

## **Climacteric Ripening**

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One of the things I find fascinating about Food Science is the rather strange terms we routinely encounter. “Climacteric ripening” falls into this category and is something familiar to most of us, whether or not we actually realize it.

“Climacteric ripening” affects a number of fruits including apples, avocados, bananas, mangoes, peaches, pears, plums, and tomatoes (yes, tomatoes are actually a fruit). Climacteric fruits ripen after being picked, which provides a number of advantages as we shall soon see. Significant spikes in respiration are triggered by the natural production of ethylene as they near optimal ripeness.

In comparison, non-climacteric fruits do not ripen after harvesting. Examples include oranges and other citrus fruits, as well as strawberries and raspberries. Such fruits need to be consumed or processed within a short time, or they will spoil.

An in-depth understanding of how fruits ripen has had a profound effect on the availability of fruits such as bananas to those of us living in non-tropical areas. If bananas were picked at their peak, they would be over-ripe and unsaleable by the time they reached their destination.

To overcome this problem, bananas (and other climacteric fruits) are picked at what is known as “commercial maturity”. Bananas are usually green and quite firm in order to resist damage in shipping and to delay the onset of spoilage. Commercially mature bananas are then placed in ripening chambers in their destination country. A small amount of ethylene, generated from ethanol, is introduced into the chambers. This activates the climacteric ripening process. The rate of respiration begins to increase and other changes start to take place.

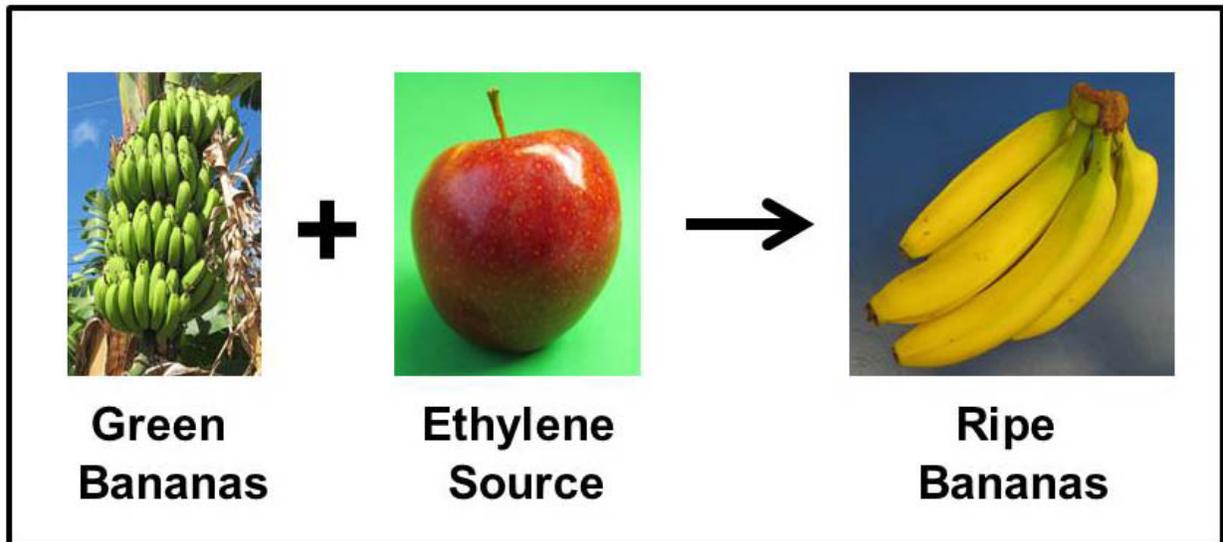
While bananas mature, starches are converted to sugars and there is a corresponding softening of the pulp. Eventually, the peel begins to yellow and develop specks of brown colour. Delivery of the bananas to retail outlets is timed so that they will be as close as possible to ideal ripeness after purchase by the consumer. Improperly ripened fruits may lose their texture and taste.

Temperature and air circulation are also important in the ripening chambers since the respiration process gives off water vapour, carbon dioxide, and heat. This is very similar to respiration in the human body. Excessive moisture and high temperatures can reduce product quality which ultimately affects the financial bottom-line.

If you happen to have some bananas that are still green and you want to ripen them faster, you can place these bananas in a paper bag with a few slices of apple. The apple slices produce ethylene gas which will then prompt the ripening of the bananas.

To delay the ripening process, you can place the fruit in a cool location. Be careful that they don't get too cold though. If you place bananas in the refrigerator, they may blacken - so care must be taken if you do decide to refrigerate them.

Understanding the difference between climacteric and non-climacteric ripening will help you in determining the proper storage conditions for fresh fruits.



**Green bananas can be ripened at home using apple slices as an ethylene source.**