

Table S1. Laboratories where physical and chemical analysis of the Rangitikei Silt Loam soil were conducted

Soil test	Laboratory
pH, Olsen P, SO ₄ , and CEC	<p>Fertilizer and Lime Research Centre laboratory, Massey University</p> <p>The laboratory follows “Total Quality Management” systems whereby the precision of all analysis is verified by the results of QC samples. The laboratory is a member of the Australasian Soil and Plant Analysis Council (ASPAC) and contributes to the New Zealand inter-laboratory comparison programme for soil, with six members either being commercial, government or university laboratories.</p>
Texture, Total C and Total N	<p>The Landcare Research laboratory, accredited by International Accreditation New Zealand (IANZ).</p>
Total Fe and Al	<p>Soil and Physical Sciences laboratory, Lincoln University</p> <p>Reference soil material (International Soil Analytical Exchange-ISE 921) from Wageningen University, The Netherlands, was analyzed for quality assurance which has a recoverable concentration of 91% to 108% of the certified value.</p>

Table S2 Hazard Quotient (HQ) and Cancer Risk (CR) calculation

Adults (> 18 years old)										
C	Fi	Ef	Ed	W	Te	EDI (C x Fi x Ef x Ed) / (W x Te)	RfD	HQ (EDI/RfD)	CSF	CR (EDI x CSF)
0.080	0.5	52	70	60	25550	0.000095	0.0003	0.32	1.5	0.00014
0.106	0.5	52	70	60	25550	0.000126	0.0003	0.42	1.5	0.00019
0.122	0.5	52	70	60	25550	0.000145	0.0003	0.48	1.5	0.00022
0.319	0.5	52	70	60	25550	0.000379	0.0003	1.26	1.5	0.00057
Adolescents (12-18 years old)										
C	Fi	Ef	Ed	W	Te	EDI (C x Fi x Ef x Ed) / (W x Te)	RfD	HQ (EDI/RfD)	CSF	CR (EDI x CSF)
0.080	0.5	52	70	50	25550	0.000114	0.0003	0.38	1.5	0.00017
0.106	0.5	52	70	50	25550	0.000151	0.0003	0.50	1.5	0.00023
0.122	0.5	52	70	50	25550	0.000174	0.0003	0.58	1.5	0.00026
0.319	0.5	52	70	50	25550	0.000454	0.0003	1.51	1.5	0.00068

C: Concentration of As in the edible part of the plant (mg kg^{-1} fresh weight)

Fi: Food intake rate (kg per person per day; assumed 0.5 kg)

Ef: Exposure frequency (days per year; assumed 52 days per year)

Ed: Exposure duration (equivalent to the average lifetime, about 70 years)

W: Average body weight (60 kg for an adult, and 50 kg for adolescents)

Te: Average exposure time ($= \text{Ed} \times 365$ days)

EDI: Estimated daily intake ($\text{mg kg}^{-1} \text{ day}^{-1}$) calculated as $\text{EDI} = (\text{C} \times \text{Fi} \times \text{Ef} \times \text{Ed}) / (\text{W} \times \text{Te})$

RfD: Oral reference dose ($0.0003 \text{ mg As kg}^{-1} \text{ body weight day}^{-1}$)

HQ: Hazard Quotient (calculated as $\text{HQ} = \text{EDI}/\text{RfD}$)

CSF: Cancer slope factor for As ($1.5 \text{ mg As kg}^{-1} \text{ day}^{-1}$)

CR: Cancer risk (calculated as: $\text{EDI} \times \text{CSF}$)