Supplementary Information

One-pot green synthesis of gold and silver nanoparticles using *Rosa canina* L. extract

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Determination of the antiradical activity of *Rosa canina* L. extract

DPPH assay (2,2-diphenyl-1-picrylhydrazyl) was used to determine the antioxidant activity of the plant extract by spectrophotometric method[1]. A freshly prepared DPPH methanolic solution (3 mL, 150 µM) was mixed with 300 µL of *Rosa canina* L. extract; the mixture was kept in the dark at room temperature for 30 minutes. Three replicates were produced and one control sample (using 300 µL of distilled water instead of the extract). The stable radical DPPH has a characteristic absorption band at 517 nm; after the reaction, the diminution of this band was monitored by UV-Vis spectroscopy.

Antiradical activity (ARA) was calculated by applying the following formula[2]:

$$ARA = 100\left(1 - \frac{A_{Sample}}{A_{Control}}\right) \quad \text{(Equation 1)}$$

Where A_{sample} is the absorbance value of the sample after the reaction at 517 nm, and $A_{control}$ is the absorbance value of the control.

Characterization of *Rosa canina* L. extract

To reveal the antioxidant capacity of the plant extract, the free radical scavenging activity of *Rosa canina* L. extract was measured spectrophotometrically using the DPPH assay[1]. The absorbance value for the control DPPH (mixed with distilled water) was 0.901 at 517 nm (Figure S1); on the other hand, after reacting with antioxidant compounds from the stock plant extract the absorbance was reduced to 0.110, thus, the calculated anti-radical activity of the extract was 88% (see eq1).

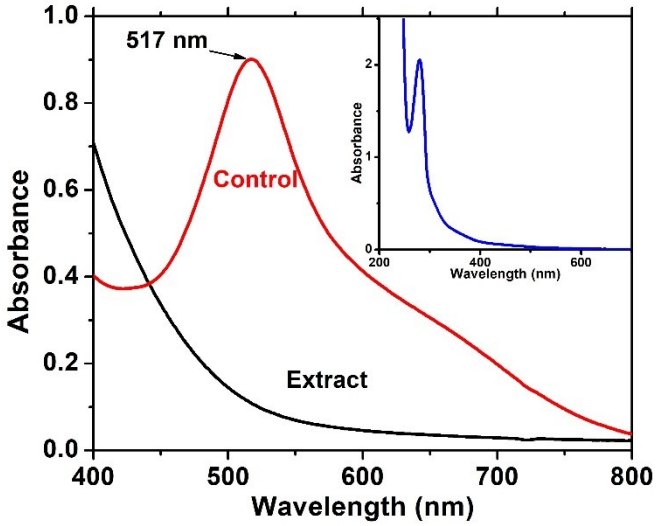

Fig. S1. UV-Vis absorption spectra of antiradical activity measurements using the DPPH assay (main) and absorption spectrum of Rosa canina L. extract (inset).

The UV-Vis absorbance spectrum of plant extract was also analysed to exclude interference with the spectrum of DPPH and the noble metal nanoparticles (Inset Figure S1). There is an absorbance band at 280 nm, but there is no notable absorbance in the gold (500-600 nm) and silver (380-420 nm) nanoparticles surface plasmon band ranges or in the DPPH band.

Au(0) concentration in gold nanoparticle solutions

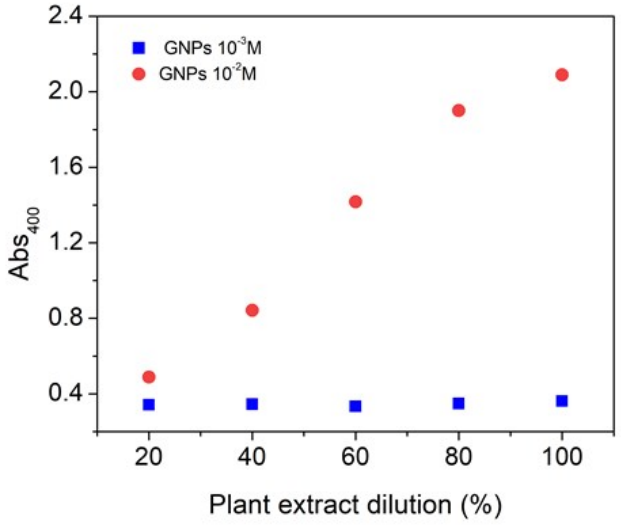

Fig. S2. Dependence of the Abs_{400} on the plant extract concentration

Scanning electron microscopy

Scanning electronic microscopy (SEM) was performed using a JSM-7800F JEOL (Tokyo, Japan) microscope: a 2µl drop of each sample was placed on top of an aluminized glass substrate and allowed to dry at room temperature. All the images were obtained using a 15 kV accelerating voltage. Open-source software ImageJ was used to analyse the SEM images to calculate the mean size; at least 200 particles were measured in their longest dimension.

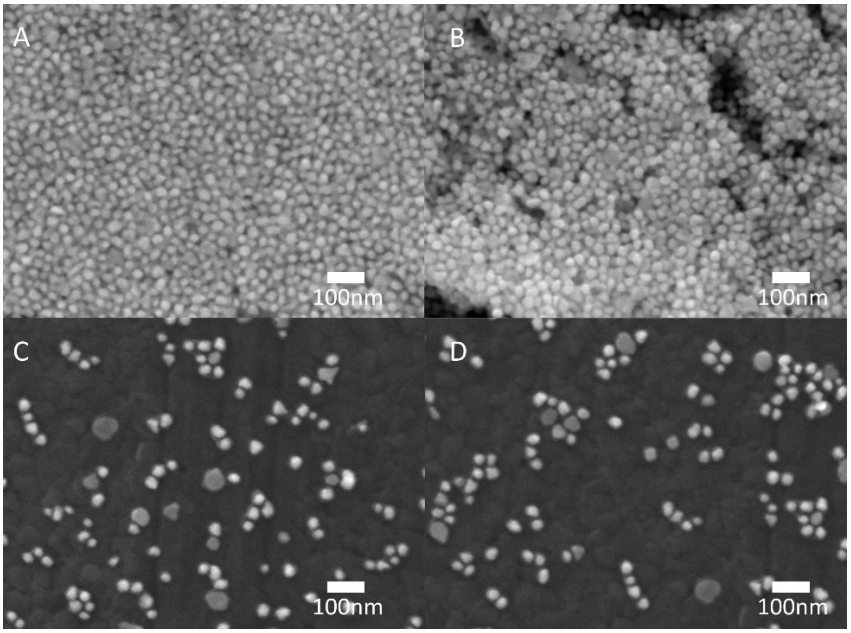

Fig. S3. SEM micrographs of samples G100-2 (panel A), G100-3 (B), S100-2 (C) and S100-3 (D).

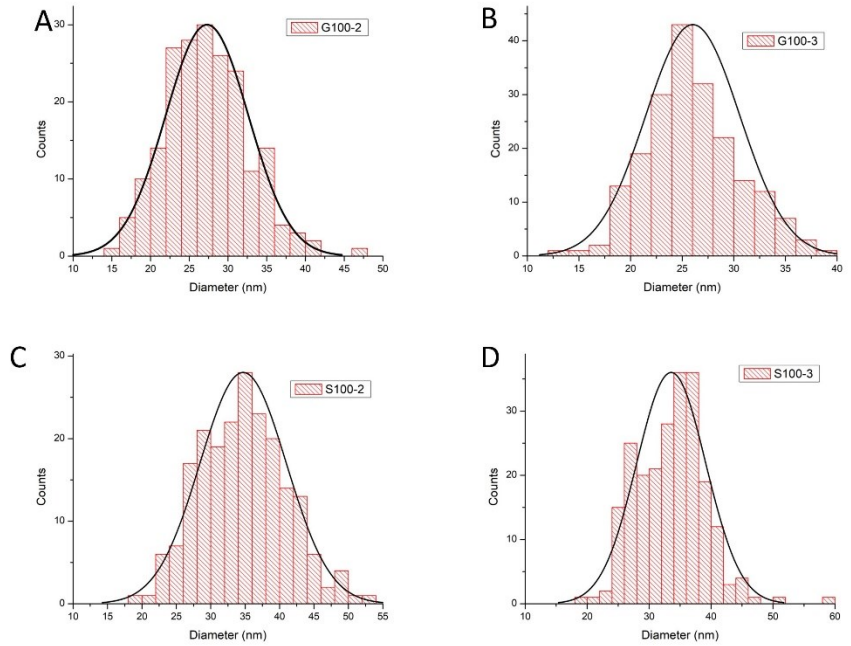

Fig. S4. Size histograms and normal fittings of samples G100-2 (panel A), G100-3 (B), S100-2 (C) and S100-3 (D).

References

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