

Concurrent Session 17: Dietary Antioxidants and Health

Antioxidant compositions of selected fruits, vegetables and beverages in Fiji

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Background – This paper reports the antioxidant compositions of fruits, vegetables and beverages in Fiji.

Objectives – The availability of such data will help promote their use in the daily diet of the people in Fiji.

Design – The total antioxidant capacity (TAC) was assayed using trolox equivalent antioxidant capacity (TEAC) decolourization method (1). The total polyphenol (TPP) assay was performed using the Folin-Ciocalteu method (1). HPLC was used to determine the major carotenoid and flavonoid profiles.

Outcomes – Commercial *noni* (*Morinda citrifolia*) fruit drink, which is exported to Australia, was shown to have the highest total polyphenol levels (375.1 mg/100g juice) followed by turmeric (*Curcuma longa*) (320 mg/100g). Sweet potato leaves (*Ipomoea batatas*) (240-280 mg/100g) and drumstick (*Moringa oleifera*) leaves (260 mg/100g) were also high in total polyphenols. The paper also discusses the TAC levels of the foods assayed. Flavonoid assay showed that quercetin was present in sweet potato leaves (43-90 mg/100g), drumstick leaves (100 mg/100g) and also in turmeric (41 mg/100g). It appears that polyphenols and carotenoids contribute to the antioxidant capacity of most foods (2).

Conclusion – Attempts are made to publicise and promote the consumption of a variety of the antioxidant-rich vegetables and fruits in the diets of the people of Fiji.

References

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- 2 Lako J, Trennery VC, Wahlqvist M, Wattanapenpaiboon T, Sotheeswaran S, and Premier R, Phytochemical flavonols, carotenoids and the antioxidant properties of a wide selection of Fijian fruit, vegetables and other readily available foods, *Food Chemistry* 2006; in press.

Antioxidant capacity of plant extracts: comparing *in vitro* and *in vivo* measures

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Background – Polyphenols from different plant sources have been investigated for their antioxidant activities. Polyphenols have been reported to exhibit anti-allergenic, anti-inflammatory and cardioprotective effects (1).

Objective – To compare the outcomes of *in vitro* and *in vivo* measures of antioxidant activity of palm polyphenols.

Design – In the *in vitro* experiments, human plasma was incubated with palm polyphenol extracts, and the antioxidant capacity was measured by two methods: 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) radical cation (ABTS⁺) scavenging and ferric reducing antioxidant power (FRAP) assays. For the *in vivo* study, hamsters were fed an atherogenic diet and supplemented with palm fruit juice (PFJ) for 8 wk. PFJ was administered at three different polyphenol concentrations, 750, 1000, and 1500 mg gallic acid equivalents (GAE)/L. The antioxidant capacity of the hamster plasma was measured at the end of 8 wk by the ABTS⁺ scavenging and FRAP assays.

Outcomes – Incubation of human plasma with palm polyphenols did not result in a significant increase in plasma ABTS⁺ scavenging capacity, but plasma FRAP values were significantly elevated. A similar trend was observed in the *in vivo* experiments. ABTS⁺ scavenging capacity in hamster plasma was unaffected by PFJ treatment at the different PFJ concentrations administered. Plasma FRAP values, on the other hand, increased from 45.64 ± 24.96 μM Trolox equivalents (TE) in control animals given water, to 82.33 ± 41.26 μM TE in animals supplemented with PFJ at 1500 mg GAE/L.

Conclusions – *In vitro* measures of antioxidant capacity are useful indicators of possible outcomes of *in vivo* trials. Nevertheless, the quantitative outcomes of the latter may differ from what could be extrapolated from purely *in vitro* measures due to absorption, metabolism and bioavailability of ingested antioxidants.

Reference

1. Balasundram N, Sundram K, Samman S. Phenolic compounds in plants and agri-industrial by-products: Antioxidant activity, occurrence, and potential uses. *Food Chem* 2006; 99 : 191-203.