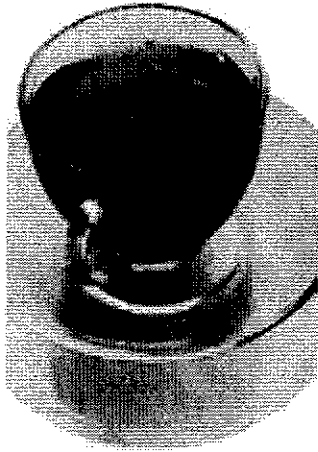


Tannins

Tannins are bitter astringent polyphenol chemicals of plant origin that are capable of binding and shrinking proteins. Their astringent quality is what causes the puckery and dry feeling in the mouth after eating foods rich in this type of polyphenols or drinking teas and red wine.

Food sources: teas, coffee, pomegranates, persimmons, most berries (cranberries, strawberries, blueberries), grapes, red wine, chocolate (with cocoa content 70% and higher), spices (cinnamon, vanilla, cloves, thyme).

Tannin polyphenols are broadly divided into two categories: hydrolysable and **condensed (proanthocyanidins)**.



Hydrolysable tannin polyphenols possess so called anti-nutrient qualities: they act as metal ion chelators considerably inhibiting non-heme iron absorption. Non-heme iron is found in plant foods and iron supplements. Animal sources of iron are not affected by this category.

Thus, drinking too much tea or coffee may lead to anemia. Consumption of one cup of tea with a meal has been found to decrease the absorption of non-heme iron in that meal by about 70%.

In order to counter these problems, it is advised that one should take tea or coffee *between* meals and *not with* meals, and not consume iron supplements with these drinks either.

Also, adding lemon to tea helps reduce or neutralize these adverse effects of tannin polyphenols on iron intake.

However, adding milk to coffee or tea has very little to no influence on the inhibitory effect of tannins according to the study "Inhibition of non-heme iron absorption in man by polyphenolic-containing beverages" published in the British Journal of Nutrition in 1999.

Consuming foods rich in vitamin C helps in neutralizing the effects of tannin polyphenols on iron absorption due to this vitamin's ability to increase iron absorption in the body.

Condensed tannins (proanthocyanidins) do not interfere with iron absorption.