Table S1. Nutrient composition of almond and cookie study snacks in the 6-week randomized controlled trial in adults with obesity

	Almond[§]	Cookie[¶]
Weight, g	57	65
Energy, kcal	322*	325
Carbohydrate, g	12	43
Dietary fiber, g	6	1
Protein, g	12	3
Total fat, g	30	16
Total SFA, g	2	5
Total MUFA, g	19	4
Total PUFA, g	7	6
Vitamin E (alpha-tocopherol), mg	11	1
Calcium, mg	120	14
Magnesium, mg	160	27
Iron, mg	2	4
Potassium, mg	434	113
Sodium, mg	1	205
Zinc, mg	2	0

[§] Nutrient composition of natural, whole, unsalted, and dry roasted almonds provided by the Almond Board of California.
[¶] Nutrient composition of Chips Ahoy chocolate chip cookies obtained from food label and the USDA food composition database.
*Metabolizable energy calculated as the average of Atwater general factor estimates and measured energy estimates from Gebauer et al. 2016 [75].

Table S2. Self-reported dietary intake (energy-adjusted) from the ASA-24 dietary recalls for the almond and cookie groups at baseline and week 6 in adults with obesity.

	Baseline		Week 6		BL-adjusted Model P-Values	Linear Mixed Effect Model P-Values		
	Almond	Cookie	Almond	Cookie	BL-adjusted Group	Group	Week	Group x Week
Carbohydrate (g)	239.85 ± 9.34	235.59 ± 9.98	202.87 ± 9.51**	233.82 ± 10.31	0.086	0.257	0.005	0.009
Total Fat (g)	92.29 ± 3.79	85.41 ± 4.05	103.55 ± 3.86	90.75 ± 4.18	0.231	0.039	0.003	0.282
Total MUFA (g)	32.38 ± 1.48	28.56 ± 1.58	39.16 ± 1.51 *,**	28.58 ± 1.64	0.001	<0.001	0.004	0.004
Oleic acid (g)	30.51 ± 1.39	26.71 ± 1.48	37.07 ± 1.43 *,**	26.9 ± 1.54	0.003	<0.001	0.003	0.005
Total PUFA (g) ǂ	-0.13 ± 0.12	-0.12 ± 0.13	0.07 ± 0.13	0.2 ± 0.13	0.613	0.618	0.024	0.591
Protein (g)	82.73 ± 5.59	95.63 ± 5.96	94.68 ± 5.71	85.57 ± 6.18	0.061	0.783	0.832	0.012
Total fiber (g) ǂ	0.1 ± 0.12	-0.01 ± 0.13	0.01 ± 0.13	-0.1 ± 0.14	0.761	0.439	0.417	0.991
Alpha-tocopherol (mg)	11.5 ± 1.19	9.23 ± 1.26	16.45 ± 1.22	10.29 ± 1.32	0.004	0.002	0.005	0.067
Calcium (mg)	929.79 ± 78.81	985.31 ± 83.54	1044.67 ± 81.08	894.36 ± 87.15	0.474	0.581	0.876	0.175
Magnesium (mg)	319.36 ± 21.19	329.25 ± 22.53	365.3 ± 21.69	303.3 ± 23.41	0.084	0.302	0.577	0.041
Phosphorus (mg)	1357.08 ± 70.86	1479.21 ± 75.51	1540.84 ± 72.37	1311.89 ± 78.27	0.040	0.538	0.884	0.002
Potassium (mg)	2500.77 ± 123.5	2628.93 ± 131.01	2551.35 ± 126.85	2224.42 ± 136.52 ^^	0.176	0.477	0.121	0.043
Zinc (mg) ǂ	-0.04 ± 0.11	-0.07 ± 0.12	0.12 ± 0.12	-0.02 ± 0.12	0.571	0.429	0.373	0.620
Refined grains (oz. eq.)	5.36 ± 0.52	5.5 ± 0.55	5.53 ± 0.54	6.11 ± 0.58	0.495	0.528	0.447	0.659

Data are presented as model-adjusted least squares means ± SE. ǂ Indicates JN transformed variable means ± SE and P-values. *Mvt-adjusted pairwise P-value ≤ 0.05 for Almond vs. Cookie within the same timepoint, **Mvt-adjusted pairwise P-value ≤ 0.05 for BL vs. W6 within the same group, ^^Mvt-adjusted pairwise P-value ≤ 0.1 for BL vs. W6 within the same group

Repeated measures were analyzed using linear mixed-effects models (fixed effects: group, week, group x week; random intercept: participant) with energy intake included as a covariate. The Group, Week, and Group x Week columns report Type III tests of fixed effects from these models; pairwise comparisons used multivariate-t (mvt) adjustment. Baseline adjusted Group reports the group effect at Week 6 from a separate baseline-adjusted linear regression. Missing data were handled by maximum likelihood (mixed models) or multiple imputation (regression models).

Table S3. Immune and Inflammatory markers for the almond and cookie groups at baseline and week 6 in adults with obesity.

	Baseline		**Week 6**		**BL-adjusted Model P-Values**	**Linear Mixed Effect Model P-Values**		
	Almond	**Cookie**	**Almond**	**Cookie**	**BL-adjusted Group**	**Group**	**Week**	**Group x Week**
Absolute basophils count (cells/uL)	45 ± 3.01	40.9 ± 3.33	41.6 ± 3.17	41.16 ± 3.36	0.384	0.584	0.362	0.289
Basophils %	0.72 ± 0.04	0.65 ± 0.05	0.67 ± 0.04	0.66 ± 0.05	0.554	0.480	0.660	0.295
Absolute eosinophils count(cells/uL)	162.68 ± 16.34	149.03 ± 18.09	157.79 ± 16.87	142.72 ± 18.18	0.808	0.535	0.430	0.921
Eosinophils %	2.58 ± 0.22	2.33 ± 0.25	2.42 ± 0.24	2.25 ± 0.25	0.976	0.497	0.351	0.750
Absolute monocytes count (cells/uL)	439.24 ± 23.87	496.84 ± 26.43	427.35 ± 24.83	472.73 ± 26.59	0.631	0.124	0.122	0.600
Monocytes %	7.06 ± 0.35	8.08 ± 0.39	6.83 ± 0.38	7.83 ± 0.4	0.038	0.029	0.354	0.954
Absolute neutrophils count (cells/uL)	3711.45 ± 228.95	3713.29 ± 253.49	3813.15 ± 239.31	3624.96 ± 255.21	0.549	0.770	0.955	0.426
Neutrophils %	57.09 ± 1.48	57.01 ± 1.64	58.47 ± 1.57	58.13 ± 1.66	0.729	0.919	0.151	0.885
Absolute lymphocytes count (cells/uL)	2001.15 ± 90.75	1980.84 ± 100.47	1920.78 ± 95.05	1887.12 ± 101.19	0.802	0.830	0.074	0.891

Lymphocytes %	32.53 ± 1.33	31.93 ± 1.47	31.6 ± 1.41	31.11 ± 1.49	0.907	0.763	0.280	0.945
White blood cells count (cells/uL)	6.36 ± 0.29	6.38 ± 0.32	6.38 ± 0.3	6.17 ± 0.32	0.445	0.812	0.470	0.365
TNF-alpha (pg/mL)	31.2 ± 1.69*	25.17 ± 1.79	16.92 ± 1.72*,**	24.86 ± 1.8	<0.001	0.600	0.000	<0.001
IFN-gamma (IU/mL)	2.32 ± 0.15	2.13 ± 0.19	1.61 ± 0.18**	2.09 ± 0.17	0.006	0.305	0.009	0.019
IL-6 (pg/mL) ǂ	0.19 ± 0.17	0.19 ± 0.18	-0.41 ± 0.18**	0.19 ± 0.18	0.020	0.080	0.038	0.035
IL-10 (pg/mL) ǂ	-0.12 ± 0.16	0.49 ± 0.2	0.64 ± 0.16**	0.39 ± 0.19	0.109	0.318	0.012	0.001

Data are presented as model-adjusted least squares means ± SE. ǂ Indicates JN transformed variable means ± SE and P-values. *Mvt-adjusted pairwise P-value ≤ 0.05 for Almond vs. Cookie within the same timepoint. ^Mvt-adjusted pairwise P-value ≤ 0.1 for Almond vs. Cookie within the same timepoint. **Mvt-adjusted pairwise P-value ≤ 0.05 for BL vs. W6 within the same group.

Repeated measures were analyzed using linear mixed-effects models (fixed effects: group, week, group x week; random intercept: participant) with kit plate number included as a covariate for serum markers and derived indices. The Group, Week, and Group x Week columns report Type III tests of fixed effects from these models; pairwise comparisons used multivariate-t (mvt) adjustment. Baseline adjusted Group reports the group effect at Week 6 from a separate baseline-adjusted linear regression. Missing data were handled by maximum likelihood (mixed models) or multiple imputation (regression models).