

Supplementary Materials

Effect of Bambara Groundnut Flour Incorporation on the Nutritional, Phytochemical, and Sensory Characteristics of Tapioca

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Table S1. Duncan's multiple range test for post-hoc comparison of mean pH values among sample groups A–F.

		pH					
		Duncan ^a					
Samples	N	Subset for alpha = 0.05					
		1	2	3	4	5	6
A	3	3.63667					
B	3		4.52000				
C	3			5.01333			
D	3				5.23667		
E	3					5.37667	
F	3						6.04000
Sig.		1.000	1.000	1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S2. Duncan's multiple range test for post-hoc comparison of mean loose bulk density (LBD) values among sample groups A–F.

		LBD					
		Duncan ^a					
Samples	N	Subset for alpha = 0.05					
		1	2	3	4	5	6
E	3	0.41700					
F	3		0.44500				
D	3			0.48400			
A	3				0.50250		
C	3					0.55600	
B	3						0.61000
Sig.		1.000	1.000	1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S3. Duncan's multiple range test for post-hoc comparison of mean trapped bulk density (TBD) values among sample groups A–F.

		TBD		
		Duncan ^a		
Samples	N	Subset for alpha = 0.05		
		1	2	3
A	3	0.56800		



Table S3. Cont.

TBD				
Duncan ^a				
Samples	N	Subset for alpha = 0.05		
		1	2	3
E	3		0.64500	
D	3			0.68200
B	3			0.68500
C	3			0.69400
F	3			0.69800
Sig.		1.000	1.000	0.061

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S4. Duncan's multiple range test for post-hoc comparison of mean swelling capacity (SC) values among sample groups A–F.

SC						
Duncan ^a						
Samples	N	Subset for alpha = 0.05				
		1	2	3	4	5
F	3	5.09400				
E	3	5.50700				
D	3		6.29400			
C	3			7.21350		
B	3				7.96400	
A	3					8.82150
Sig.		0.131	1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S5. Duncan's multiple range test for post-hoc comparison of mean water absorption capacity (WAC) values among sample groups A–F.

WAC				
Duncan ^a				
Samples	N	Subset for alpha = 0.05		
		1	2	3
E	3	2.22900		
F	3	2.49100		
D	3	3.00540		
C	3		4.04800	
A	3			5.52600
B	3			5.61200
Sig.		0.064	1.000	0.803

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S6. Duncan's multiple range test for post-hoc comparison of mean oil absorption capacity (OAC) values among sample groups A–F.

OAC				
Duncan ^a				
Samples	N	Subset for alpha = 0.05		
		1	2	3
A	3	0.42500		
B	3		0.66750	
C	3		0.77900	0.77900
E	3		0.88850	0.88850
D	3		0.89300	0.89300
F	3			0.97500
Sig.		1.000	0.070	0.104

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S7. Duncan's multiple range test for post-hoc comparison of mean moisture content (MC) values among sample groups A–F.

MC					
Duncan ^a					
Samples	N	Subset for alpha = 0.05			
		1	2	3	4
A	3	6.9600			
B	3	7.0167	7.0167		
C	3		7.4233		
D	3		7.4433		
E	3			8.2533	
F	3				9.1900
Sig.		0.777	0.060	1.000	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S8. Duncan's multiple range test for post-hoc comparison of mean ash content (%) among sample groups A–F.

Ash			
Duncan ^a			
Samples	N	Subset for alpha = 0.05	
		1	2
A	3	1.1567	
E	3	1.3100	
B	3	1.3233	
F	3	1.4567	1.4567
D	3	1.7433	1.7433
C	3		1.9933
Sig.		0.063	0.074

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S9. Duncan's multiple range test for post-hoc comparison of mean fat content (%) among sample groups A–F.

Fat						
Duncan ^a						
Samples	N	Subset for alpha = 0.05				
		1	2	3	4	5
A	3	7.0500				
B	3	7.5500	7.5500			
C	3		8.1000			
D	3			8.8000		
E	3				10.5500	
F	3					11.4000
Sig.		0.091	0.066	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S10. Duncan's multiple range test for post-hoc comparison of mean fibre content (%) among sample groups A–F.

Fibre							
Duncan ^a							
Samples	N	Subset for alpha = 0.05					
		1	2	3	4	5	6
A	3	0.0000					
B	3		0.1600				
C	3			0.3100			
D	3				0.5200		
E	3					0.7300	
F	3						1.1200
Sig.		1.000	1.000	1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S11. Duncan's multiple range test for post-hoc comparison of mean protein content (%) among sample groups A–F.

		Protein					
		Duncan ^a					
Samples	N	Subset for alpha = 0.05					
		1	2	3	4	5	6
A	3	5.4290					
B	3		7.8807				
C	3			9.6893			
D	3				13.5720		
F	3					16.0240	
E	3						17.2937
Sig.		1.000	1.000	1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S12. Duncan's multiple range test for post-hoc comparison of mean carbohydrate content (%) among sample groups A–F.

		Carbohydrate					
		Duncan ^a					
Samples	N	Subset for alpha = 0.05					
		1	2	3	4	5	6
F	3	59.5367					
E	3		63.1432				
D	3			67.9200			
C	3				72.4910		
B	3					76.0652	
A	3						79.4031
Sig.		1.000	1.000	1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S13. Duncan's multiple range test for post-hoc comparison of mean calcium content among sample groups A–F.

		Calcium		
		Duncan ^a		
Samples	N	Subset for alpha = 0.05		
		1	2	3
A	3	0.03250		
B	3	0.03950		
E	3		0.05750	
F	3		0.06050	0.06050
C	3		0.06600	0.06600
D	3			0.06750
Sig.		0.115	0.074	0.125

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S14. Duncan's multiple range test for post-hoc comparison of mean magnesium content among sample groups A–F.

		Magnesium				
		Duncan ^a				
Samples	N	Subset for alpha = 0.05				
		1	2	3	4	5
A	3	0.02950				
B	3		0.04850			
C	3			0.06400		
D	3				0.07450	
E	3				0.08000	
F	3					0.14750
Sig.		1.000	1.000	1.000	0.077	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S15. Duncan's multiple range test for post-hoc comparison of mean potassium content (%) among sample groups A–F.

		Potassium					
		Duncan ^a					
Samples	N	Subset for alpha = 0.05					
		1	2	3	4	5	6
A	3	0.02600					
B	3		0.09500				
C	3			0.15100			
D	3				0.21350		
E	3					0.22850	
F	3						0.25800
Sig.		1.000	1.000	1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S16. Duncan's multiple range test for post-hoc comparison of mean iron content among sample groups A–F.

		Iron					
		Duncan ^a					
Samples	N	Subset for alpha = 0.05					
		1	2	3	4	5	6
A	3	40.57050					
B	3		128.06400				
C	3			171.07200			
D	3				256.05250		
E	3					264.10800	
F	3						336.71150
Sig.		1.000	1.000	1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S17. Duncan's multiple range test for post-hoc comparison of mean zinc content among sample groups A–F.

		Zinc				
		Duncan ^a				
Samples	N	Subset for alpha = 0.05				
		1	2	3	4	5
A	3	1.05450				
B	3		4.38500			
C	3			8.30600		
D	3				10.20700	
E	3				10.74700	
F	3					13.03350
Sig.		1.000	1.000	1.000	0.364	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S18. Duncan's multiple range test for post-hoc comparison of mean cyanide content among sample groups A–F.

		Cyanide				
		Duncan ^a				
Samples	N	Subset for alpha = 0.05				
		1	2	3	4	5
F	3	4.7712				
E	3		4.9226			
D	3			5.1381		
C	3				5.3320	
B	3				5.4753	
A	3					5.6533
Sig.		1.000	1.000	1.000	0.089	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S19. Duncan's multiple range test for post-hoc comparison of mean alkaloid content among sample groups A–F

		Alkaloid					
		Duncan ^a					
Samples	N	Subset for alpha = 0.05					
		1	2	3	4	5	6
A	3	3.07633					
B	3		3.37100				
C	3			3.52633			
D	3				3.57333		
E	3					3.60767	
F	3						3.72433
Sig.		1.000	1.000	1.000	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S20. Duncan's multiple range test for post-hoc comparison of mean tannin content among sample groups A–F.

		Tannin				
		Duncan ^a				
Samples	N	Subset for alpha = 0.05				
		1	2	3	4	5
A	3	0.06933				
C	3		0.09633			
B	3		0.09667			
E	3			0.10900		
D	3				0.12233	
F	3					0.18267
Sig.		1.000	.939	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S21. Duncan's multiple range test for post-hoc comparison of mean flavonoid content among sample groups A–F.

		Flavonoid			
		Duncan ^a			
Samples	N	Subset for alpha = 0.05			
		1	2	3	4
F	3	1.29000			
E	3		1.37833		
C	3			1.53833	
D	3			1.53933	
B	3			1.57000	
A	3				1.77833
Sig.		1.000	1.000	0.083	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S22. Duncan's multiple range test for post-hoc comparison of mean trypsin inhibitor among sample groups A–F.

		Trypsin Inhibitor				
		Duncan ^a				
Samples	N	Subset for alpha = 0.05				
		1	2	3	4	5
A	3	0.02333				
B	3		0.20900			
C	3		0.21100			
D	3			0.29467		
E	3				0.54900	
F	3					0.61333
Sig.		1.000	0.767	1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 3.000. A—100CS; B—90CS:10BGF; C—80CS:20BGF; D—70CS:30BGF; E—60CS:40BGF; F—50CS:50BGF.

Table S23. Duncan's multiple range test for post-hoc comparison of mean colour scores among sample groups.

Colour			
Duncan ^a			
Samples	N	Subset for alpha = 0.05	
		1	2
207	50	6.24	
433	50	6.40	
228	50	6.76	
567	50	6.84	
389	50	7.00	
317	50		8.32
Sig.		0.137	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 50.000. 317—100CS; 228—90CS:10BGF; 433—80CS:20BGF; 207—70CS:30BGF; 567—60CS:40BGF; 389—50CS:50BGF.

Table S24. Duncan's multiple range test for post-hoc comparison of mean taste scores among sample groups.

Taste			
Duncan ^a			
Samples	N	Subset for alpha = 0.05	
		1	2
433	50	6.12	
207	50	6.52	
389	50	6.60	
567	50	6.76	
228	50	7.00	7.00
317	50		7.84
Sig.		0.109	0.086

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 50.000. 317—100CS; 228—90CS:10BGF; 433—80CS:20BGF; 207—70CS:30BGF; 567—60CS:40BGF; 389—50CS:50BGF.

Table S25. Duncan's multiple range test for post-hoc comparison of mean appearance scores among sample groups.

Appearance				
Duncan ^a				
Samples	N	Subset for alpha = 0.05		
		1	2	3
207	50	6.00		
389	50	6.80	6.80	
567	50		7.00	
228	50		7.12	
433	50		7.24	
317	50			8.36
Sig.		0.067	0.362	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 50.000. 317—100CS; 228—90CS:10BGF; 433—80CS:20BGF; 207—70CS:30BGF; 567—60CS:40BGF; 389—50CS:50BGF.

Table S26. Duncan's multiple range test for post-hoc comparison of mean aroma scores among sample groups.

Aroma				
Duncan ^a				
Samples	N	Subset for alpha = 0.05		
		1	2	3
433	50	6.28		
389	50	6.92	6.92	
207	50	7.04	7.04	
567	50		7.28	7.28
228	50		7.32	7.32
317	50			8.00
Sig.		0.082	0.383	0.100

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 50.000. 317—100CS; 228—90CS:10BGF; 433—80CS:20BGF; 207—70CS:30BGF; 567—60CS:40BGF; 389—50CS:50BGF.

Table S27. Duncan's multiple range test for post-hoc comparison of mean thickness scores among sample groups.

Thickness			
Duncan ^a			
Samples	N	Subset for alpha = 0.05	
		1	2
567	50	6.36	
207	50	6.52	
389	50	6.64	
433	50	6.68	
228	50	7.08	
317	50		8.00
Sig.		0.146	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 50.000. 317—100CS; 228—90CS:10BGF; 433—80CS:20BGF; 207—70CS:30BGF; 567—60CS:40BGF; 389—50CS:50BGF.

Table S28. Duncan's multiple range test for post-hoc comparison of mean overall acceptability scores among sample groups.

Overall Acceptability			
Duncan ^a			
Samples	N	Subset for alpha = 0.05	
		1	2
389	50	6.24	
567	50	6.28	
433	50	6.68	
207	50	6.84	
228	50	7.08	
317	50		7.96
Sig.		0.090	1.000

Means for groups in homogeneous subsets are displayed. ^a. Uses Harmonic Mean Sample Size = 50.000. 317—100CS; 228—90CS:10BGF; 433—80CS:20BGF; 207—70CS:30BGF; 567—60CS:40BGF; 389—50CS:50BGF.