Maori medicinal food bioactives - what can the University of Auckland offer?

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Potential functional foods in the traditional Maori diet

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Cabbage Tree (*Cordyline terminalis, Cordyline australis*)

- cinchophen, in the leaves of *C. terminalis*, has antipyretic and analgesic properties
- linoleic acid, in the seeds of *C. australis*, is an essential fatty acid, deficiency causes skin complaints and is a factor in heart disease
Taro (*Colocasia esculenta*):

- Anthocyanins, corms contain cyanidin 3-glucoside, pelargonidin 3-glucoside and cyanidin 3-rhamnoside.
- Reputed to improve circulation and eyesight, act as anti-oxidants and anti-inflammatories and inhibit cancer cell growth.

![Anthocyanins structure](image)
Kumara (sweet potato, *Ipomoea batatas*)

- most important vegetable of the traditional Māori diet.
- phytoalexins, produced in response to infection, injury or fungicidal treatment
- sporamins A & B, which may possess anti-cancer properties through anti-angiogenic effects
- coumarins (scopoletin, aesculetin and umbelliferone), which have anti-coagulant properties and may inhibit HIV replication
- Anthocyanins may also be important
Ferguson LR; Zhu S; Han DY; Harris PJ. *Inhibition or enhancement by 4 Pacific Island food plants against cancers induced by 2 amino-3-methylimidazo[4,5-f]quinoline in male Fischer 344 rats.* Nutrition & Cancer. 64(2):218-27, 2012.
SL222 Sweetpotato cultivar

- Purple Sweetpotato (kumara) - SL222 cultivar

- Blueberries contain $2.67 \pm 0.097 \mu\text{mol/g}$ anthocyanins, while the anthocyanin content is as high as $4.02 \pm 0.095 \text{mmol/g}$ in sweet potato SL222 (Philpott M et al 2003).

- Consumption of Blueberries in US 0.33kg/year, sweetpotato 100kg/person/year in some countries.
Genetic Model of Colorectal Cancer

normal → ACF → adenoma → carcinoma

Adenomatous Polyposis Coli (APC) gene = “gatekeeper” of CRC
Min mouse studies

• Counted the tumour numbers.
• Supported mechanistic data.
• Confirmed that the purple kumara has superior activity to traditional varieties.
• This almost certainly relates to the anthocyanic components.
• An extract had superior activities to the intact food plant.
Tomblin V; Ferguson LR; et al.  
*Potential pathway of anti-inflammatory effect by New Zealand honeys.*  

Clover  
Kanuka  
Manuka
(a) **Curcumin**: In soluble in water, and degradation in physiological pH conditions, and low bioavailability

(b) **Curcumin loaded nanogels**: pH responsive, protect from environment degradation of curcumin, controlled release of curcumin, high aqueous dispersible, improved bioavailability, and enhanced anticancer activity.