

Papaya & Pawpaw

Carica papaya

Almost the biggest berries
in the world!

For those of us who enjoy these tropical fruits, it's quite astonishing to think that the huge, football-shaped fruits are technically *berries* and the *trees* on which they grow are technically *woody herbs*. But berries they are, fitting the scientific definition of a berry as a simple, fleshy fruit with seeds produced from the ovary of a single flower. In common parlance, we tend to think of berries as small, often sweet, succulent, brightly coloured, edible fruit, such as blackberries, strawberries and mulberries, but technically, not one of these is a berry!



Yellow Pawpaw: Janine from Mililani, Hawaii, United States, CC BY 2.0.
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Red Papaya

Pawpaw or papaya? This can be confusing, but in Australia, we usually refer to the larger fruits with yellow flesh as *pawpaw*, and the narrower, more elongated fruits with distinctively orange red flesh as *papaya*. The difference in colour is attributed to combinations of carotenoids (naturally occurring pigments) and also differences in the size of the pigment molecules and the way in which they are distributed within cells. For example,

the major carotenoid in the red papaya is lycopene (the principal pigment of tomatoes), and the major carotenoids in the yellow pawpaw are β -carotene and β -cryptoxanthin. Both fruits are good sources of vitamin C and folate.

Papaya is cultivated world-wide throughout the tropics, with India the largest producer (6 million tonnes in 2020) but it is believed to have originated in the tropical regions of southern Mexico, Central America and Jamaica although lack of fossils (pollen grains and phytoliths) make confirmation difficult.



Male flowers: Ton Rulkens, CC BY-SA 2.0
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Female flowers: Dr. Raju Kasambe, CC BY-SA 4.0
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Some papaya plants have only female or male flowers; others can have flowers with both male and female components (hermaphrodite), and yet others have male flowers and female flowers on the one plant. So, if you plan to grow a papaya, make sure that you don't grow one that produces only male flowers!



Papaya is not only known as a delicious tropical fruit, but also for an enzyme, *papain*, present in leaves, milky sap (latex), roots and fruit. Papain catalyses the breakage of peptide bonds in proteins, thus weakening the structure of tissues. It is therefore used to tenderise meat, to clarify beer, remove hair from hides prior to tanning, and as a cleansing agent for soft contact lenses. It is even deployed in forensic science to reveal the structure of mummified fingers! A second enzyme, chymopapain, is used to shrink or dissolve ruptured disks in spinal injuries.

If you have ever wondered why it's nigh on impossible to make a dessert by setting papaya (or pineapple or kiwifruit for that matter) in jelly, then look no further than the enzymes in these fruits, including papain. The main component of jelly is

gelatin, a product made from collagen, an important protein present in all animals. When gelatin is heated, its proteins form a tangled mesh that traps water and other components to make the jelly. If you add papaya, the protease enzyme papain effectively prevents the gelatin from solidifying.



Papaya, *Carica papaya*, originated in the tropical regions of southern Mexico, Central America and Jamaica.

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