

Yacon prebiotic functional drinks, the sensory and antioxidant profiles:

dietotherapy applications of yacon concentrate

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Yacon



Yacon grown in Whangarei, NZ



Yacon roots

 PRODUCT OF
NEW ZEALAND



Yacon concentrate



Awarded Nutra Ingredients Asia Awards

Health-related properties

Biologically active compounds e.g. FOS, inulin, phenolic

Provide physiological benefits beyond basic nutrition to reduce the risk of chronic diseases

e.g. anti-cancer, anti-inflammatory, antioxidant activity, weight management, immunity improvement, diabetes management, gut microbial balance

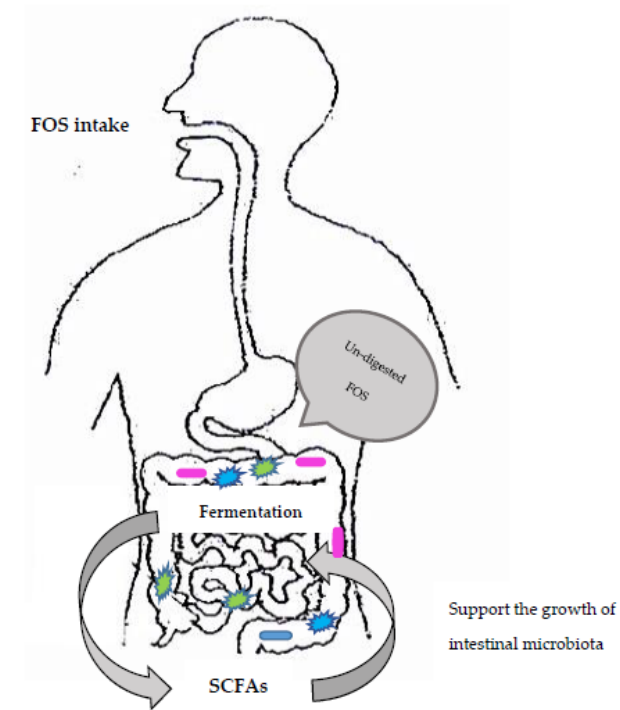


Figure 1. Fructooligosaccharides (FOS) work in the gastrointestinal tract as prebiotics; SCFAs: short chain fatty acids.

Aim of the study

Development of yacon functional drinks

Sensory evaluation

Antioxidant capacity

Shelf-life

Development of yacon functional drinks

Three prototypes developed

- Yacon-collagen
- Yacon-blackcurrant
- Yacon-vitamin c



Sensory evaluation

Four sensory attributes

- Appearance, sweetness, flavor, overall liking

Prototypes been tested

- Yacon-collagen, Yacon-blackcurrant




By 9-point hedonic scale from

1 (very slight perception) to **9** (very intense perception)

- UREC# 2022-1041

Sensory acceptable with ratings above the centre point of the scores (all ratings > 5, $n=50$)

Sensory evaluation

	Appearance	Sweetness	Flavour	Overall
 Like extremely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Like a lot	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Like moderately	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Like slightly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 Neither like nor dislike	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dislike slightly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dislike moderately	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dislike a lot	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
 Dislike extremely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Any comments?				

Antioxidant capacity

Assays

- Cupric ion reducing antioxidant capacity (CUPRAC)
- Ferric ion reducing antioxidant power (FRAP)
- 2,2-diphenyl-1-picrylhydrazyl (DPPH)

(compared with yacon concentrate to test if pH or other conditions may affect)

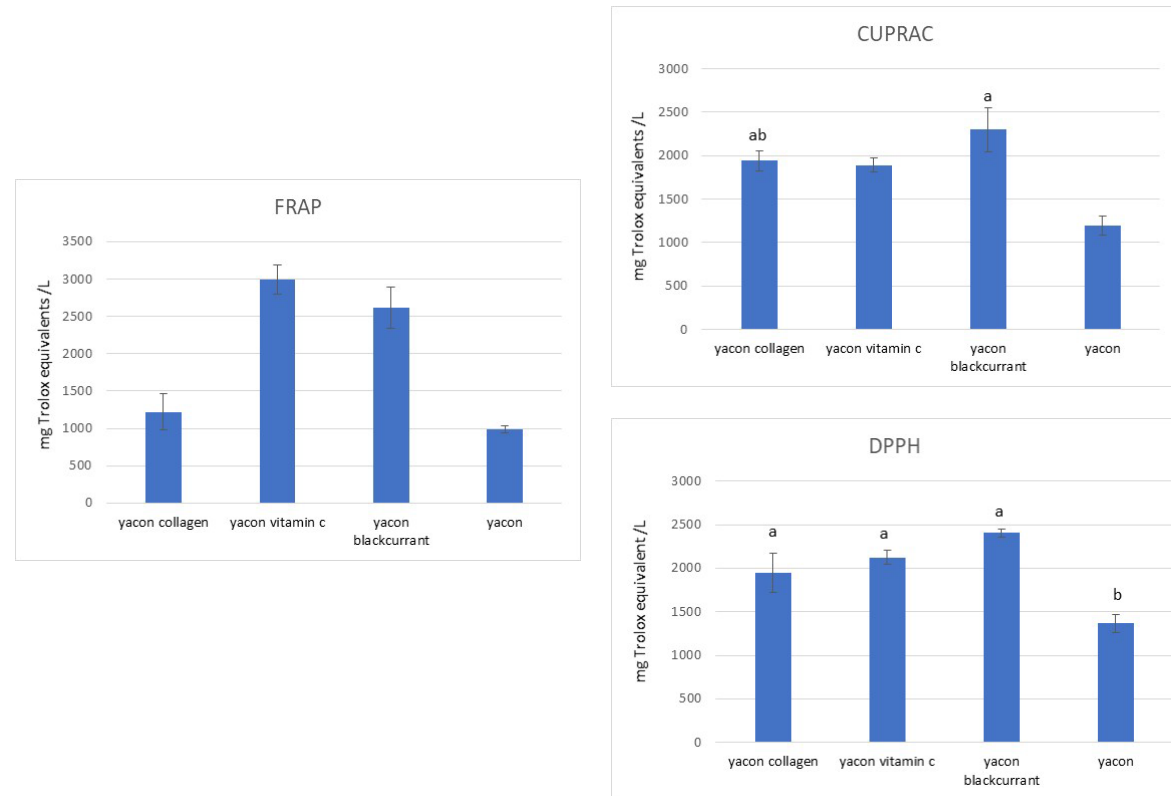


Figure 2: Antioxidant activity of yacon functional drinks. Data is expressed as mean \pm SD ($n=3$).

Shelf-life

Accelerated shelf-life test

Water baths at 30, 40, 50, 60 °C

Spectrometric method

Test daily for two weeks

Shelf-life of yacon-collagen
and yacon-blackcurrant
drinks > 1 year at room
temperature

While yacon-vitamin(c)
refrigerated

Shelf-life

Yacon samples Kinetics					
Temperature °C	Temp (K)	K	ln(K)	1/T	
30	303	0.00001	-11.51	0.0033	
40	313	0.00006	-9.72	0.003195	
50	323	0.000051	-9.88	0.003096	
60	333	0.000164	-8.72	0.003003	
Arrhenius Slope		Activation Energy			
-8339.9		E= 69337.9286 J/mol			
Intercept		Arrhenius Constant			
16.3		K ₀ 11994994.55 abs/h			
Temperature (T)	T(K)	K _T			
30	303	1.33443E-05 abs/h			
C _{B0}	0.1715	time (h)	days	months	Years
Target Absorbance C _B	0.16	24842.0975	1035.087	34.50291	2.875243

Conclusions

The developed yacon prebiotic functional drinks

- **Sensory acceptable** with appearance, sweetness, flavor, and overall liking
- **Higher antioxidant capacity** compared with yacon concentrate
- **Provide more healthier food products** for consumers to exercise healthier food choices



Further work

Further work - commercially available



Acknowledgements

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Thank you!