Table 2 Results of optimization by desirability function for salad dressings supplemented with different gum combinations for selected dependent variables with an averaged target value of commercial salad dressings

Independent (x) and dependent (Y) variables	Constraints	Lower limit	Upper limit	Optimum formulation	Validation
Oil content (x_1) %	in the range	7.5	35	25.18	25.18
Xanthan gum (XG) content (x_2) %	in the range	0.2	1.5	0.67	0.67
n value	target=0.22	0.12	0.39	0.18	0.16±0.01
m value (Pa.s^n)	target=28.09	0.41	115.56	28.09	25.46±0.01
η_{ap} value (Pa.s)	target=1.44	0.039	3.91	1.11	1.02±0.04
G_N^0 Value (Pa)	target=98.35	21.4	444.9	79.46	90.22±4.13
Firmness(N)	target=0.21	0.12	0.83	0.29	0.24±0.008
D [3,2]	target=8.35	3.87	20.69	8.35	21.13±0.66
D [4,3]	target=157.02	23.8	193.78	88.36	97.15±9.76
Desirability				0.76	
Oil content (x_1) %	in the range	7.5	35	24.5	24.5
Xanthan gum-Gum Arabic (XG-GA) content (x_2) %	in the range	0.2	1.5	1.5	1.5
m value (Pa.s^n)	maximize	0.11	27.11	16.32	10.51±0.76
η_{ap} value (Pa.s)	maximize	0.01	1.21	0.81	0.57±0.04
Firmness(N)	target =0.21	0.12	0.3	0.19	0.15±0.01
L^* value	target=66.48	45.25	67.99	63.68	62.26±1.22
D [3,2]	target=8.35	5.214	17.08	8.35	21.05±0.19
D [4,3]	maximize	21.99	139.25	53.23	63.59±2.37
Desirability				0.69	
Oil content (x_1) %	in the range	7.5	35	17.5	17.5
Xanthan gum- PGA (XG-PGA) content (x_2) %	in the range	0.2	1.5	1.46	1.46
n value	target =0.22	0.19	0.45	0.24	0.22±0.003
m value	target =28.09	0.34	64.4	32.81	38.71±2.78
η_{ap} value (Pa.s)	target =1.44	0.04	2.84	1.44	2.02±0.12
G_N^0 value (Pa)	maximize	0.36	88.44	33.01	50.75±4.25
Firmness (N)	target =0.21	0.12	0.62	0.32	0.35±0.02
L^* value	target =66.48	50.31	69.86	63.66	65.43±2.06
a^* value	target =-0.28	-0.69	-0.23	-0.4	-0.46±0.07
D [4,3]	maximize	17.01	55.31	43.07	57.27±7.48
Desirability				0.76	
Oil content (x_1) %	in the range	7.5	35	16.51	16.51
Xanthan gum-Pectin (XG-PE) content (x_2) %	in the range	0.2	1.5	1.21	1.21

n value	target=0.22	0.16	0.73	0.22	0.18±0.002
m value	target=28.09	0.09	91.96	22.81	30.89±0.05
η_{ap} value (Pa.s)	target=1.44	0.02	3.72	1.15	1.61±0.01
Firmness(N)	target=0.21	0.12	0.72	0.24	0.28±0.003
*L** value	target=66.48	48.77	68.59	60.36	61.03±0.79
*a** value	target=-0.28	-1.1	-0.24	-0.37	-0.29±0.05
*b** value	target=8.26	5.15	10.17	9.81	9.59±0.4
D [3,2]	target=8.35	4.25	14.63	9.72	23.97±0.48
D [4,3]	maximize	24.89	125.04	83.35	35.44±6.19
Desirability				0.69	
Oil content (x_1) %	in the range	7.5	35	15.7	15.7
Xanthan gum-Guar gum (XG-GG) content (x_2) %	in the range	0.2	1.5	0.94	0.94
n value	target=0.22	0.099	0.41	0.17	0.17±0.001
m value	target=28.09	0.53	190.46	38.04	34.93±1.26
η_{ap} value (Pa.s)	target=1.44	0.056	7.52	1.44	1.44±0.04
Firmness(N)	target=0.21	0.11	1.09	0.35	0.31±0.005
*L** value	target=66.48	54.66	67.08	61.65	59.81±0.65
*b** value	target=8.26	7.62	9.3	8.93	9.15±0.15
Delta E	target=10.81	8.83	12.8	10.83	10.75±0.23
D [3,2]	target=8.35	3.92	17.17	8.35	22.21±1.92
D [4,3]	maximize	19.04	143.93	59.67	88.407±2.71
Span	target=13.04	2.72	22	7.05	7.47±1.45
Desirability				0.65	