

Supplementary material

Alleviating the physical discomfort in healthy individuals with Moringa seed extract: a randomized, double-blind, placebo-controlled, parallel-group trial

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Supplementary Table S1. The VAS scores of physiological conditions among the all subjects.

		Baseline	Week 1	Week 2	Week 3	Week 4
Fatigue	Pla (<i>n</i> = 68)	68.6 ± 1.1	52.0 ± 1.9 #	50.5 ± 1.9 #	46.4 ± 2.2 #	41.8 ± 2.4 #
	MSE (<i>n</i> = 67)	68.8 ± 1.1	48.8 ± 2.1 #	46.3 ± 2.2 #	41.2 ± 2.7 #	38.1 ± 2.6 #
	<i>p</i> -value	0.896	0.275	0.157	0.135	0.289
Stiff shoulder & Neck pain	Pla (<i>n</i> = 68)	70.8 ± 1.4	53.8 ± 2.3 #	51.8 ± 2.2 #	47.2 ± 2.6 #	44.9 ± 2.7 #
	MSE (<i>n</i> = 67)	69.4 ± 1.4	50.1 ± 2.5 #	48.8 ± 2.7 #	43.4 ± 3.0 #	36.7 ± 2.9 #
	<i>p</i> -value	0.460	0.282	0.389	0.341	0.041 *
Joint pain	Pla (<i>n</i> = 68)	33.2 ± 3.0	31.0 ± 2.9	25.0 ± 2.5 #	23.1 ± 2.5 #	22.3 ± 2.4 #
	MSE (<i>n</i> = 67)	32.8 ± 3.0	22.5 ± 2.7 #	23.4 ± 2.8 #	23.2 ± 2.7 #	19.7 ± 2.6 #
	<i>p</i> -value	0.914	0.033 *	0.681	0.980	0.462
Muscle pain	Pla (<i>n</i> = 68)	47.1 ± 2.7	39.2 ± 2.5 #	32.7 ± 2.4 #	29.5 ± 2.5 #	27.7 ± 2.5 #
	MSE (<i>n</i> = 67)	45.5 ± 2.8	32.4 ± 3.1 #	31.5 ± 3.1 #	29.4 ± 2.9 #	21.1 ± 2.6 #
	<i>p</i> -value	0.676	0.092	0.766	0.990	0.066
Knee pain	Pla (<i>n</i> = 68)	32.9 ± 3.1	28.0 ± 2.9	24.6 ± 2.7 #	21.2 ± 2.6 #	18.6 ± 2.4 #
	MSE (<i>n</i> = 67)	29.2 ± 2.9	21.7 ± 2.8 #	22.9 ± 2.8 #	21.7 ± 2.7 #	18.0 ± 2.5 #
	<i>p</i> -value	0.398	0.123	0.662	0.893	0.841
Headache	Pla (<i>n</i> = 68)	39.7 ± 3.2	29.7 ± 2.9 #	28.0 ± 2.6 #	27.3 ± 2.8 #	22.6 ± 2.6 #
	MSE (<i>n</i> = 67)	36.6 ± 3.1	26.6 ± 2.9 #	24.8 ± 2.9 #	23.2 ± 2.8 #	20.4 ± 2.7 #
	<i>p</i> -value	0.494	0.446	0.410	0.305	0.560
Eye strain	Pla (<i>n</i> = 68)	72.0 ± 1.5	55.5 ± 2.5 #	48.7 ± 2.8 #	45.4 ± 2.8 #	43.2 ± 3.0 #
	MSE (<i>n</i> = 67)	70.2 ± 1.8	55.4 ± 2.6 #	52.9 ± 2.8 #	47.2 ± 3.1 #	42.0 ± 3.1 #
	<i>p</i> -value	0.453	0.992	0.298	0.673	0.774
Dry eye	Pla (<i>n</i> = 68)	62.1 ± 2.8	48.3 ± 3.0 #	44.8 ± 3.1 #	40.9 ± 3.0 #	41.9 ± 3.3 #
	MSE (<i>n</i> = 67)	59.8 ± 3.0	45.5 ± 3.1 #	44.8 ± 3.3 #	40.7 ± 3.2 #	38.0 ± 3.3 #
	<i>p</i> -value	0.573	0.533	0.997	0.964	0.413
Sleep initiation	Pla (<i>n</i> = 68)	58.7 ± 2.1	47.5 ± 2.3 #	44.5 ± 2.5 #	40.2 ± 2.3 #	35.0 ± 2.4 #
	MSE (<i>n</i> = 67)	57.2 ± 2.0	45.3 ± 2.6 #	41.8 ± 2.9 #	36.1 ± 3.0 #	33.1 ± 2.9 #
	<i>p</i> -value	0.601	0.534	0.475	0.270	0.611
Waking during sleep	Pla (<i>n</i> = 68)	60.6 ± 2.6	45.1 ± 2.6 #	42.7 ± 2.5 #	40.1 ± 2.6 #	36.6 ± 2.6 #
	MSE (<i>n</i> = 67)	59.3 ± 2.4	45.2 ± 3.1 #	41.2 ± 3.2 #	36.5 ± 2.9 #	33.2 ± 2.9 #
	<i>p</i> -value	0.709	0.988	0.701	0.358	0.382
Fatigue on waking up	Pla (<i>n</i> = 68)	68.1 ± 1.6	52.8 ± 2.3 #	49.6 ± 2.4 #	44.9 ± 2.4 #	38.4 ± 2.4 #
	MSE (<i>n</i> = 67)	64.4 ± 1.8	47.8 ± 2.7 #	44.7 ± 2.9 #	38.7 ± 2.9 #	34.6 ± 3.0 #
	<i>p</i> -value	0.124	0.159	0.191	0.103	0.318
Refreshment on waking up	Pla (<i>n</i> = 68)	68.2 ± 1.6	53.7 ± 2.2 #	51.7 ± 2.1 #	46.6 ± 2.3 #	39.4 ± 2.4 #
	MSE (<i>n</i> = 67)	67.2 ± 1.5	50.6 ± 2.6 #	47.7 ± 2.7 #	40.6 ± 2.9 #	35.8 ± 3.0 #
	<i>p</i> -value	0.648	0.374	0.251	0.109	0.341
Daytime sleepiness	Pla (<i>n</i> = 68)	64.1 ± 2.0	49.1 ± 2.7 #	48.2 ± 2.4 #	43.0 ± 2.7 #	41.8 ± 2.7 #
	MSE (<i>n</i> = 67)	61.7 ± 2.0	49.0 ± 2.7 #	44.9 ± 2.8 #	42.7 ± 2.8 #	37.7 ± 3.0 #
	<i>p</i> -value	0.404	0.978	0.373	0.936	0.319
Motivation toward work and study	Pla (<i>n</i> = 68)	60.6 ± 1.7	51.8 ± 2.0 #	48.9 ± 2.2 #	44.1 ± 2.4 #	41.9 ± 2.2 #
	MSE (<i>n</i> = 67)	59.4 ± 1.9	48.0 ± 2.0 #	45.5 ± 2.4 #	41.3 ± 2.5 #	37.6 ± 2.5 #
	<i>p</i> -value	0.650	0.173	0.297	0.428	0.200

Data are represented as Mean ± SEM. VAS scale: 0 –100 (best to worst).

Pla: Placebo group (*n* = 68); MSE: Moringa seed extract group (*n* = 67).

(Keys: *: Significant at *p* ≤ 0.05 (Between-group comparison with placebo); #: Significant at *p* ≤ 0.05 (Within-group comparison with baseline))

Supplementary Table S2. The changes of VAS scores of physiological conditions from the baseline among the all subjects.

		Week 1	Week 2	Week 3	Week 4	RM ANOVA*
Fatigue	Pla (<i>n</i> = 68)	-16.6 ± 1.9	-18.1 ± 2.1	-22.2 ± 2.2	-26.8 ± 2.6	0.897
	MSE (<i>n</i> = 67)	-20.0 ± 2.2	-22.5 ± 2.3	-27.6 ± 2.7	-30.8 ± 2.7	
	<i>p</i> -value	0.257	0.162	0.122	0.285	
Stiff shoulder & Neck pain	Pla (<i>n</i> = 68)	-17.0 ± 2.2	-19.0 ± 2.3	-23.6 ± 2.5	-25.9 ± 2.6	0.172
	MSE (<i>n</i> = 67)	-19.3 ± 2.4	-20.5 ± 2.5	-26.0 ± 2.9	-32.6 ± 2.6	
	<i>p</i> -value	0.489	0.649	0.541	0.069	
Joint pain	Pla (<i>n</i> = 68)	-2.2 ± 2.7	-8.2 ± 2.7	-10.1 ± 2.9	-10.9 ± 2.9	0.013 *
	MSE (<i>n</i> = 67)	-10.2 ± 2.7	-9.3 ± 2.6	-10.0 ± 2.7	-13.0 ± 2.6	
	<i>p</i> -value	0.038 *	0.773	0.988	0.583	
Muscle pain	Pla (<i>n</i> = 68)	-7.9 ± 3.0	-14.2 ± 2.5	-17.6 ± 2.6	-19.4 ± 2.6	0.044 *
	MSE (<i>n</i> = 67)	-12.8 ± 2.9	-13.9 ± 2.9	-16.4 ± 3.2	-24.4 ± 3.0	
	<i>p</i> -value	0.244	0.941	0.771	0.216	
Knee pain	Pla (<i>n</i> = 68)	-4.9 ± 2.8	-8.3 ± 2.8	-11.7 ± 2.8	-14.2 ± 2.8	0.013 *
	MSE (<i>n</i> = 67)	-7.5 ± 2.2	-6.3 ± 2.4	-8.0 ± 2.6	-11.3 ± 2.4	
	<i>p</i> -value	0.458	0.601	0.333	0.427	
Headache	Pla (<i>n</i> = 68)	-10.0 ± 2.9	-11.7 ± 2.8	-12.4 ± 3.0	-17.1 ± 3.1	0.904
	MSE (<i>n</i> = 67)	-10.1 ± 2.8	-11.8 ± 2.4	-14.0 ± 2.2	-16.2 ± 2.6	
	<i>p</i> -value	0.977	0.969	0.681	0.831	
Eye strain	Pla (<i>n</i> = 68)	-16.5 ± 2.4	-23.2 ± 2.6	-26.6 ± 2.8	-28.8 ± 2.8	0.285
	MSE (<i>n</i> = 67)	-14.8 ± 2.4	-17.3 ± 2.6	-23.1 ± 3.1	-28.3 ± 3.1	
	<i>p</i> -value	0.612	0.114	0.406	0.906	
Dry eye	Pla (<i>n</i> = 68)	-13.9 ± 2.6	-17.3 ± 2.7	-21.3 ± 2.9	-20.3 ± 3.0	0.405
	MSE (<i>n</i> = 67)	-14.3 ± 2.7	-15.0 ± 3.2	-19.0 ± 3.6	-21.8 ± 3.6	
	<i>p</i> -value	0.912	0.589	0.623	0.746	
Sleep initiation	Pla (<i>n</i> = 68)	-11.3 ± 2.2	-14.2 ± 2.6	-18.5 ± 2.8	-23.7 ± 2.6	0.792
	MSE (<i>n</i> = 67)	-11.9 ± 2.5	-15.4 ± 2.6	-21.6 ± 2.8	-24.1 ± 2.7	
	<i>p</i> -value	0.859	0.750	0.437	0.916	
Waking during sleep	Pla (<i>n</i> = 68)	-15.4 ± 2.5	-17.8 ± 2.6	-20.5 ± 2.7	-23.9 ± 2.9	0.444
	MSE (<i>n</i> = 67)	-14.1 ± 2.8	-18.1 ± 2.9	-23.5 ± 3.0	-26.0 ± 3.1	
	<i>p</i> -value	0.713	0.949	0.463	0.620	
Fatigue on waking up	Pla (<i>n</i> = 68)	-15.3 ± 2.4	-18.4 ± 2.6	-23.1 ± 2.6	-29.7 ± 2.4	0.863
	MSE (<i>n</i> = 67)	-16.6 ± 2.6	-19.7 ± 2.9	-25.9 ± 2.8	-29.8 ± 2.8	
	<i>p</i> -value	0.716	0.743	0.465	0.976	
Refreshment on waking up	Pla (<i>n</i> = 68)	-14.5 ± 2.5	-16.5 ± 2.6	-21.6 ± 2.4	-28.7 ± 2.7	0.819
	MSE (<i>n</i> = 67)	-16.6 ± 2.7	-19.5 ± 2.7	-26.3 ± 3.0	-31.3 ± 2.9	
	<i>p</i> -value	0.567	0.423	0.225	0.510	
Daytime sleepiness	Pla (<i>n</i> = 68)	-15.1 ± 2.5	-15.9 ± 2.4	-21.1 ± 2.6	-22.4 ± 2.7	0.318
	MSE (<i>n</i> = 67)	-12.8 ± 2.4	-16.8 ± 2.6	-18.7 ± 2.9	-24.0 ± 2.7	
	<i>p</i> -value	0.508	0.803	0.541	0.670	
Motivation toward work and study	Pla (<i>n</i> = 68)	-8.7 ± 2.4	-11.7 ± 2.7	-16.5 ± 2.7	-18.7 ± 2.7	0.862
	MSE (<i>n</i> = 67)	-11.4 ± 2.1	-13.9 ± 2.5	-17.7 ± 2.7	-21.8 ± 2.6	
	<i>p</i> -value	0.391	0.544	0.760	0.401	

Data are represented as Mean ± SD. VAS scale: 0–100 (best to worst).

Pla: Placebo group (*n* = 68); MSE: Moringa seed extract group (*n* = 67).

(Keys: *: Significant at $p \leq 0.05$ (Between-group comparison with placebo); *: Repeated measure two-way ANOVA Pre/ Post model (Difference); Between groups)

Supplementary Table S3. The VAS scores of physiological conditions among the subjects with urinary 8-iso-PGF_{2t} above the median value.

		Baseline	Week 1	Week 2	Week 3	Week 4
Fatigue	Pla (<i>n</i> = 27)	69.9 ± 1.5	54.3 ± 3.2 #	54.1 ± 2.7 #	48.2 ± 3.2 #	44.5 ± 3.2 #
	MSE (<i>n</i> = 41)	68.3 ± 1.4	48.5 ± 2.8 #	45.9 ± 3.1 #	39.4 ± 3.6 #	36.0 ± 3.4 #
	<i>p</i> -value	0.454	0.189	0.070	0.090	0.092
Stiff shoulder & Neck pain	Pla (<i>n</i> = 27)	71.3 ± 2.2	56.6 ± 3.6 #	54.6 ± 3.3 #	50.1 ± 3.8 #	48.2 ± 4.4 #
	MSE (<i>n</i> = 41)	68.8 ± 1.4	51.9 ± 3.2 #	50.6 ± 3.4 #	42.9 ± 4.0 #	34.6 ± 3.8 #
	<i>p</i> -value	0.316	0.347	0.433	0.213	0.024 *
Joint pain	Pla (<i>n</i> = 27)	35.3 ± 5.0	32.6 ± 4.9	25.2 ± 3.9 #	25.9 ± 4.4	24.8 ± 3.9 #
	MSE (<i>n</i> = 41)	29.7 ± 3.9	19.4 ± 3.5 #	20.3 ± 3.5 #	19.9 ± 3.3 #	15.4 ± 3.0 #
	<i>p</i> -value	0.374	0.026 *	0.366	0.275	0.059
Muscle pain	Pla (<i>n</i> = 27)	50.4 ± 3.8	41.3 ± 4.5 #	35.1 ± 3.9 #	34.6 ± 4.6 #	31.9 ± 4.0 #
	MSE (<i>n</i> = 41)	44.2 ± 3.8	30.1 ± 4.0 #	29.6 ± 4.1 #	28.1 ± 3.5 #	18.6 ± 3.3 #
	<i>p</i> -value	0.273	0.071	0.352	0.253	0.013 *
Knee pain	Pla (<i>n</i> = 27)	30.1 ± 5.2	27.6 ± 5.1	24.0 ± 4.2	21.7 ± 4.2	17.1 ± 3.3 #
	MSE (<i>n</i> = 41)	24.9 ± 3.4	15.0 ± 3.0 #	17.2 ± 3.0 #	16.8 ± 3.1 #	13.1 ± 2.8 #
	<i>p</i> -value	0.381	0.026 *	0.182	0.330	0.367
Headache	Pla (<i>n</i> = 27)	40.7 ± 5.3	31.5 ± 5.1	27.5 ± 3.7 #	28.5 ± 4.4 #	21.8 ± 3.7 #
	MSE (<i>n</i> = 41)	31.2 ± 3.8	23.1 ± 3.8 #	20.8 ± 3.9 #	18.5 ± 3.2 #	16.8 ± 3.3 #
	<i>p</i> -value	0.140	0.189	0.241	0.065	0.334
Eye strain	Pla (<i>n</i> = 27)	75.4 ± 1.9	60.9 ± 3.6 #	52.1 ± 4.1 #	48.9 ± 3.9 #	45.8 ± 4.4 #
	MSE (<i>n</i> = 41)	69.2 ± 2.1	55.9 ± 3.6 #	51.8 ± 3.9 #	46.1 ± 4.2 #	38.9 ± 4.1 #
	<i>p</i> -value	0.044 *	0.348	0.952	0.638	0.265
Dry eye	Pla (<i>n</i> = 27)	68.8 ± 3.6	56.8 ± 4.1 #	48.3 ± 4.2 #	46.4 ± 4.1 #	47.1 ± 5.0 #
	MSE (<i>n</i> = 41)	59.3 ± 3.8	47.1 ± 4.1 #	46.1 ± 4.3 #	41.3 ± 4.2 #	36.7 ± 4.0 #
	<i>p</i> -value	0.088	0.113	0.729	0.402	0.108
Sleep initiation	Pla (<i>n</i> = 27)	59.9 ± 3.9	51.1 ± 3.4 #	47.4 ± 3.7 #	42.1 ± 3.4 #	37.3 ± 3.7 #
	MSE (<i>n</i> = 41)	54.2 ± 2.7	44.7 ± 3.2 #	40.3 ± 3.6 #	35.9 ± 3.9 #	30.1 ± 3.8 #
	<i>p</i> -value	0.216	0.187	0.185	0.271	0.198
Waking during sleep	Pla (<i>n</i> = 27)	60.4 ± 4.1	50.5 ± 3.7 #	46.8 ± 4.1 #	45.2 ± 3.8 #	41.7 ± 4.2 #
	MSE (<i>n</i> = 41)	57.2 ± 3.3	43.8 ± 4.3 #	37.4 ± 4.2 #	36.9 ± 3.8 #	28.6 ± 3.6 #
	<i>p</i> -value	0.546	0.279	0.136	0.141	0.022 *
Fatigue on waking up	Pla (<i>n</i> = 27)	66.4 ± 2.7	57.5 ± 3.2 #	52.9 ± 3.3 #	49.0 ± 3.2 #	42.0 ± 3.7 #
	MSE (<i>n</i> = 41)	63.6 ± 2.5	45.4 ± 3.8 #	44.3 ± 3.9 #	38.7 ± 3.9 #	31.8 ± 3.9 #
	<i>p</i> -value	0.446	0.028 *	0.124	0.059	0.079
Refreshment on waking up	Pla (<i>n</i> = 27)	67.3 ± 2.8	59.9 ± 2.8	54.2 ± 3.2 #	50.6 ± 3.4 #	45.0 ± 3.7 #
	MSE (<i>n</i> = 41)	66.1 ± 2.0	48.8 ± 3.8 #	46.7 ± 3.8 #	40.4 ± 3.9 #	34.0 ± 3.8 #
	<i>p</i> -value	0.726	0.036 *	0.169	0.070	0.054
Daytime sleepiness	Pla (<i>n</i> = 27)	63.7 ± 3.5	56.0 ± 4.0 #	53.4 ± 3.9 #	48.1 ± 4.0 #	47.7 ± 4.0 #
	MSE (<i>n</i> = 41)	63.0 ± 2.4	49.8 ± 3.7 #	44.8 ± 3.9 #	42.9 ± 4.0 #	37.1 ± 4.0 #
	<i>p</i> -value	0.866	0.278	0.141	0.377	0.078
Motivation toward work and study	Pla (<i>n</i> = 27)	63.7 ± 3.2	55.6 ± 3.3	51.8 ± 3.6 #	46.8 ± 3.4 #	45.4 ± 3.3 #
	MSE (<i>n</i> = 41)	57.0 ± 2.6	46.8 ± 2.6 #	43.1 ± 3.2 #	39.2 ± 3.2 #	33.9 ± 3.1 #
	<i>p</i> -value	0.104	0.039 *	0.081	0.114	0.016 *

Data are represented as Mean ± SD. VAS scale: 0–100 (best to worst).

Pla: Placebo group (*n* = 27); MSE: Moringa seed extract group (*n* = 41).

(Keys: *: Significant at $p \leq 0.05$ (Between-group comparison with placebo); #: Significant at $p \leq 0.05$ (Within-group comparison with baseline))

Supplementary Table S4. The changes of VAS scores of physiological conditions from the baseline among the subjects with urinary 8-iso-PGF_{2t} above the median value.

		Week 1	Week 2	Week 3	Week 4	RM ANOVA*
Fatigue	Pla (n = 27)	-15.6 ± 2.7	-15.8 ± 3.0	-21.7 ± 3.3	-25.4 ± 3.4	0.922
	MSE (n = 41)	-19.8 ± 2.9	-22.4 ± 3.2	-28.9 ± 3.7	-32.3 ± 3.6	
	p-value	0.320	0.159	0.177	0.195	
Stiff shoulder & Neck pain	Pla (n = 27)	-14.7 ± 2.8	-16.7 ± 3.4	-21.1 ± 3.4	-23.1 ± 3.9	0.086
	MSE (n = 41)	-16.8 ± 3.3	-18.1 ± 3.4	-25.8 ± 4.0	-34.1 ± 3.6	
	p-value	0.645	0.780	0.404	0.045 *	
Joint pain	Pla (n = 27)	-2.7 ± 3.9	-10.1 ± 3.9	-9.4 ± 4.7	-10.5 ± 4.7	0.159
	MSE (n = 41)	-10.3 ± 3.8	-9.4 ± 3.4	-10.5 ± 3.4	-14.2 ± 3.4	
	p-value	0.184	0.890	0.848	0.511	
Muscle pain	Pla (n = 27)	-9.1 ± 3.9	-15.2 ± 3.1	-15.8 ± 3.6	-18.5 ± 3.1	0.235
	MSE (n = 41)	-13.8 ± 4.1	-14.6 ± 3.9	-16.8 ± 4.2	-25.6 ± 4.2	
	p-value	0.436	0.915	0.870	0.226	
Knee pain	Pla (n = 27)	-2.5 ± 4.3	-6.1 ± 4.3	-8.4 ± 4.8	-13.0 ± 4.5	0.034 *
	MSE (n = 41)	-9.9 ± 2.7	-7.7 ± 2.9	-8.7 ± 3.2	-11.7 ± 2.9	
	p-value	0.136	0.761	0.952	0.800	
Headache	Pla (n = 27)	-9.2 ± 5.0	-13.2 ± 4.5	-12.2 ± 4.8	-18.9 ± 5.2	0.690
	MSE (n = 41)	-8.1 ± 3.6	-10.4 ± 3.0	-13.5 ± 2.7	-14.4 ± 3.2	
	p-value	0.849	0.587	0.808	0.438	
Eye strain	Pla (n = 27)	-14.5 ± 3.0	-23.3 ± 4.0	-26.5 ± 4.1	-29.7 ± 4.3	0.470
	MSE (n = 41)	-13.4 ± 3.1	-17.5 ± 3.4	-23.2 ± 3.9	-30.4 ± 3.8	
	p-value	0.798	0.269	0.572	0.906	
Dry eye	Pla (n = 27)	-12.0 ± 3.8	-20.6 ± 4.3	-22.4 ± 4.5	-21.7 ± 5.1	0.163
	MSE (n = 41)	-12.2 ± 3.1	-13.2 ± 3.7	-17.8 ± 4.2	-22.6 ± 4.3	
	p-value	0.971	0.207	0.470	0.890	
Sleep initiation	Pla (n = 27)	-8.7 ± 3.3	-12.4 ± 3.9	-17.8 ± 4.7	-22.6 ± 4.7	0.987
	MSE (n = 41)	-9.5 ± 3.4	-13.9 ± 3.8	-18.9 ± 3.7	-24.0 ± 3.7	
	p-value	0.882	0.797	0.850	0.805	
Waking during sleep	Pla (n = 27)	-9.9 ± 3.9	-13.6 ± 3.9	-15.2 ± 4.3	-18.7 ± 4.2	0.396
	MSE (n = 41)	-13.4 ± 3.8	-19.8 ± 3.9	-21.5 ± 4.0	-28.6 ± 4.3	
	p-value	0.538	0.290	0.298	0.119	
Fatigue on waking up	Pla (n = 27)	-8.9 ± 3.6	-13.6 ± 3.9	-17.4 ± 3.9	-24.5 ± 3.6	0.848
	MSE (n = 41)	-18.2 ± 3.7	-19.3 ± 3.8	-25.4 ± 3.8	-31.8 ± 3.9	
	p-value	0.090	0.315	0.162	0.198	
Refreshment on waking up	Pla (n = 27)	-7.3 ± 3.8	-13.1 ± 4.2	-16.7 ± 3.6	-22.3 ± 4.4	0.779
	MSE (n = 41)	-17.3 ± 3.7	-19.4 ± 3.7	-25.2 ± 4.0	-32.1 ± 3.9	
	p-value	0.074	0.271	0.139	0.103	
Daytime sleepiness	Pla (n = 27)	-7.7 ± 3.7	-10.3 ± 3.4	-15.6 ± 3.4	-16.0 ± 4.1	0.393
	MSE (n = 41)	-13.2 ± 3.2	-18.1 ± 3.3	-19.6 ± 3.5	-25.9 ± 3.4	
	p-value	0.273	0.118	0.428	0.067	
Motivation toward work and study	Pla (n = 27)	-8.1 ± 4.2	-11.9 ± 4.9	-16.9 ± 4.1	-18.3 ± 4.1	0.641
	MSE (n = 41)	-10.1 ± 2.8	-13.8 ± 3.5	-17.0 ± 3.6	-23.0 ± 3.3	
	p-value	0.677	0.749	0.981	0.365	

Data are represented as Mean ± SD. VAS scale: 0–100 (best to worst).

Pla: Placebo group (n = 27); MSE: Moringa seed extract group (n = 41).

(Keys: *: Significant at $p \leq 0.05$ (Between-group comparison with placebo); *: Repeated measure two-way ANOVA Pre/ Post model (Difference); Between groups)

Supplementary Table S5. The VAS scores of physiological conditions among the female subjects.

		Baseline	Week 1	Week 2	Week 3	Week 4
Fatigue	Pla (<i>n</i> = 33)	68.7 ± 1.4	55.6 ± 2.4 #	54.0 ± 2.2 #	50.9 ± 2.7 #	45.5 ± 3.1 #
	MSE (<i>n</i> = 35)	68.6 ± 1.4	47.3 ± 3.0 #	44.9 ± 3.3 #	38.9 ± 3.9 #	34.3 ± 3.7 #
	<i>p</i> -value	0.968	0.034 *	0.024 *	0.014 *	0.022 *
Stiff shoulder & Neck pain	Pla (<i>n</i> = 33)	73.4 ± 1.4	60.2 ± 2.9 #	58.0 ± 2.7 #	53.6 ± 3.2 #	50.2 ± 3.5 #
	MSE (<i>n</i> = 35)	71.0 ± 1.9	53.8 ± 3.5 #	51.3 ± 4.2 #	44.1 ± 4.6 #	36.8 ± 4.7 #
	<i>p</i> -value	0.303	0.166	0.184	0.092	0.024 *
Joint pain	Pla (<i>n</i> = 33)	30.3 ± 4.3	31.8 ± 4.4	23.7 ± 3.8	21.4 ± 3.4 #	20.1 ± 3.4 #
	MSE (<i>n</i> = 35)	31.6 ± 4.8	21.9 ± 4.2 #	22.6 ± 4.4 #	20.2 ± 3.8 #	18.7 ± 3.9 #
	<i>p</i> -value	0.842	0.106	0.861	0.820	0.793
Muscle pain	Pla (<i>n</i> = 33)	46.1 ± 3.7	41.7 ± 3.7	32.9 ± 3.5 #	31.9 ± 3.7 #	27.2 ± 3.6 #
	MSE (<i>n</i> = 35)	46.1 ± 4.3	32.5 ± 4.4 #	33.4 ± 4.6 #	26.4 ± 3.9 #	22.1 ± 4.2 #
	<i>p</i> -value	0.988	0.114	0.922	0.308	0.356
Knee pain	Pla (<i>n</i> = 33)	27.7 ± 4.7	26.0 ± 4.0	22.0 ± 3.4	18.7 ± 3.1 #	14.8 ± 2.8 #
	MSE (<i>n</i> = 35)	28.5 ± 4.6	19.5 ± 4.0 #	20.0 ± 3.8 #	16.8 ± 3.6 #	15.8 ± 3.6 #
	<i>p</i> -value	0.908	0.254	0.699	0.697	0.822
Headache	Pla (<i>n</i> = 33)	36.0 ± 4.9	34.1 ± 4.4	28.2 ± 3.6	27.8 ± 4.0	23.4 ± 3.6 #
	MSE (<i>n</i> = 35)	38.1 ± 4.9	28.4 ± 4.6 #	23.7 ± 4.4 #	22.6 ± 4.2 #	18.5 ± 3.9 #
	<i>p</i> -value	0.763	0.370	0.430	0.375	0.357
Eye strain	Pla (<i>n</i> = 33)	73.9 ± 2.1	63.2 ± 3.2 #	55.0 ± 3.4 #	51.7 ± 3.8 #	49.7 ± 4.0 #
	MSE (<i>n</i> = 35)	74.3 ± 2.0	57.2 ± 3.6 #	55.8 ± 4.2 #	46.8 ± 4.6 #	41.6 ± 4.8 #
	<i>p</i> -value	0.891	0.212	0.880	0.409	0.194
Dry eye	Pla (<i>n</i> = 33)	68.0 ± 3.7	59.8 ± 3.6 #	52.2 ± 3.8 #	50.3 ± 4.0 #	50.1 ± 4.3 #
	MSE (<i>n</i> = 35)	71.0 ± 2.9	51.4 ± 4.3 #	51.2 ± 4.6 #	44.0 ± 4.5 #	42.1 ± 4.9 #
	<i>p</i> -value	0.534	0.133	0.864	0.293	0.223
Sleep initiation	Pla (<i>n</i> = 33)	57.7 ± 2.8	50.8 ± 2.9 #	48.9 ± 3.2 #	44.1 ± 3.1 #	34.5 ± 3.4 #
	MSE (<i>n</i> = 35)	54.8 ± 3.1	41.9 ± 3.4 #	37.7 ± 4.0 #	28.5 ± 3.9 #	27.1 ± 3.8 #
	<i>p</i> -value	0.499	0.052	0.030 *	0.002 *	0.150
Waking during sleep	Pla (<i>n</i> = 33)	58.9 ± 3.8	46.5 ± 3.3 #	42.1 ± 3.6 #	40.0 ± 3.5 #	37.1 ± 3.7 #
	MSE (<i>n</i> = 35)	61.7 ± 3.6	40.3 ± 4.9 #	40.5 ± 4.9 #	32.9 ± 4.2 #	29.2 ± 3.9 #
	<i>p</i> -value	0.604	0.301	0.796	0.194	0.150
Fatigue on waking up	Pla (<i>n</i> = 33)	69.0 ± 2.1	59.0 ± 2.7 #	53.0 ± 3.2 #	47.0 ± 3.0 #	40.7 ± 3.0 #
	MSE (<i>n</i> = 35)	67.8 ± 1.6	47.5 ± 3.7 #	46.4 ± 4.0 #	38.2 ± 4.2 #	32.6 ± 4.3 #
	<i>p</i> -value	0.676	0.015 *	0.194	0.091	0.123
Refreshment on waking up	Pla (<i>n</i> = 33)	68.5 ± 2.1	58.5 ± 2.8 #	53.4 ± 2.9 #	50.2 ± 2.9 #	40.3 ± 3.2 #
	MSE (<i>n</i> = 35)	69.7 ± 2.0	51.4 ± 3.8 #	47.9 ± 3.9 #	39.0 ± 4.2 #	33.0 ± 4.1 #
	<i>p</i> -value	0.685	0.132	0.261	0.032 *	0.161
Daytime sleepiness	Pla (<i>n</i> = 33)	63.6 ± 2.8	52.5 ± 3.6 #	48.0 ± 3.4 #	43.0 ± 4.1 #	43.1 ± 3.9 #
	MSE (<i>n</i> = 35)	64.2 ± 2.4	46.3 ± 3.9 #	42.1 ± 4.1 #	38.6 ± 4.3 #	35.4 ± 4.1 #
	<i>p</i> -value	0.876	0.245	0.266	0.465	0.178
Motivation toward work and study	Pla (<i>n</i> = 33)	61.5 ± 2.0	53.9 ± 2.5 #	49.7 ± 3.0 #	45.7 ± 3.5 #	42.1 ± 3.0 #
	MSE (<i>n</i> = 35)	61.2 ± 2.5	48.2 ± 2.5 #	44.1 ± 3.5 #	39.1 ± 3.7 #	35.3 ± 3.9 #
	<i>p</i> -value	0.917	0.110	0.221	0.199	0.164

Data are represented as Mean ± SD. VAS scale: 0–100 (best to worst).

Pla: Placebo group (*n* = 33); MSE: Moringa seed extract group (*n* = 35).

(Keys: *: Significant at *p* ≤ 0.05 (Between-group comparison with placebo); #: Significant at *p* ≤ 0.05 (Within-group comparison with baseline))

Supplementary Table S6. The changes of VAS scores of physiological conditions from the baseline among the female subjects.

		Week 1	Week 2	Week 3	Week 4	RM ANOVA*
Fatigue	Pla (<i>n</i> = 33)	-13.1 ± 2.7	-14.6 ± 2.7	-17.8 ± 2.9	-23.1 ± 3.6	0.685
	MSE (<i>n</i> = 35)	-21.3 ± 2.9	-23.7 ± 3.3	-29.6 ± 3.9	-34.3 ± 3.8	
	<i>p</i> -value	0.042 *	0.035 *	0.017 *	0.037 *	
Stiff shoulder & Neck pain	Pla (<i>n</i> = 33)	-13.2 ± 2.9	-15.4 ± 2.9	-19.8 ± 3.2	-23.2 ± 3.5	0.148
	MSE (<i>n</i> = 35)	-17.2 ± 3.2	-19.7 ± 3.7	-26.9 ± 4.5	-34.2 ± 4.4	
	<i>p</i> -value	0.368	0.362	0.198	0.054	
Joint pain	Pla (<i>n</i> = 33)	1.5 ± 3.6	-6.7 ± 3.7	-9.0 ± 4.0	-10.3 ± 4.2	0.071
	MSE (<i>n</i> = 35)	-9.8 ± 3.8	-9.0 ± 4.3	-11.4 ± 4.3	-12.9 ± 4.2	
	<i>p</i> -value	0.038 *	0.684	0.676	0.656	
Muscle pain	Pla (<i>n</i> = 33)	-4.5 ± 4.0	-13.3 ± 3.7	-14.3 ± 3.9	-18.9 ± 4.2	0.177
	MSE (<i>n</i> = 35)	-13.5 ± 4.5	-12.6 ± 4.4	-19.7 ± 4.6	-24.0 ± 4.7	
	<i>p</i> -value	0.137	0.910	0.376	0.423	
Knee pain	Pla (<i>n</i> = 33)	-1.7 ± 3.8	-5.7 ± 3.8	-9.0 ± 3.6	-12.9 ± 4.0	0.096
	MSE (<i>n</i> = 35)	-9.0 ± 3.2	-8.5 ± 3.5	-11.6 ± 3.6	-12.7 ± 3.5	
	<i>p</i> -value	0.149	0.599	0.612	0.963	
Headache	Pla (<i>n</i> = 33)	-1.9 ± 3.7	-7.8 ± 4.1	-8.2 ± 4.5	-12.7 ± 4.6	0.983
	MSE (<i>n</i> = 35)	-9.8 ± 4.2	-14.4 ± 3.7	-15.5 ± 3.2	-19.6 ± 3.7	
	<i>p</i> -value	0.164	0.236	0.197	0.243	
Eye strain	Pla (<i>n</i> = 33)	-10.7 ± 3.3	-19.0 ± 3.6	-22.2 ± 4.2	-24.2 ± 4.0	0.163
	MSE (<i>n</i> = 35)	-17.2 ± 3.4	-18.5 ± 4.0	-27.5 ± 4.4	-32.7 ± 4.3	
	<i>p</i> -value	0.180	0.936	0.378	0.149	
Dry eye	Pla (<i>n</i> = 33)	-8.2 ± 3.7	-15.8 ± 3.9	-17.7 ± 4.6	-17.9 ± 4.3	0.230
	MSE (<i>n</i> = 35)	-19.6 ± 3.5	-19.8 ± 4.0	-27.0 ± 4.2	-28.8 ± 4.4	
	<i>p</i> -value	0.028 *	0.478	0.137	0.080	
Sleep initiation	Pla (<i>n</i> = 33)	-6.9 ± 2.8	-8.8 ± 3.6	-13.6 ± 4.0	-23.1 ± 3.7	0.209
	MSE (<i>n</i> = 35)	-12.9 ± 3.7	-17.2 ± 4.3	-26.3 ± 4.0	-27.7 ± 3.9	
	<i>p</i> -value	0.197	0.135	0.028 *	0.398	
Waking during sleep	Pla (<i>n</i> = 33)	-12.5 ± 3.8	-16.8 ± 3.9	-18.9 ± 3.4	-21.9 ± 3.6	0.425
	MSE (<i>n</i> = 35)	-21.4 ± 4.1	-21.2 ± 4.5	-28.8 ± 4.4	-32.5 ± 4.2	
	<i>p</i> -value	0.117	0.468	0.077	0.060	
Fatigue on waking up	Pla (<i>n</i> = 33)	-9.9 ± 3.0	-15.9 ± 3.3	-22.0 ± 3.5	-28.3 ± 3.3	0.608
	MSE (<i>n</i> = 35)	-20.3 ± 3.9	-21.5 ± 4.2	-29.6 ± 4.3	-35.2 ± 4.3	
	<i>p</i> -value	0.039 *	0.298	0.170	0.198	
Refreshment on waking up	Pla (<i>n</i> = 33)	-10.0 ± 3.5	-15.1 ± 3.9	-18.3 ± 3.4	-28.2 ± 3.8	0.588
	MSE (<i>n</i> = 35)	-18.3 ± 4.0	-21.8 ± 4.1	-30.6 ± 4.5	-36.7 ± 4.3	
	<i>p</i> -value	0.121	0.247	0.031 *	0.144	
Daytime sleepiness	Pla (<i>n</i> = 33)	-11.1 ± 3.4	-15.5 ± 2.9	-20.6 ± 4.0	-20.4 ± 3.7	0.886
	MSE (<i>n</i> = 35)	-17.9 ± 3.1	-22.1 ± 3.1	-25.5 ± 3.2	-28.7 ± 3.3	
	<i>p</i> -value	0.146	0.130	0.345	0.099	
Motivation toward work and study	Pla (<i>n</i> = 33)	-7.6 ± 3.0	-11.8 ± 3.2	-15.8 ± 3.6	-19.4 ± 3.3	0.979
	MSE (<i>n</i> = 35)	-13.0 ± 3.3	-17.1 ± 4.1	-22.1 ± 4.2	-25.9 ± 4.2	
	<i>p</i> -value	0.231	0.307	0.258	0.226	

Data are represented as Mean ± SD. VAS scale: 0–100 (best to worst).

Pla: Placebo group (*n* = 33); MSE: Moringa seed extract group (*n* = 35).

(Keys: *: Significant at *p* ≤ 0.05 (Between-group comparison with placebo); *: Repeated measure two-way ANOVA Pre/ Post model (Difference); Between groups)