

Supplementary Data

Optimization of water chestnut (*Trapa bispinosa*) starch, fructo-oligosaccharide and inulin concentrations for low-fat flavoured yogurt consisting probiotic *Lactocaseibacillus rhamnosus* strain

Running Title: Low fat flavoured probiotic yogurt

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Figure 1S: Length and breadth ratios of Water chestnut (a); Low-fat probiotic mango yoghurt during storage (b).

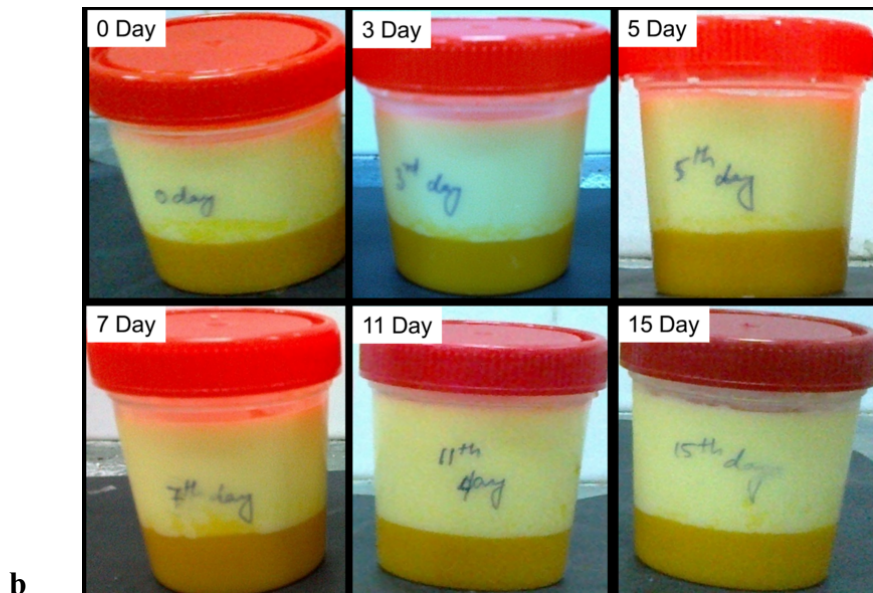
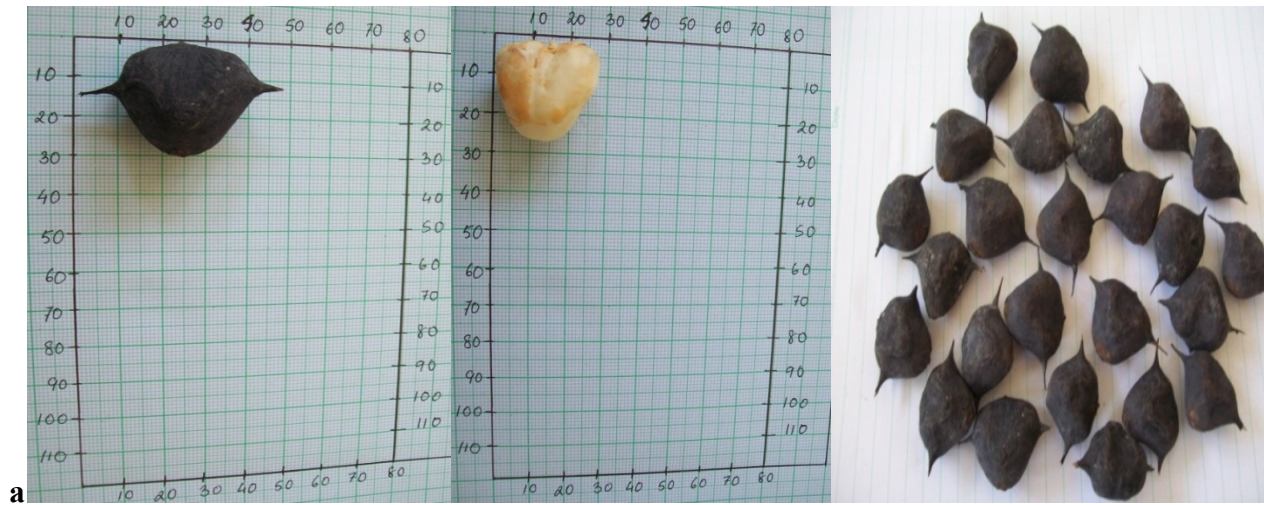


Table 1S: Central composite face centered design (CCFD) with experimental values of response variables and some other physical properties of low-fat yogurt.

Run	Process Variables				Experimental Responses							
	Fat (%)	Starch (%)	FOS (%)	Inulin (%)	pH	Titrateable Acidity	Syneresis (%)	WHC (%)	Consistency	Firmness	Index of Viscosity	Cohesiveness
1	0.5	1.0	0.5	0.5	4.93	0.49	62.00	22.70	7014.17	386.70	-213.21	-104.58
2	1.5	1.0	0.5	0.5	4.90	0.48	36.40	32.25	6737.71	300.32	-131.05	-91.84
3	0.5	3.0	0.5	0.5	4.90	0.51	65.44	32.88	8409.94	202.02	-176.23	-70.06
4	1.5	3.0	0.5	0.5	4.90	0.49	26.80	33.52	6746.08	177.62	-155.94	-90.25
5	0.5	1.0	1.5	0.5	4.92	0.48	57.00	22.98	5870.59	488.64	-219.84	-64.55
6	1.5	1.0	1.5	0.5	4.80	0.46	36.72	31.43	6433.50	487.74	-103.68	-57.61
7	0.5	3.0	1.5	0.5	4.90	0.48	58.56	32.80	7734.88	481.90	-204.20	-68.32
8	1.5	3.0	1.5	0.5	5.02	0.49	40.00	33.28	7223.90	468.37	-110.28	-67.42
9	0.5	1.0	0.5	1.5	4.90	0.48	64.66	32.8	6237.77	163.88	-190.62	-118.10
10	1.5	1.0	0.5	1.5	4.83	0.47	28.00	32.08	8309.65	163.87	-211.07	-133.90
11	0.5	3.0	0.5	1.5	4.91	0.51	66.00	24.27	7107.06	163.87	-268.79	-85.70
12	1.5	3.0	0.5	1.5	4.90	0.51	46.40	37.90	7003.50	163.87	-122.95	-86.12
13	0.5	1.0	1.5	1.5	4.70	0.45	61.81	32.80	6145.85	169.30	-142.80	-83.47
14	1.5	1.0	1.5	1.5	4.87	0.46	36.00	33.52	7038.75	165.69	-116.16	-113.54

15	0.5	3.0	1.5	1.5	4.90	0.46	53.00	22.89	6520.12	164.20	-237.96	-55.50
16	1.5	3.0	1.5	1.5	4.90	0.51	46.40	32.84	5720.18	163.98	-94.51	-66.00
17	0.5	2.0	1.0	1.0	4.90	0.49	63.00	24.89	6632.34	178.62	-214.49	-106.18
18	1.5	2.0	1.0	1.0	4.81	0.47	39.60	31.12	7897.93	168.92	-155.51	-99.59
19	1.0	1.0	1.0	1.0	5.09	0.48	45.00	23.33	5975.05	196.31	-197.64	-170.22
20	1.0	3.0	1.0	1.0	5.12	0.54	57.00	25.16	6084.44	166.05	-187.10	-84.19
21	1.0	2.0	0.5	1.0	5.10	0.49	52.00	24.44	6437.79	164.35	-270.01	-128.74
22	1.0	2.0	1.5	1.0	5.13	0.49	61.00	23.34	5681.39	272.24	-197.21	-80.26
23	1.0	2.0	1.0	0.5	5.12	0.54	61.00	24.89	6460.30	440.23	-117.63	-61.74
24	1.0	2.0	1.0	1.5	5.16	0.48	62.00	26.66	6613.80	163.91	-178.08	-93.16
25	1.0	2.0	1.0	1.0	5.11	0.5	55.00	28.90	6912.64	310.35	-170.35	-99.99
26	1.0	2.0	1.0	1.0	5.10	0.51	61.00	22.94	6502.54	278.35	-172.46	-89.99
27	1.0	2.0	1.0	1.0	5.11	0.51	63.00	22.09	6518.78	275.98	-188.57	-95.99
28	1.0	2.0	1.0	1.0	5.21	0.51	61.00	23.26	6521.45	252.46	-206.33	-105.99
29	1.0	2.0	1.0	1.0	5.09	0.52	62.00	22.16	6189.54	272.54	-182.35	-107.99

Table 2S: ANOVA results for different parameters of the samples

Sl No	Model parameters	DF	pH		Titratable acidity		Syneresis		WHC		Consistency		Firmness		Index of viscosity		Cohesiveness	
			Sum of sq.	P-value	Sum of sq.	P-value	Sum of sq.	P-value	Sum of sq.	P-value	Sum of sq.	P-value	Sum of sq.	P-value	Sum of sq.	P-value	Sum of sq.	P-value
1	Model	14	0.4335	< 0.0001	0.011634	0.0140	3570.81	< 0.0001	512.5648	0.0117	11085285	0.0039	355082.9	< 0.0001	47387.28	0.0108	14875.06	0.0040
2	X ₁	1	0.0001	0.9009	0.0000347	0.7110	2571.521	< 0.0001	133.0842	0.0029	1149545	0.4305	1069.799	0.4419	24715.97	0.0001	137.7319	0.4571
3	X ₂	1	0.0145	0.0490	0.003472	0.0020	56.90667	0.1650	7.558272	0.4050	431541.30	0.1380	7629.054	0.0530	56.48898	0.8090	3879.474	0.0012
4	X ₃	1	0.0010	0.5913	0.001256	0.0396	0.430901	0.9004	2.694294	0.6162	17637717	0.0067	52874.11	< 0.0001	5450.891	0.0297	3545.763	0.0017
5	X ₄	1	0.0057	0.1976	0.00045	0.1949	23.01811	0.3672	4.536072	0.5167	207883.54	0.2934	211457.9	< 0.0001	951.7468	0.3292	1406.571	0.0284
6	X ₁ ²	1	0.1704	< 0.0001	0.001666	0.0202	101.3138	0.0709	46.53229	0.0513	21090087	0.0037	3980.946	0.1491	251.4718	0.6114	61.36235	0.6177
7	X ₂ ²	1	0.0001	0.8499	0.000131	0.4746	111.2579	0.0597	0.611026	0.8107	285479.36	0.2216	2618.906	0.2360	16.02018	0.8975	978.3385	0.0609
8	X ₃ ²	1	0.0003	0.9251	0.000429	0.2050	2.902582	0.7456	0.041123	0.9504	236500.27	0.2637	72.38459	0.8399	3883.157	0.0605	27.31439	0.7385
9	X ₄ ²	1	0.0021	0.4278	0.000131	0.4746	40.15091	0.2387	10.46873	0.3294	79219.433	0.5113	20509.88	0.0038	5713.884	0.0266	2374.239	0.0067
10	X ₁ X ₂	1	0.0016	0.484	0.00030	0.280	38.922	0.245	2.79558	0.609	2503980	0.002	173.855	0.754	2475.24	0.125	1.02414	0.948

				9	6	3		7	4	7		0	5	4	5	3	2	4
11	X_1X_3	1	0.0049	0.2299	0.000506	0.1707	151.6284	0.0314	0.762129	0.7891	853.792	0.9452	535.2869	0.5844	1450.399	0.2325	5.113564	0.8849
12	X_1X_4	1	0.0009	0.5990	0.000506	0.1707	12.969	0.4958	1.236544	0.7335	974997.7	0.0330	920.7312	0.4749	18.18554	0.8909	204.3671	0.3673
13	X_2X_3	1	0.0090	0.1105	0	1.0000	3.199627	0.7335	3.667225	0.5593	34513.05	0.6632	4708.729	0.1191	467.8919	0.4901	184.7364	0.3907
14	X_2X_4	1	0.0012	0.5403	0.0004	0.2201	32.07806	0.2899	82.95566	0.0130	1849584	0.0057	6668.746	0.0682	448.2651	0.4992	1108.371	0.0477
15	X_3X_4	1	0.0020	0.4331	0.0001	0.5314	5.622827	0.6522	1.071225	0.7513	157617.9	0.3579	45401.93	0.0001	1672.383	0.2016	2.61273	0.9176
16	Residual	14	0.0435		0.003399		371.1735		143.5021		2441699		23911.27		13038.24		3296.717	
17	Lack of Fit	10	0.0340	0.3906	0.003199	0.0443	331.9735	0.1255	110.8597	0.4119	2178424	0.1300	22178.59	0.0647	12196.64	0.0525	3080.721	0.0539
18	Pure Error	4	0.0095		0.0002		39.2		32.64241		263274.3		1732.685		841.6053		215.9954	
19	R^2		0.9088		0.7739		0.9058		0.7813		0.8195		0.9369		0.7842		0.8186	

Table 3S: Color values the samples during storage

Storage time	Control			Sample		
Days	L	a	b	L	a	b
0	74.16	-2.42	20.16	74.46	-2.21	21.23
3	73.43	-2.74	18.79	73.64	-2.79	20.63
5	75.26	-2.96	21.98	73.98	-2.69	21.36
7	75.53	-2.28	18.72	74.18	-2.18	18.52
11	77.73	-2.74	24.81	76.14	-3.74	22.31
15	81.49	-3.28	25.54	79.83	-3.86	22.09

Color values of the samples were during analyzed during storage period to observe any change in the color of the product in terms of L, a, and b values. L-value indicates the lightness or whiteness of the samples, a-value indicates redness to greenness and b-value indicates blueness to yellowness.