

SUPPLEMENTRY DATA

TABLES

Table 1: Constraints of optimization of process parameters and the response

Variable	Target	Lower Value	Upper Value	Importance
Roasted pearl-millet flour (%)	is in range	2.5	8	+++
<i>Hibiscus rosa-sinensis</i> (%)	is in range	2.5	8	+++
Sugar (%)	minimize	25	45	+++
Probiotic Count (log CFU/g)	maximize	5.22	7.54	+++++
Lactic acidity (%)	is in range	0.52	1.18	+++
Colour and Acceptance (Hedonic rating 1-9)	maximize	3.89	6.87	+++
Body and Texture (Hedonic rating 1-9)	maximize	5.33	8.5	+++
Overall Acceptance (Hedonic rating 1-9)	maximize	4.33	7.64	+++

Table 2: Proximate analysis of control and PHS samples

Parameter	Control	PHS
Total solids (%)	57.34 ± 0.55	68.46 ± 0.70
Moisture (%)	42.66 ± 0.55	39.54 ± 0.70
Ash (%)	0.79 ± 0.03	0.88 ± 0.01
Protein (%)	7.24 ± 0.51	9.19 ± 0.3
Fat (%)	6.23 ± 0.25	8.37 ± 0.5
Carbohydrate (%)	42.73 ± 0.54	43.05 ± 0.78
Titrateable acidity (% lactic acidity)	0.86 ± 0.03	0.92 ± 0.06
Antioxidant activity (% DPPH)	0.0 ± 0.00	42.35 ± 0.05
pH	4.5 ± 0.21	4.3 ± 0.23
Crude fibre (%)	0.0 ± 0.00	5.89 ± 0.04
Calcium (mg/kg)	180.13 ± 4.56	220.34 ± 5.88
Magnesium (mg/kg)	90.33 ± 6.34	150.26 ± 0.5
Iron (mg/kg)	2.33 ± 6.05	12.23 ± 6.03
Zinc (mg/kg)	2.58 ± 7.45	5.33 ± 6.31
Copper (mg/kg)	0.36 ± 5.27	1.44 ± 7.02
Manganese (mg/kg)	0.52 ± 0.02	2.63 ± 0.05
Phosphorous (mg/kg)	200.93 ± 3.04	295.76 ± 5.02
L*	95 ± 0.2	23.51 ± 0.1
a*	0.5 ± 0.05	18.89 ± 0.03
b*	1.3 ± 0.5	4.5 ± 0.02
Chroma	1.39	19.42

Hue angle (°)	68.96°	13.40°
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Table 3: Chemical analysis on storage

Parameter / Analysis	0 th Day (Mean±SD)		7 th Day (Mean±SD)		14 th Day (Mean±SD)		21 st Day (Mean±SD)		28 th Day (Mean±SD)		35 th Day (Mean±SD)	
	Ctrl	PHS	Ctrl	PHS	Ctrl	PHS	Ctrl	PHS	Ctrl	PHS	Ctrl	PHS
Titratable Acidity (% lactic acid)	0.86 ±0.03 ^{a*}	0.92 ±0.06 ^{ab}	0.89 ±0.02 ^{ab}	0.97 ±0.02 ^b	0.92 ±0.03 ^b	1.14 ±0.03 ^b	0.95 ±0.03 ^b	1.17 ±0.02 ^c	0.99 ±0.03 ^c	1.21 ±0.02 ^c	1.35 ±0.03 ^c	1.58 ±0.02 ^d
Total Solids (%)	57.34 ±0.05 ^a	68.46 ±0.07 ^b	57.32 ±0.02 ^a	68.38 ±0.07 ^b	57.26 ±0.05 ^a	68.31 ±0.07 ^b	57.24 ±0.07 ^a	68.25 ±0.04 ^b	57.19 ±0.06 ^a	68.19 ±0.07 ^b	57.12 ±0.06 ^a	68.13 ±0.06 ^b
pH	4.50 ±0.21 ^b	4.30 ±0.23 ^a	4.45 ±0.05 ^a	4.21 ±0.05 ^a	4.42 ±0.05 ^a	4.18 ±0.05 ^a	4.36 ±0.05 ^a	4.13 ±0.05 ^a	4.32 ±0.05 ^a	4.11 ±0.05 ^a	3.92 ±0.05 ^a	3.7 ±0.05 ^a

*Means with different superscripts in the same row differ significantly (p<0.05); values in each cell represent mean±SD, n=3

Table 4: Microbial analysis on storage

Parameter/ Analysis	0 th Day (Mean±SD)	7 th Day (Mean±SD)	14 th Day (Mean±SD)	21 st Day (Mean±SD)	28 th Day (Mean±SD)	35 th Day (Mean±SD)
SPC (log CFU/g)	2.85±0.02 ^{a*}	3.54±0.02 ^b	4.35±0.03 ^c	4.86±0.02 ^d	5.65±0.03 ^e	7.38±0.03 ^f
Coliform (log CFU/g)	00 ± 0.00 ^a	00 ± 0.00 ^a	00 ± 0.00 ^a	00 ± 0.00 ^a	00 ± 0.00 ^a	3.78±0.05 ^b
Yeast and Mold (log CFU/g)	00 ± 0.00 ^a	00 ±0.00 ^a	00 ±0.00 ^a	2.02±0.04 ^b	2.16± 0.03 ^{bc}	2.89±0.05 ^c
Probiotic count (log CFU/g)	7.53±0.33 ^a	7.55±0.03 ^a	7.49±0.04 ^a	6.58±0.04 ^b	6.08±0.03 ^c	5.84±0.04 ^d

* Means with different superscripts in the same row differ significantly (p<0.05); values in each cell represent mean±SD, n=3

Table 5: Sensory analysis on storage

Parameter/ Analysis	0th Day (Mean±SD)	7th Day (Mean±SD)	14th Day (Mean±SD)	21st Day (Mean±SD)	28th Day (Mean±SD)	35th Day (Mean±SD)
Colour and Appearance	6.49±0.14 ^{d*}	6.41±0.08 ^{cd}	6.38±0.06 ^c	6.26±0.05 ^b	6.03±0.06 ^a	5.12±0.06 ^a
Body and Texture	7.36±0.18 ^c	7.32±0.06 ^c	7.29±0.06 ^c	7.11±0.06 ^b	6.91±0.07 ^a	5.34±0.06 ^d
Sweetness	7.64±0.06 ^c	7.59±0.06 ^c	7.51±0.06 ^c	7.07±0.06 ^b	6.84±0.06 ^a	5.79±0.06 ^a
Flavour	8.07±0.06 ^a	7.98 ± 0.05 ^b	7.94 ± 0.06 ^{bc}	7.89±0.06 ^{bc}	7.82±0.05 ^c	6.07±0.05 ^d
Overall Acceptance	6.96±0.21 ^a	6.94±0.06 ^a	6.88 ± 0.06 ^{ab}	6.82±0.07 ^{bc}	6.76±0.06 ^c	5.23±0.06 ^d
* Means with different superscripts in the same row differ significantly (p<0.05); values in each cell represent mean±SD, n=3						

FIGURES







