Electronic Supplementary Material (ESI) for Nanoscale Advances.

Supporting Information

Synthesis of Silver Nanoparticles using Fagonia Cretica and their Antimicrobial Activities

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Experimental Methods

Physical Characterization

UV-vis spectrum was recorded using HITACHI U-5100 UV-visible spectrophotometer. Fourier transform infrared (FT-IR) spectrum was recorded using Varian 660-IR FT-IR spectrophotometer. Transmission electron microscopic (TEM) images were taken with JEOL JEM 2100. X-ray diffraction (XRD) was done using Bruker D8 advance eco diffractometer from Thermo Scientific. Analysis of *Fagonia cretica* extract's chromatographic profiles and identification of bioactive reducing biomolecules were performed by HPLC-UV-MS/from Agilent 1100 Series LC equipped with UltimateXB-C18 column (Welch Materials, MD, USA).

Antimicrobial activities of Ag NPs

The antibacterial activity was studied against gram negative (*Proteus vulgaris*, *Escherichia coli, Klebsiella pneumoniae* strains obtained from B.V, Hospital Bahawalpur) bacteria at different concentrations of Ag NPs by well diffusion method. Antimicrobial activity is carried out by spreading and diffusion method, followed by calculation of zones of inhibition. Initially, bacterial strains were taken and grew in liquid broth media. Then, the agar was taken and weighed amount was dissolved in distilled water, autoclaved and then naturally cooled down to the agar plates. Afterwards, the calculated amounts of Ag NPs were added in the petri plates and left for solidification. After solidification, spreading of fresh culture of the respective strain on petri plates was done and left for appropriate time so that the culture can absorb the NPs. Then incubate the plates for overnight at 37 °C in incubator. On next day, growth of the bacteria was monitored. Ag NPs were active, and they kill all the bacterial strains. This process is named as spreading method. In diffusion method, the agar plates were prepared as mentioned above, after solidifying the plates spread the bacterial strains on agar plates. Then, the paper discs were taken and dip in Ag NPs,

after dipping these paper discs were stuck on plates one by one and incubated overnight at 37 °C in incubator. On next day, growth of the bacteria was monitored and inhibition in growth confirmed the active nature of Ag NPs.

Assays for Determination of ROS

Production of intracellular reactive oxygen species (ROS) in presence of silver nanoparticles Ag NPs, ciprofloxin and plant extract was determined by using fluorescent dye 2,7-dichlorodihydrofluorescein diacetate (DCFH-DA) using standard protocol.

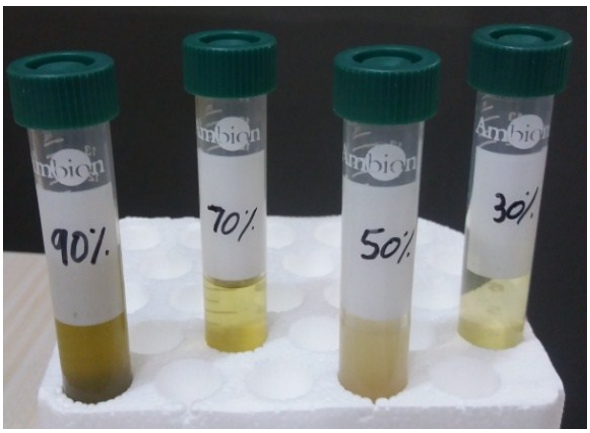

Fig S1: Illustration of extraction of *Fagonia cretica* extract in 30%, 50%, 70% and 90% of ethanol to water ratio.

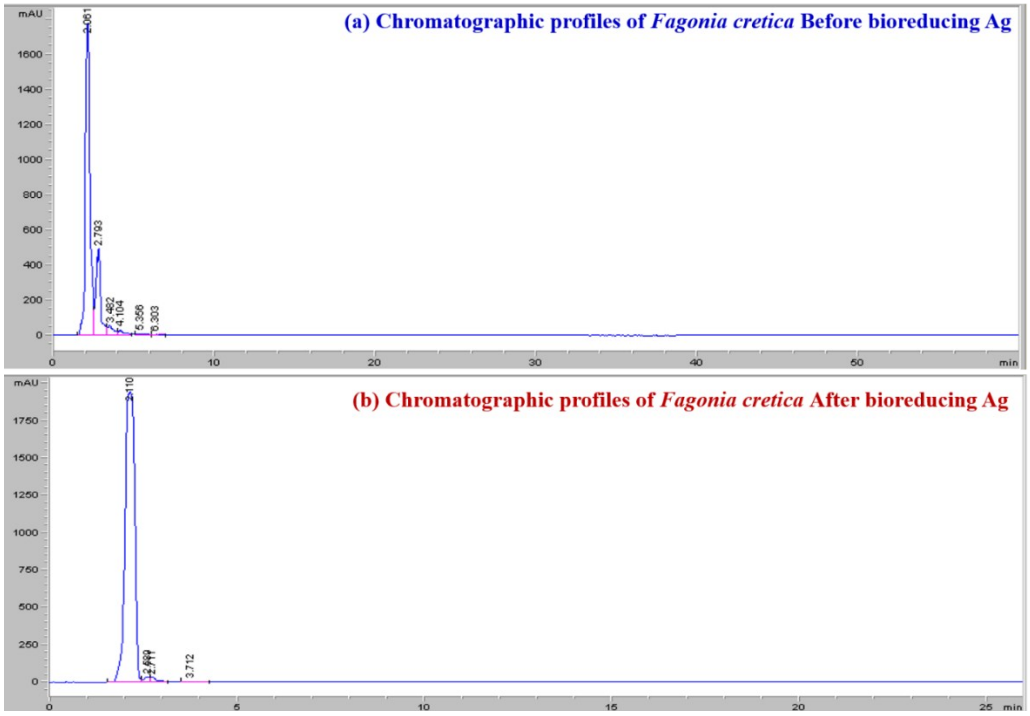

Fig. S2. Chromatographic profiling of *Fagonia cretica* extract before (a) and after (b) bio reduction of Ag ions.

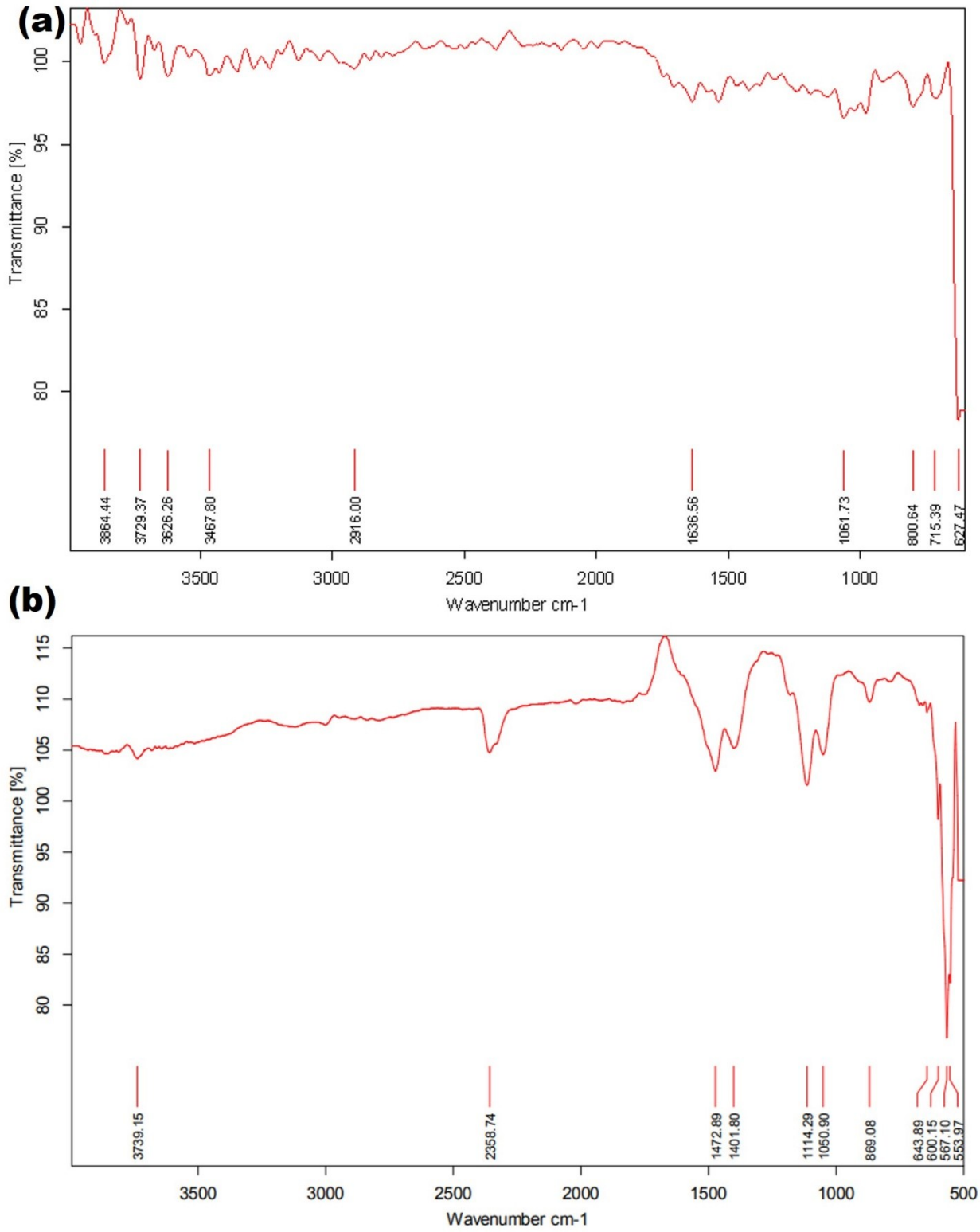

Fig. S3. FTIR spectrum of (a) *Fagonia cretica* extract (b) as-synthesized Ag NPs.

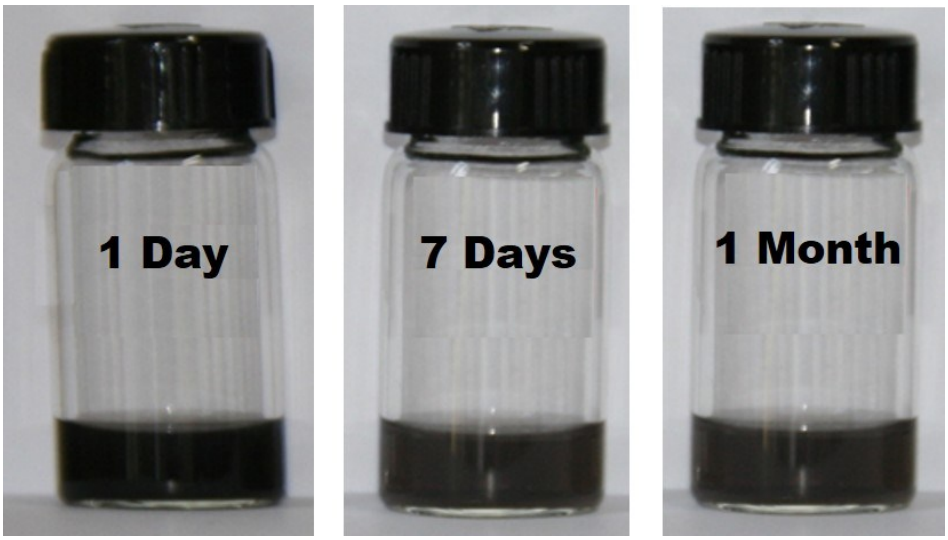

Fig. S4. Stability of Ag NPs suspension at different time period.

Table S1. Zones of inhibition of Ag NPs against bacterial strain by disc diffusion method.

Ag NPs			Zone of inhibition
Name of strain	Quantity of strain use µL/mL	Concentration of strain use µg/mL	Mean value mm
Kalebsella	60	5	10
	120	10	12
	240	20	15
Proteous	60	5	14
	120	10	16
	240	20	17
E. Coli	60	5	9
	120	10	10
	240	20	13

Table S2. Zones of inhibition of ciprofloxin against bacterial strain by disc diffusion method.

Ciprofloxacin			Zone of inhibition
Name of strain	Quantity of strain use µL/mL	Concentration of strain use µg/mL	Mean value mm
Kalebsella	60	5	11
	120	10	11
	240	20	12
Proteous	60	5	9
	120	10	8
	240	20	9
E. Coli	60	5	10
	120	10	11
	240	20	14

Table S3. Zones of inhibition of *Fagonia Cretica* against bacterial strain by disc diffusion method.

Fagonia Cretica			Zone of inhibition in
Name of strain	Quantity of strain use µL/mL	Concentration of strain use µg/mL	Mean value in mm
Kalebsella	60	5	2
	120	10	2
	240	20	3
Proteous	60	5	2
	120	10	2
	240	20	2
E. Coli	60	5	1
	120	10	1
	240	20	3