shows that if nitrogen is used, it is applied with phosphorus fertilizer (Nuñez). Carrots require great care and consideration when it comes to how they are grown and cultivated, and only with this great care and consideration can carrots be as healthy and delicious as they are.

In California, carrots are cultivated year round. They are planted in the different regions of the state at specific times of the year, so that the end products and harvest times are optimal. In the Southern California (San Joaquin and Cuyama Valleys) carrots are planted from December to March and from July to September and are harvested from May to July and

November to February. In the Southern desert, carrots are cultivated from August to February and harvested from December to June whereas in the high desert, they are grown from April to July and gathered from August to December. On the central coast of California, carrots are grown from December to August and harvested from April to January. However, the most flavorful and freshest carrots are harvested during the summer and fall (Nuñez). Each of these times of year play an important role in the proper growing and harvesting of carrots because without them, California would not be able to grow the high-quality carrots that it does today.

For harvesting commercial carrots, farmers use self-propelled multi-row harvesters. After they are harvested, the carrots are carried to a place where they are washed and then sorted by grade and size followed by a packaging process. The carrots that are damaged or do not meet certain criteria are culled and often used for the cut and peel market. However, some carrots are grown specifically to be sold into the cut and peel market. In this case, the harvesting of carrots for mini carrots in the cut and peel market differ from the collection of crop commercially grown carrots which can be rather challenging because the roots have a high density. Harvesting carrots for a bundle is different as well because the beds are undercut, and the vegetables are sorted by hand in the farmland. The green tops are tied together with a wire twist tie and then transferred to another location to be washed and packaged. In all cases, the proper handling of carrots is crucial as it can prevent from damaging the vegetable and ultimately extend the storage life.

The best condition for carrot storage is thirty-two degrees Fahrenheit and 99% humidity. Under these conditions, vegetables can be stored for more than seven months, allowing them to stay fresh through shipping and purchase. Vegetables for the cut and peel market are usually cut into 2.1-inch pieces which makes them and bunched carrots quicker to spoil. They need to be

precooled to thirty-two degrees Fahrenheit and can be stored for up to two weeks (Kelley). During transport and storage, the carrots should not be exposed to ethylene gas because it can activate the compounds in the vegetable that makes them bitter and less enjoyable. The carrots are shipped from California year around; however, the highest peak is from December to August (Nuñez).

The main processors of carrot foods in California are Grimmway Farms, Bolthouse Farms, and Kern Ridge Growers, many of which also contract with other farmers and grow their carrots as well. The B&P Packing Co is the main company that packs the vegetable. Carrots also have multiple uses besides the obvious one in the food industry. They are employed in areas including cosmetics and pharmaceutical industries as a pigment. Most anti-aging creams consist of some form of carrot such as carrots seed oil or carrot juice, making carrot by-products much more common than a normal consumer may realize.

Every day, households obtain easy access to carrots by visiting their local grocery store. Most consumers purchase carrots a few minutes away from their home but do not consider the fact that they are being shipped hundreds of miles across the state for their convenience. The four main areas of California that grow carrots include the San Joaquin Valley and the Cuyama Valley, the southern desert, the high desert, and the central coast (Nuñez, 2008). Within these areas are also the popular counties including Kern and Santa Barbara, Imperial and Riverside, Los Angeles, and Monterrey.

California's leading counties of carrot production are Kern, Imperial, Monterey, Madera, and Los Angeles with Kern County being the top growing county for carrots with an economic value of about \$418,920. Following Kern, Imperial County's economic value for carrots is about

\$74,224. Monterey's economic value is \$21,930, Madera's is \$14,620, and Los Angeles' carrot economic value is about \$12,370.82. Together, they produce about \$562,310 worth of carrots annually and produce 86% of all United States carrot product. California is the number one supplier of carrots for the United States, growing on 62,000 acres across the state. As a whole, the economic value for carrots grown in California is about \$659,610 making carrots the seventh most popular vegetable in the United States. (Naeve, 2015). The economic value of carrots annually for the United States is about \$692.8 million.

Not only does the United States make a profit off of carrots within the country, but they also export them to make profits in other countries as well. In 2011, the export values for carrots was about \$115 million with the United States exporting 71% of carrots to Canada, 8% to Mexico, 7% to Japan, 5% to South Korea, and 9% to the rest of the world. With the annual economic value of carrots being \$692.8 million, carrots have a significant impact on the United States' wealth. Although a small carrot may not seem to have a high impact, this vegetable will continue to have a significant economic influence as well as a large overall influence on society.

Carrots as a whole have come a long way and continue to impact today's society in a number of ways. The main focus of carrots is on nutritional values that it can provide and the numerous ways it can be consumed. There are a handful of major health benefits that can come from carrots including better eyesight and even healthier skin. Carrots contain vitamins and antioxidants such as vitamin A and beta-carotene that aid in improving and maintaining retina function in your eyes as well as preventing dry skin, acne, and uneven skin tone. (Herrington) They also contain carotenoids that, when eaten in appropriate portions, can help prevent heart diseases by reducing cholesterol. (Herrington) Eating small portions of carrots can be beneficial

to the consumer in ways similar to the ones listed above. However, they can become harmful if too much is consumed at once, or if they are eaten too often.

While carrots can have positive nutritional impacts, they can also serve other roles other than the one in a meal. Traces of carrot by-products can be found in a number of different types of beauty products including lotions, oils, and moisturizers. The more popular carrot based ingredients found in these types of products include carrot seed essential oil, carrot root powder, and carrot root extract. (Carrot Products) These ingredients can be used in multiple products including facial and skin treatments, creams, conditioners, and lotions and soaps. (Carrot Products) However, these products need to be used in moderation similar to simply eating carrots because if they are used too often, the skin and hair will instead be damaged rather than treated or moisturized. All in all, carrots have grown to play a large role in the nutritional part of society's day to day lives as well as a smaller, less common role in some people's beauty regimens.

Overall, carrots have come a long way throughout history to be where they are now and they continue to play important roles in today's society. Carrots have grown from being a small part in a small botanical family, to a large part in the daily diet of many people around the world. They have become a popular vegetable to grow in California as well as other places around the world, and can be found at virtually any grocery store which will often buy them from places near and far. Carrots can also be made into multiple types of carrot by-products which can be found in different types of beauty supplies. Altogether, carrots are used in a handful of important ways, both nutritionally and for beautification, and are a bigger part in society's day to day lives than most people have come to believe or realize.

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