

Supporting Information

Silver Nanoparticles' Biogenic Synthesis Using *Caralluma subulata* Aqueous Extract and Application for Dye Degradation and Antibacterial Activities

Waleed Mohammed Alamier ^{1,*}, Nazim Hasan ^{1,*}, Imam Saheb Syed ¹, Ayyob M. Bakry ¹, Khatib Sayeed Ismail ², Gangaraju Gedda ^{3,4} and Wubshet Mekonnen Girma ⁵

¹ Department of Chemistry, Faculty of Science, Jazan University, P.O. Box 2097, Jazan 45142, Saudi Arabia; isayed@jazanu.edu.sa (I.S.S.); ayyob1986@gmail.com (A.M.B.)

² Department of Biology, Faculty of Science, Jazan University, P.O. Box 2097, Jazan 45142, Saudi Arabia; kismail@jazanu.edu.sa

³ Department of Chemistry, School of Engineering, Presidency University, Bangalore 560064, Karnataka, India; raju.analy@gmail.com

⁴ Department of Animal Science & Technology, BET Research Institute, Chung-Ang University, Anseong 17546, Republic of Korea

⁵ Department of Chemistry, College of Natural Science, Wollo University, Dessie P.O. Box 1145, Ethiopia; wubshet.mekonnen@wu.edu.et

* Correspondence: wmalamier@jazanu.edu.sa (W.M.A.); hhasan@jazanu.edu.sa (N.H.)

Table S1. List of phytochemicals identified in aqueous extract of *Caralluma subulata* by Gas Chromatography-Mass spectrometry (GC-MS) along with their retention times, and peak area%, similarity index and molecular weight.

Peak	R. Time (min)	Peak area %	SI %	Name of identified phytochemicals from CS	Molecular weight (g/mol)
1	3.40	1.62	59.38	Methyl format	60
2	5.01	1.03	33.53	2,2'-Bioxirane	86
3	6.80	1.18	46.46	3-Furaldehyde	96
4	10.74	0.94	86.16	2-Furancarboxaldehyde-5-methyl	110
5	10.84	3.05	60.51	2,4-Dihydroxy-2,5-dimethyl-3(2H)-furan-3-one	144
6	12.07	3.68	29.22	5-Hexen-3-ol, 2,2,4-trimethyl-	142
7	13.14	3.43	29.80	5-Hydroxy-2,2-dimethylhexan-3-one	144
8	14.81	1.76	30.01	cis-2-Ethyl-2-hexen-1-ol	128
9	16.08	11.40	18.31	2,4,6-Cycloheptatriene-1-carbonitrile	117
10	16.88	16.47	89.27	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl	144
11	20.03	42.10	88.61	2-Furancarboxaldehyde, 5-(hydroxymethyl)	126
12	30.74	0.99	15.85	-Methyl-Z-tetradecen-1-ol acetate	268
13	32.35	1.15	6.94	17-Octadecynoic acid	280
14	32.49	1.64	6.27	[1,1'-Bicyclopropyl]-2-octanoic acid, 2'-hexyl-, methyl ester	322

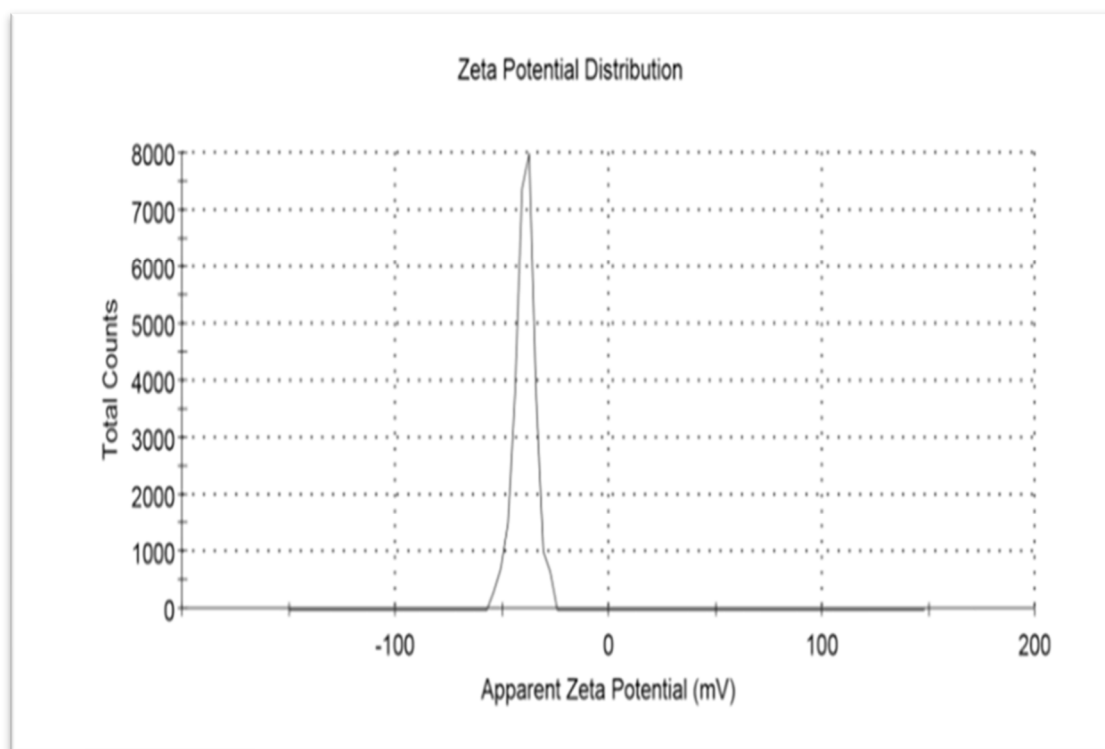


Figure S1. Zeta potential of Ag-CS NPs.

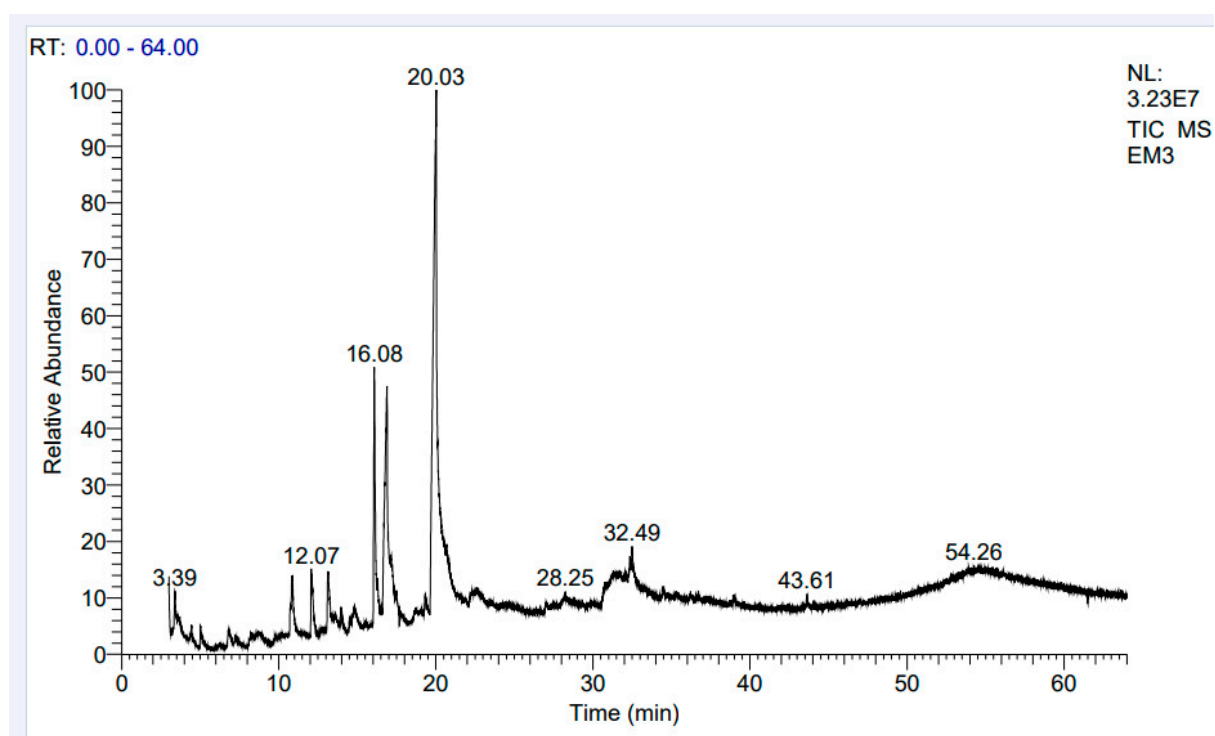


Figure S2. Gas Chromatography-Mass Spectrometry (GC-MS) chromatogram of aqueous extract of *Caralluma subulata*. Bioactive compounds in the extract are shown in Table S1.

Table S2. XRD different peaks-based Crystallinity calculation.

S. No	2 θ (Degree)	FWHM	Crystallinity (nm)	Average Crystallinity (nm)
1	32.58	0.55277	15.64	22.93
2	55.10	0.38501	24.31	
3	67.84	0.17612	56.75	
4	38.40	1.36446	6.44	
5	44.76	0.57633	15.68	
6	64.74	0.43841	22.43	
7	77.02	1.07445	9.89	

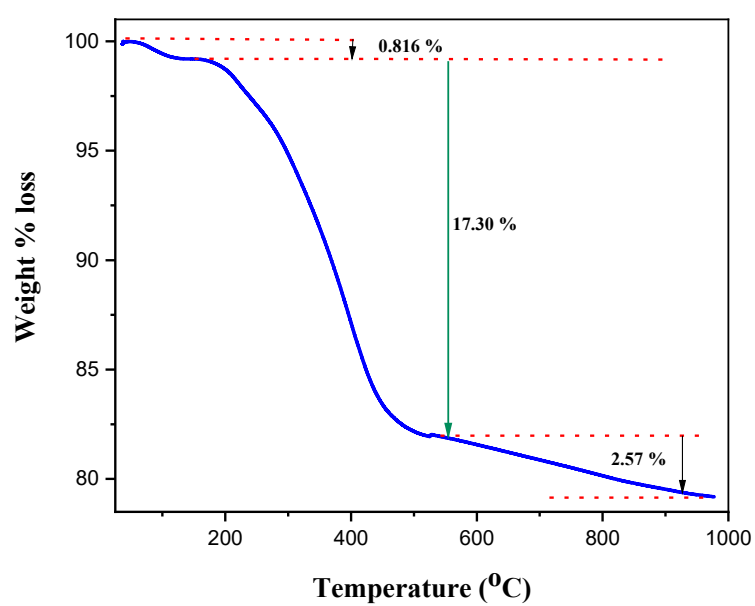


Figure S3. Thermogravimetric analysis (TGA) of Ag-CS NPs.

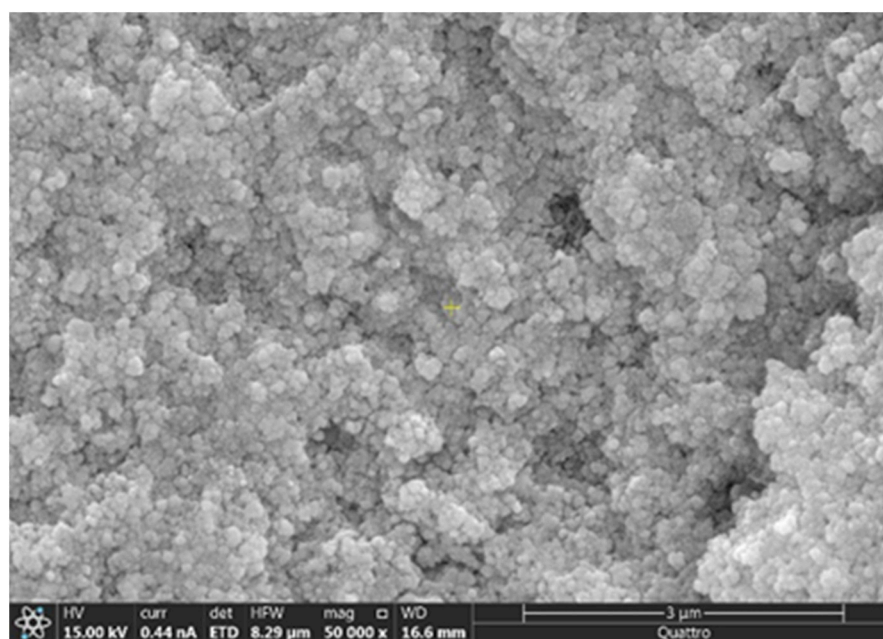


Figure S4. SEM images of Ag-CS NPs after application MB dye reduction using NaBH₄.

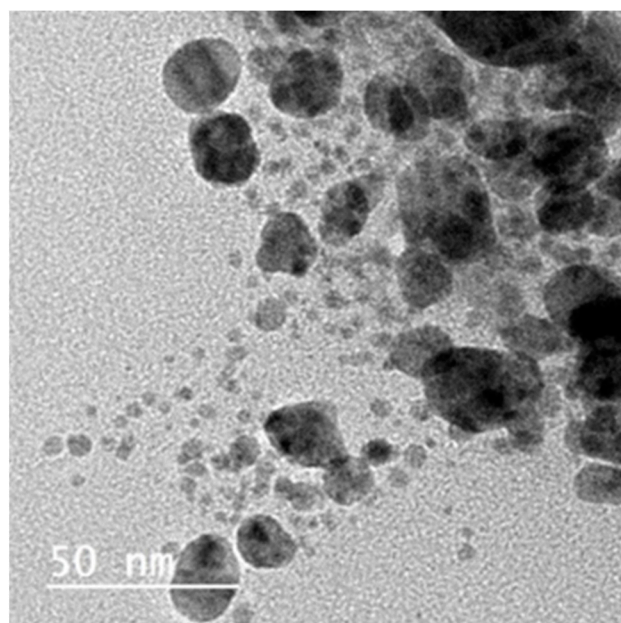


Figure S5. TEM images of Ag-CS NPs after application MB dye reduction using NaBH_4 .