

## Flavonoids in Australian tea

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Flavonoids are polyphenolic compounds widely distributed in plants. Rich sources include tea, wine, fruits and vegetables. Flavonoids exhibit antioxidant activity and the relationship between this activity and possible health outcomes has been the subject of much research (1).

Flavonoids occurring in green tea are mainly flavan-3-ols, which constitute 90% (w/w) of the phenolic compounds in the leaves. Flavonoids in black tea are mainly theaflavins and thearubigins, the complex oxidation products of green tea phenolic compounds. The main tea phenolic compounds are catechins and their gallates, which were previously called tea tannins and also referred to as tea polyphenols. These polyphenols account for 20–35 % (w/w) of dry tea, thus representing a significant proportion of the tea constituents (2).

To date no information has been published on the polyphenolic content of Australian grown tea. This study analysed the flavonoids in tea grown and processed on a tea farm at Malanda, North Queensland. The results reported are part of a study on the quality of tea grown in Australia.

Fresh tea leaves, consisting of one apical bud and two adjunct leaves, were hand plucked approximately every 4 weeks during the sampling period (May 2000 to May 2001). Samples from the processing line were collected during black tea processing in April, July, and October 2000, and January 2001. The phenolic compounds were extracted using a method developed and optimised for this study, and analysed using an HPLC with photodiode array detection. Four catechins, six catechin gallates, five flavonoid glycosides, and seven phenolic acids were identified and quantified in the green leaves. Catechins, catechin gallates and theaflavins were the main flavonoids quantified for the in-line samples.

Epigallocatechin gallate (EGCG) is the major flavonoid in the fresh leaves of Australian grown tea. The levels (91.31–128.63 mg/g across harvests) are high compared to the levels reported from other countries. Levels of total flavanols (combined catechins/catechin gallates) in the fresh tea leaves (218.49–264.11 mg/g across harvests) are generally higher than the levels found in other countries. The levels of total theaflavins found in the final black tea from the factory (25.60–46.15 mg/g across harvests) are generally higher than the levels found in commercial black teas from other countries (e.g. Kenya, see table). This is because higher levels of EGCG and other green tea flavonoids are converted to higher levels of their oxidation products, theaflavins. EGCG and theaflavins are used as quality indicators for black tea production. Based on the results of this study, teas produced in Australia should possess as good a quality as the teas produced in other countries and have the potential to contribute more flavonoids to the diet.

Country	Total theaflavins (mg/g dry basis)				
	April	July	October	January	Overall mean
Kenya <sup>1</sup>	12.63	17.25	17.64	16.42	16.30
Australia <sup>2</sup>	33.11	25.64	37.60	46.15	35.63

<sup>1</sup>Adapted from Owuor, 1992 (3); measured by spectrophotometric method. <sup>2</sup>Measured by HPLC in this study.

### References

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