

Green synthesis of *Blumea balsamifera* oil nanoemulsions stabilized by natural emulsifiers and its effect on wound healing

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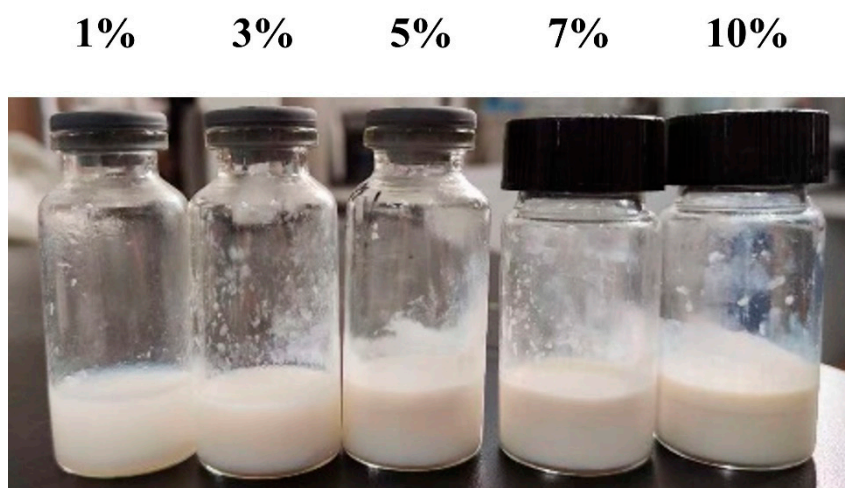


Figure S1. Effect of oil phase content on BBG-NEs.

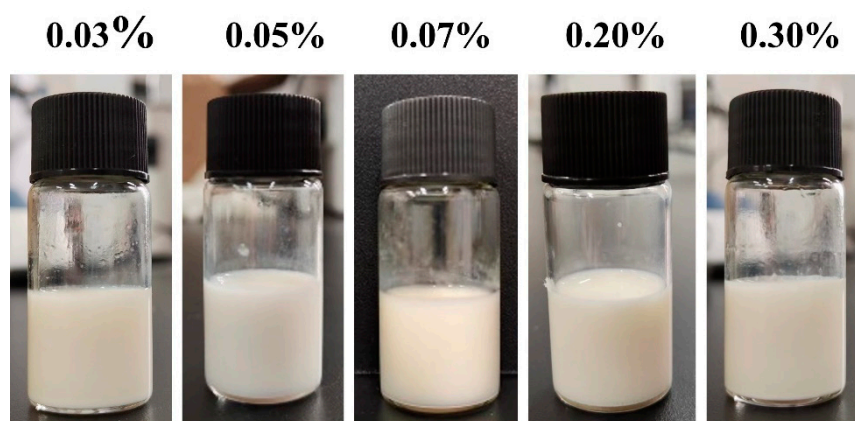


Figure S2. Effect of *Bletilla striata* polysaccharide content on BBG-NEs.

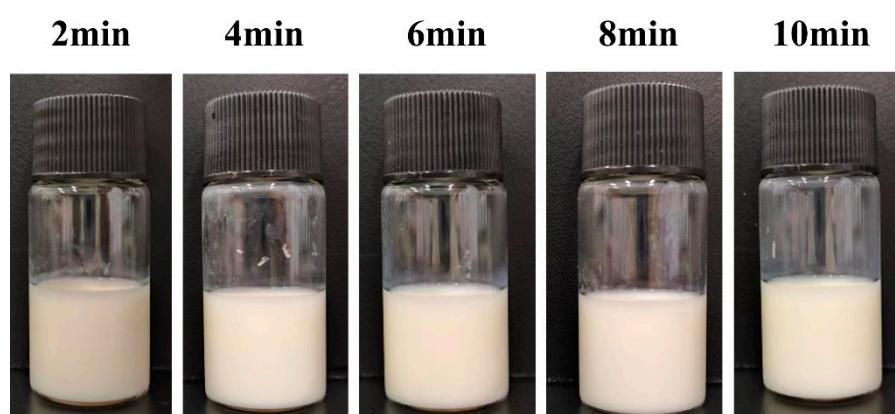


Figure S3. Effect of ultrasonic time on BBG-NEs.

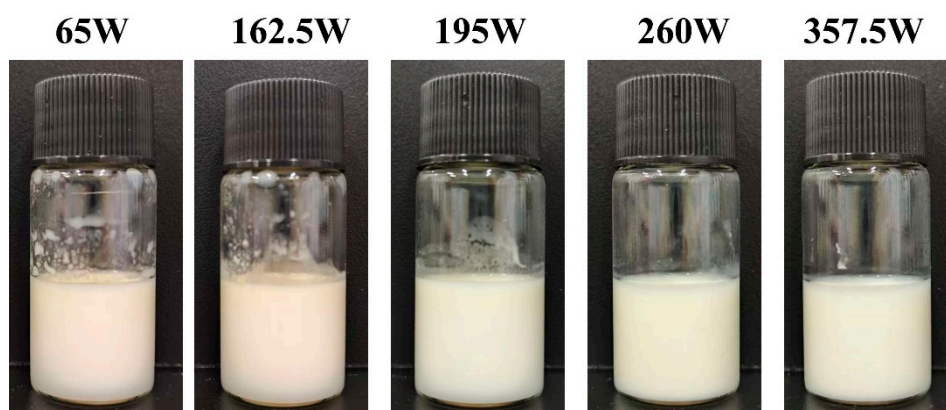


Figure S4. Effect of ultrasonic power on BBG-NEs.

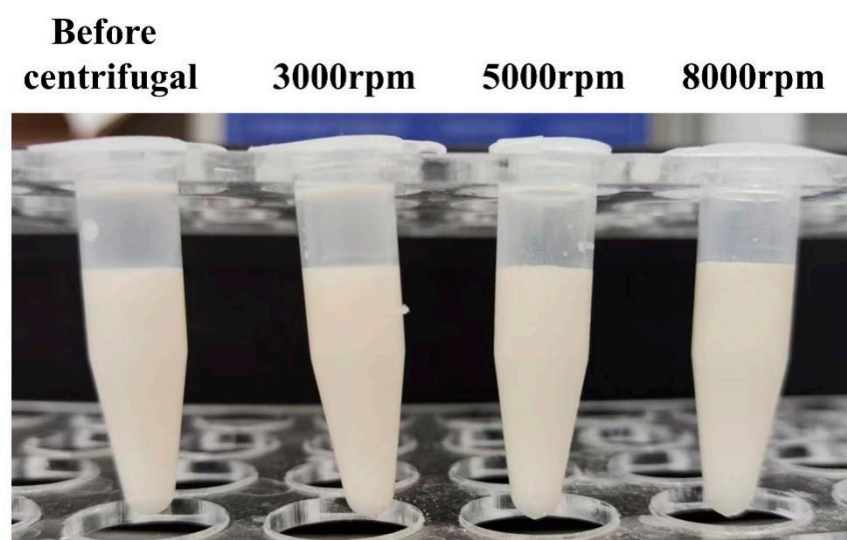


Figure S5. Centrifugal stability of BBG-NEs.

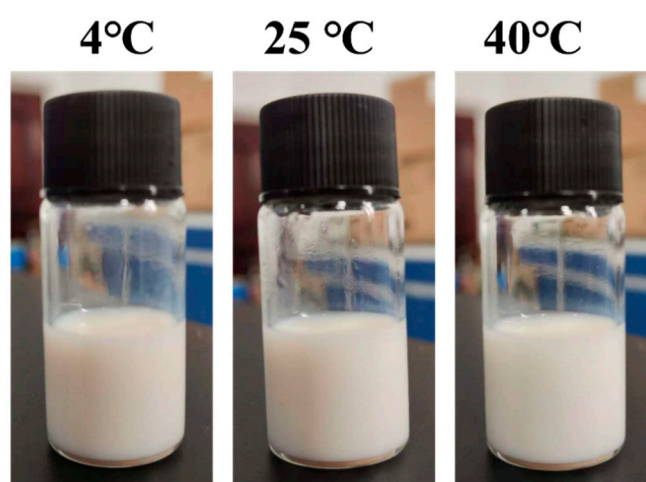


Figure S6. Temperature stability of BBG-NEs.

represent the larger the DEGREE value of the component.

Table S1. Particle size, PDI and potential of BBG-NEs prepared by ultrasonication with different BBO content.

No.	Oil phase (BBO), w/w	Appearance	Zeta potential (mV)	Particle size(nm)	PDI
1	1%	Homogeneous milky white liquid, opaque	-25.48±1.69	222.2±7.06	0.243±0.013
2	3%	Homogeneous milky white liquid, opaque	-55.98±13.58	229.71±6.82	0.238±0.001
3	5%	Milky white liquid, layered	— —	— —	— —
4	7%	Milky white liquid, layered	— —	— —	— —
5	10%	Milky white liquid, layered	— —	— —	— —

Table S2. Particle size, PDI and potential of BBG-NEs prepared by ultrasonication with different content of BSP.

No.	Emulsifier (BSP), w/w	Appearance	Zeta potential (mV)	Particle size(nm)	PDI
1	0.03%	Homogeneous milky white liquid, opaque	-41.70±1.52	200.39±2.17	0.238±0.001
2	0.05%	Homogeneous milky white liquid, opaque	-30.17±0.72	213.95±5.89	0.238±0.002
3	0.07%	Homogeneous milky white liquid, opaque	-38.37±0.94	209.74±3.61	0.241±0.005
4	0.2%	Homogeneous milky white liquid, opaque	-48.28±10.35	221.59±2.22	0.268±0.039
5	0.3%	Homogeneous milky white liquid, opaque	-32.94±0.53	212.66±3.51	0.306±0.044

Table S3. Particle size, PDI and potential of BBG-NEs prepared by ultrasonication with different ultrasonic time.

No.	Ultrasonic time, min	Appearance	Zeta potential	Particle size(nm)	PDI
1	2min	Homogeneous milky white liquid, opaque	-38.37±0.94	209.74±3.61	0.241±0.005
2	4min	Homogeneous milky white liquid, opaque	-35.23±0.81	177.04±3.05	0.231±0.007
3	6min	Homogeneous milky white liquid, opaque	-32.86±0.71	170.2±2.39	0.212±0.008
4	8min	Homogeneous milky white liquid, opaque	-27.51±0.99	194.11±8.34	0.281±0.056
5	10min	Homogeneous milky white liquid, opaque	-32.23±3.13	162.24±3.99	0.189±0.018

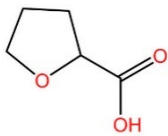
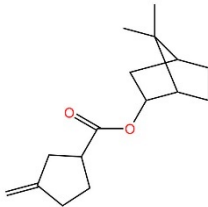
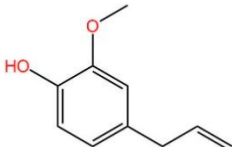
Table S4. Particle size, PDI and potential of BBG-NEs prepared by ultrasonication with different ultrasonic power.

No.	Ultrasonic power , W	Appearance	Zeta potential	Particle size(nm)	PDI
1	65	Homogeneous milky white liquid, opaque, with oil droplets on the surface	-22.18±0.57	268.06±6.95	— —
2	162.5	Homogeneous milky white liquid, opaque	-32.86±0.71	170.2±2.39	0.212±0.008
3	195	Homogeneous milky white liquid, opaque	-34.63±1.63	177.85±5.96	0.209±0.015
4	260	Homogeneous milky white liquid, opaque	-32.22±1.99	173±2.97	0.214±0.012
5	357.5	Homogeneous milky white liquid, opaque	-29.69±2.05	143.16±3.463	0.207±0.036

Table S5. Parameters of genes associated with BBG-NEs for wound healing (top 5).

Protein names	Gene names	Betweenness unDir	Closeness unDir	Degree unDir
Serine/Threonine Kinase 1	AKT1	601.5349403	0.005617978	98
C-X-C Motif Chemokine Ligand 8	CXCL8	529.9941482	0.004901961	73
Epidermal Growth Factor Receptor	EGFR	206.7625745	0.005263158	86
Hypoxia Inducible Factor 1 Subunit Alpha	HIF1A	399.3425545	0.005154639	82
Jun Proto-Oncogene, AP-1 Transcription Factor Subunit	JUN	262.9061061	0.005050505	78

Table S6. Compounds in the drug-ingredient-target network (top 5).

Compound name	Molecular function	2D structure	Degree
Tetrahydrofuran-2-carboxylic acid	C ₅ H ₈ O ₃		6
1,7,7-Trimethylbicyclo[2.2.1]heptan-2-yl-3-methylenecyclopentane-carboxylate	C ₁₇ H ₂₆ O ₂		4
Eugenol	C ₁₀ H ₁₂ O ₂		3

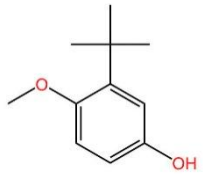
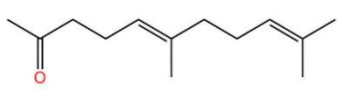
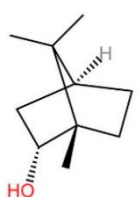
4-Methoxy-3-tert-butylphenol	C ₁₁ H ₁₆ O ₂		3
Geranyl acetone	C ₁₃ H ₂₂ O		3
L-borneol	C ₁₀ H ₁₈ O		/

Table S7. The molecular docking results (top 5).

Protein	AKT	CXCL8	EGFR	HIF1A	JUN
Affinity kcal/mol	(PDB	(PDB	(PDB	(PDB	(PDB
Compound	code	code	code	code	code
	5YVN)	6N2U)	8A27)	8HE3)	7NYO)
1,7,7-trimethylbicyclo[2.2.1]heptan-2-yl-3-methylenecyclopentane-carboxylate	-5.42	-5.20	-5.11	-3.83	-4.35
Tetrahydrofuran-2-carboxylic acid	-4.12	-3.80	-3.5	-3.23	-2.41
Eugenol	-3.61	-4.26	-4.35	-2.45	-2.19
4-Methoxy-3-tert-butylphenol	-3.86	-4.07	-3.41	-3.07	-2.62
Geranyl acetone	-4.21	-4.50	-3.22	-2.73	-2.68
L-borneol	-5.14	-5.11	-5.29	-4.2	-3.7

Table S8. Nanoemulsion formulation with different BBO content.

No.	Oil phase (BBO), w/w	Emulsifier (polysaccharide), w/w	Co-emulsifier (glycyrrhizic acid), w/w	Ultrasonic time, min	Ultrasonic power, W
1	1%	1%	0.3%	2	162.5
2	3%	1%	0.3%	2	162.5
3	5%	1%	0.3%	2	162.5
4	7%	1%	0.3%	2	162.5
5	10%	1%	0.3%	2	162.5

Table S9. Nanoemulsion formulation with different content of BSP.

No.	Oil phase (BBO), w/w	Emulsifier (polysaccharide), w/w	Co-emulsifier (glycyrrhizic acid), w/w	Ultrasonic time, min	Ultrasonic power, W
1	3%	0.03%	0.3%	2	162.5
2	3%	0.05%	0.3%	2	162.5
3	3%	0.07%	0.3%	2	162.5
4	3%	0.2%	0.3%	2	162.5
5	3%	0.3%	0.3%	2	162.5

Table S10. Nanoemulsion formulation with different ultrasonic time.

No.	Oil phase (BBO), w/w	Emulsifier (polysaccharide), w/w	Co-emulsifier (glycyrrhizic acid), w/w	Ultrasonic time, min	Ultrasonic power, W
1	3%	0.07%	0.3%	2	162.5
2	3%	0.07%	0.3%	4	162.5
3	3%	0.07%	0.3%	6	162.5
4	3%	0.07%	0.3%	8	162.5
5	3%	0.07%	0.3%	10	162.5

Table S11. Nanoemulsion formulation with different ultrasonic power.

No.	Oil phase (BBO), w/w	Emulsifier (polysaccharide), w/w	Co-emulsifier (glycyrrhizic acid), w/w	Ultrasonic time, min	Ultrasonic power, W
1	3%	0.07%	0.3%	6	65
2	3%	0.07%	0.3%	6	162.5
3	3%	0.07%	0.3%	6	195
4	3%	0.07%	0.3%	6	260
5	3%	0.07%	0.3%	6	357 . 5