

Table S1. General beetroot soup formulation

Ingredient	Amount
Beetroot	1,764 g
Fresh garlic	22 g
Garlic powder	70 g
Onion powder	17g
Olive oil	15 mL
Parsley	13 g
Salt	10 g

Table S2. ICP-OES parameters	
ICP-OES conditions	Values
Radiofrequency power (W)	1200
Plasma flow (L·min ⁻¹)	12
Auxiliary flow (L·min ⁻¹)	0.2
Nebulizer pressure (bar)	1.0
Sample flow rate (mL·min ⁻¹)	1.0
Integration time (s)	1.0
Resolution	High

Table S3. Elemental content in the certified reference materials, expressed as $\text{mg}\cdot\text{kg}^{-1}$ dry weight. Recoveries (%) were calculated for each element separately.

Reference materials ($\text{mg}\cdot\text{kg}^{-1}$)			
Element	Reference	Experimental	Recovery
Cu	4.9 ± 0.2	5	102%
K	61000 ± 2000	55000	91%
Mg	6500 ± 300	6100	94%
Mn	21.2 ± 1.0	22	104%
P	2600	2150	83%
Zn	15.6 ± 1.2	13	83%

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Table S4. Limits of detection (LOD) and limits of quantification (LOQ) for each element determined in beetroot-soup samples

Minerals	LOD (mg·100g ⁻¹)	LOQ (mg·100g ⁻¹)
Cu	0.0051	0.0017
Na	0.031	0.099
K	0.014	0.046
Mg	0.020	0.066
Mn	0.0001	0.0002
P*	0.0025	0.0008
Zn	0.0002	0.0002

Table S5. Proximate composition of lyophilized beetroot soup formulations (100 g)

	Pure beetroot-soup	Beetroot-soup in starch (1:2)	Beetroot-soup in maltodextrin (1:2)
Ashes (%)	7.27±0.86 ^a	2.22±0.44 ^b	1.83±0.37 ^b
Moisture (%)	4.50±0.34 ^a	3.15±0.81 ^b	4.65±0.53 ^a
Energy (kcal)	353.01±2.35 ^b	383.07±2.12 ^a	384.64±1.77 ^a
Carbohydrate (g)	71.70±0.97 ^b	88.40±0.77 ^a	89.20±0.79 ^a
Protein (g)	3.92±0.26 ^a	1.95±0.28 ^b	1.91±0.13 ^b
Lipid (g)	5.41±1.11 ^a	2.27±0.82 ^b	2.19±0.75 ^b
Total dietary fibers (g)	6.35±0.22 ^a	3.57±0.37 ^b	3.40±0.36 ^b
Total sugars (g)	21.31±1.24 ^a	10.82±1.19 ^b	12.55±1.39 ^b
Fructose (g)	1.55±0.53 ^a	0.68±0.55 ^b	0.97±0.33 ^b
Glucose (g)	3.14±0.61 ^a	1.48±0.44 ^b	1.98±0.28 ^b
Sucrose (g)	16.62±1.15 ^a	8.66±1.10 ^b	9.60±1.07 ^b

Values expressed as means ± standard deviation (n= 3). Different letters in the columns indicate statistically significant differences between samples (p<0.05).

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Table S6. Microbiological analyzes of powdered beetroot-soup: pure soup, soup microencapsulated in starch or maltodextrin at the ratio 1:2 (w/w)

Microbiological analyses	Time (days)												Limits established by Brazilian current legislation
	0			30			60			90			
	PBS	BSA	BSM	PBS	BSA	BSM	PBS	BSA	BSM	PBS	BSA	BSM	
<i>Bacillus cereus</i> (CFU·g ⁻¹)	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	3x10 ³ CFU·g ⁻¹
<i>Salmonella sp.</i> (25 g)	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence
<i>Esherichia coli</i> (MPN·g ⁻¹)	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	< 0.3 MPN·g ⁻¹
Total coliforms (MPN·g ⁻¹)	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	1x10 ² MPN·g ⁻¹
Thermotolerant coliforms (MPN·g ⁻¹)	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	Absence	1x10 ² MPN·g ⁻¹
Molds and Yeasts (CFU·g ⁻¹)	Absence	Absence	Absence	Absence	Absence	Absence	2.7 x 10 ³	Absence	Absence	4.5 x 10 ³	1.1 x 10 ²	1.4 x 10 ²	-

PBS. Pure beetroot soup; BSA, beetroot soup microencapsulated in starch; BSM, beetroot soup microencapsulated in maltodextrin; CFU·g⁻¹, colony forming units per gram; MPN·g⁻¹, most likely number per gram of powdered beetroot soup. Limits established by the current Brazilian legislation Resolution No. 331, of December 23, 2019[42].