Yacon concentrate NZFOS+
its phytochemical contents, health-related properties and potential applications

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Introduction

Yacon  (why and how to use yacon)
  • Fructooligosaccharides (FOS)
  • Inulin
  • Phenolic compounds

NZFOS+
  • Phytochemical contents
  • Health-related properties
  • Potential applications
Yacon plants grown in Whangarei, NZ

Yacon leaf

Yacon roots
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

Phytochemical contents of NZFOS+
  • Total phenolic compounds
  • Total flavonoid
  • Chlorogenic acid
  • Phenolic profiling

Antioxidant activity
Glycaemic effect
Materials

Yacon concentrate NZFOS+ (-80 Brix)

Manuka Honey UMF 20+

Table 1. Nutrition information of yacon concentrate and Manuka honey, quantity per 100g.

<table>
<thead>
<tr>
<th></th>
<th>Yacon concentrate</th>
<th>Manuka honey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kJ)</td>
<td>948</td>
<td>1370</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>3.0</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Total fat (g)</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Saturated fat (g)</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Carbohydrate (g)</td>
<td>33.9</td>
<td>80</td>
</tr>
<tr>
<td>Total sugar (g)</td>
<td>33.9</td>
<td>78</td>
</tr>
<tr>
<td>NSP fibre (g)</td>
<td>37.7</td>
<td></td>
</tr>
<tr>
<td>FOS (g)</td>
<td>37.7</td>
<td></td>
</tr>
<tr>
<td>Sodium (mg)</td>
<td>26</td>
<td>12</td>
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</tbody>
</table>
Phytochemical contents

Total phenolic content
By Folin-Ciocalteu

Total flavonoid content
By Gonzalez-Aguilar et al. (2007) modified

Figure 2. Total phenolic and total flavonoid of yacon concentrate and Manuka honey. GAE: gallic acid equivalent; QE: quercetin equivalent. Data are expressed as mean ± SD (n=3).
Phytochemical contents (cont.)

Chlorogenic acid content and phenolic profiling

By the liquid chromatography coupled with mass spectrometry (LC-MS)

Table 2. Concentration of chlorogenic acid (μg CA/ g sample). Data is presented as mean ± SD (n=3).

<table>
<thead>
<tr>
<th>Sample</th>
<th>μg CA/ g sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yacon concentrate</td>
<td>11.88 ± 0.765</td>
</tr>
<tr>
<td>Manuka Honey</td>
<td>0.08 ± 0.001</td>
</tr>
</tbody>
</table>

Other phenolic detected: Gallic acid, catechin, caffeic acid, epicatechin, p-coumaric acid, ferulic acid, ellagic acid, myricetin, isorhamnetin
Antioxidant activity

Figure 3: Antioxidant activity of yacon concentrate and Manuka Honey. TE: trolox equivalent. Data is expressed as mean ± SD (n=3).
Glycaemic effect

Glycaemic index (GI)
- n=10
- Healthy
- 10-12 hours overnight fasting
- Finger-prick blood samples taken at 15, 30, 45, 60, 90, and 120 minutes

The GI of yacon concentrate in comparison to Manuka honey (40 vs 52)

Figure 4: Mean glycaemic responses over two hours
Conclusions

NZFOS+

Low in glycemic impact, rich in phenolic compounds, high in antioxidant capacity associated with

• The maintenance of health and wellbeing
• Prevention of chronic diseases

Further investigations for human studies needed

Potential applications

• Dietary supplement: a daily intake of 20 g of FOS or less
• A low-calorie sweetener
• Prebiotic functional drinks

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Thank you!