

POLYPHENOLS

poly = more than one;

phenol = a chemical with this structure:
and this formula: C_6H_5OH



All polyphenols are antioxidants,
and free radical scavengers.

All polyphenols are able to "complex"
(i.e. combine) with other molecules.

Polyphenols can be divided into two broad categories:

hydrolyzable tannins, and **phenylpropanoids**.

hydrolyzable tannins

(Hydrolyzable means
able to be broken down
by contact with water)

tannic acid

A yellow, astringent
hydrolyzable tannin
found in the bark and
timber of many trees.

flavonol

Flavonols are a
structural subgroup
of flavonoids
(e.g. quercetin)

flavanol = flavan-3-ol

Flavanols are a structural
subgroup of flavonoids.

The most abundant
flavanols in cocoa are
catechin and **epicatechin**.

Flavanols can polymerize,
forming **proanthocyanidin**.

When catechins or
epicatechins polymerize,
the proanthocyanidin they
form is called **procyranidin**.

phenylpropanoids

Phenylpropanoids are a class of plant-derived compounds
that are synthesized from the amino acid phenylalanine.
This class includes **flavonoids** and **condensed tannins**.
Phenylpropanoids have a wide variety of functions in plants,
including defense against herbivores, microbial attack,
and sun burn.

flavonoids

Flavonoids are a large class of plant chemicals
renowned for their antioxidant activity.
More than 4000 flavonoids have been classified.
Flavonoids carry out many functions, such as
producing yellow, red, and blue pigmentation
in flowers, and providing plants with
protection from microbes, insects, and sun burn.

anthocyanin

Anthocyanin is a flavonoid, named after the Greek
words for flower (antho), and blue (cyan). It imparts
the purple colour to fresh Forastero cocoa beans.
Anthocyanin is a water-soluble, glycosidic compound.
(Glycosidic means sugar-containing).
Generically speaking, a glycoside (e.g. anthocyanin)
is made up of a glycone (the sugar portion), and
an aglycone (the non-sugar portion).
During fermentation, anthocyanin is enzymatically
transformed to become an **anthocyanidin** aglycone.

anthocyanidin

The water-insoluble, sugar-free aglycone of
anthocyanin.
(During cocoa fermentation, glycosidase enzymes
split anthocyanin molecules into anthocyanidin
and sugar molecules).

condensed tannin

A condensed tannin is a
large molecule,
made up of multiple
flavanol units.
The term "condensed
tannin" is often used
interchangeably with
"proanthocyanidin".
Most condensed tannins
are water soluble, but
some very large
condensed tannins are
insoluble.

polymerization