



Awesome Avocados



Fun Facts

- Avocados are classified as fruits of the flowering plant family, Lauraceae.
- Avocado trees can grow as tall as 80 feet and produce as many as 400 pieces of fruit annually!
- Although avocados are grown year-round, more than 75% of California's shipments take place March – August.
- English colonists nicknamed Avocados "alligator pears" due to their rough green skin and shape.



Try at Home: Fresh Guacamole

Ingredients

- 2 ripe avocados (should be soft with a little give when gently squeezing)
- 1 ripe medium tomato, diced
- ½ red onion, diced
- 2 Tbsp cilantro leaves, chopped
- 1 Tbsp lime juice
- Dash of salt and pepper to taste

Directions

1. Scoop out inside flesh of avocado and remove seed. Mash with a fork.
2. Mix in all the other ingredients and enjoy with raw veggies or whole grain tortilla chips.



Nutritional Benefits

A ½ cup of sliced avocados is:

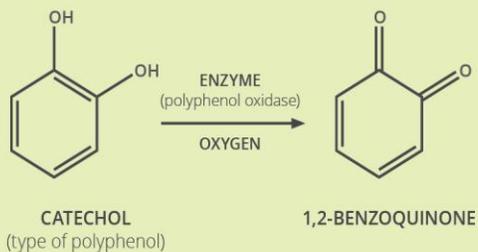
- An excellent source of fiber, which aids digestion, and monounsaturated fat, which is necessary for brain and skin health. Both fiber and unsaturated fats make you feel satisfied and fuller for longer after a meal.
- A good source of vitamin C (antioxidant), vitamin B6 (protein metabolism), folate (DNA synthesis), potassium (electrolyte), and vitamin K (blood clotting and bone health).
- A source of many other essential vitamins and minerals including vitamin E, riboflavin, niacin, and magnesium.

Science Station!

If you leave guacamole out too long without covering it tightly, it will turn brown. Oxygen from the air reacts with an enzyme in the avocado resulting in the observed color change. (See picture on next page). Don't throw guacamole away; it's still perfectly safe to eat!

THE CHEMISTRY OF AN AVOCADO

WHAT MAKES AVOCADO GO BROWN?



Avocados contain a class of compounds called phenols. These compounds can be converted to compounds called quinones when exposed to oxygen in the air - this process is hastened by the enzyme polyphenol oxidase.

Some of these quinone compounds are toxic to bacteria, and so the process is beneficial for the fruit. However, the quinones can also react with themselves to form long polymer chains, causing the brown colouration. This also occurs in many other fruits. Avocados brown quickly as they have a large amount of polyphenol oxidase.

The polymeric compounds causing the brown colouration are melanin pigments. Melanin is also the primary pigment determining skin colour in humans.



PREVENTING THE BROWNING OF AVOCADOS



Contrary to popular belief, leaving the stone in the avocado or guacamole doesn't slow browning, as it doesn't block oxygen. Covering with clingfilm can block oxygen, and hence delay browning. Adding lemon or lime juice, or chilling the avocado, can also delay browning, as it inhibits the activity of the polyphenol oxidase enzyme.

Preventing Oxidation:

There are 3 ways to prevent/delay the browning reaction due to oxidation.

1. Inactivate the enzyme- Since Polyphenol oxidase is sensitive to very acidic environments, adding lemon or lime juice will lower the pH to create a more acidic environment, and thus prohibiting the reaction from occurring.
2. Prevent oxygen from entering the system- placing plastic wrap over surface of guacamole or putting it in an air-tight container will prevent oxygen from reacting with the enzyme, preventing browning.
3. Drop the temp- Enzymes are sensitive to changes in pH and temperature, so putting the guacamole in the fridge will slow the reaction.

References:

California Avocados. *California Department of Food and Agriculture*. www.cdfa.ca.gov.

Harvest of the Month. *California Department of Public Health*.
http://harvestofthemonth.cdph.ca.gov/documents/Spring/Avocados/Avocado%20-%20Educator's%20Newsletter_Final.pdf.

Dietary Facts Sheets. *National Institute of Health*. <https://ods.od.nih.gov/factsheets/>.

Bauer, Elise. How to make the perfect guacamole.
https://www.simplyrecipes.com/recipes/perfect_guacamole/.

