Supporting Information

Mixed Phytochemicals Mediated Synthesis of Multi-functional Ag-Au-Pd Nanoparticles for Glucose Oxidation and Antimicrobial Applications

K. Jagajjanani Rao and Santanu Paria*

Interfaces and Nanomaterials, Department of Chemical Engineering, National Institute of Technology, Rourkela–769 008, Orissa, India.

*Corresponding author. E–mail address: santanuparia@yahoo.com, or sparia@nitrkl.ac.in;

Fax: +91 661 246 2926

I – Average molar mass of the synthesized trimetallic NPs

From the weight % results from EDX analysis (Fig. 7.1), we calculated the average molar mass (M) by mass fractions (w_i) and molar mass of individual components (m_i) of the trimetallic NPs which has three elements by the following equation:

$$1/M = \sum_i \frac{w_i}{m_i}$$

Thus, trimetallic NPs from LE has a molar mass of 130 g/mol, while it is 140 g/mol for NPs obtained from LE+CE.

II - Percentage crystallinity calculation

As we have done the analysis on glass, the background profile can be scaled such that it abuts the amorphous nature and the crystallinity from the sample can be calculated as follows:

$$\%\,\text{crystallinity} = \frac{(\text{background profile area - total area})}{(\text{background profile area})} \times 100$$

The % crystallinity is useful in identification of the % crystallinity of trimetallic NPs from LE+CE and LE alone.

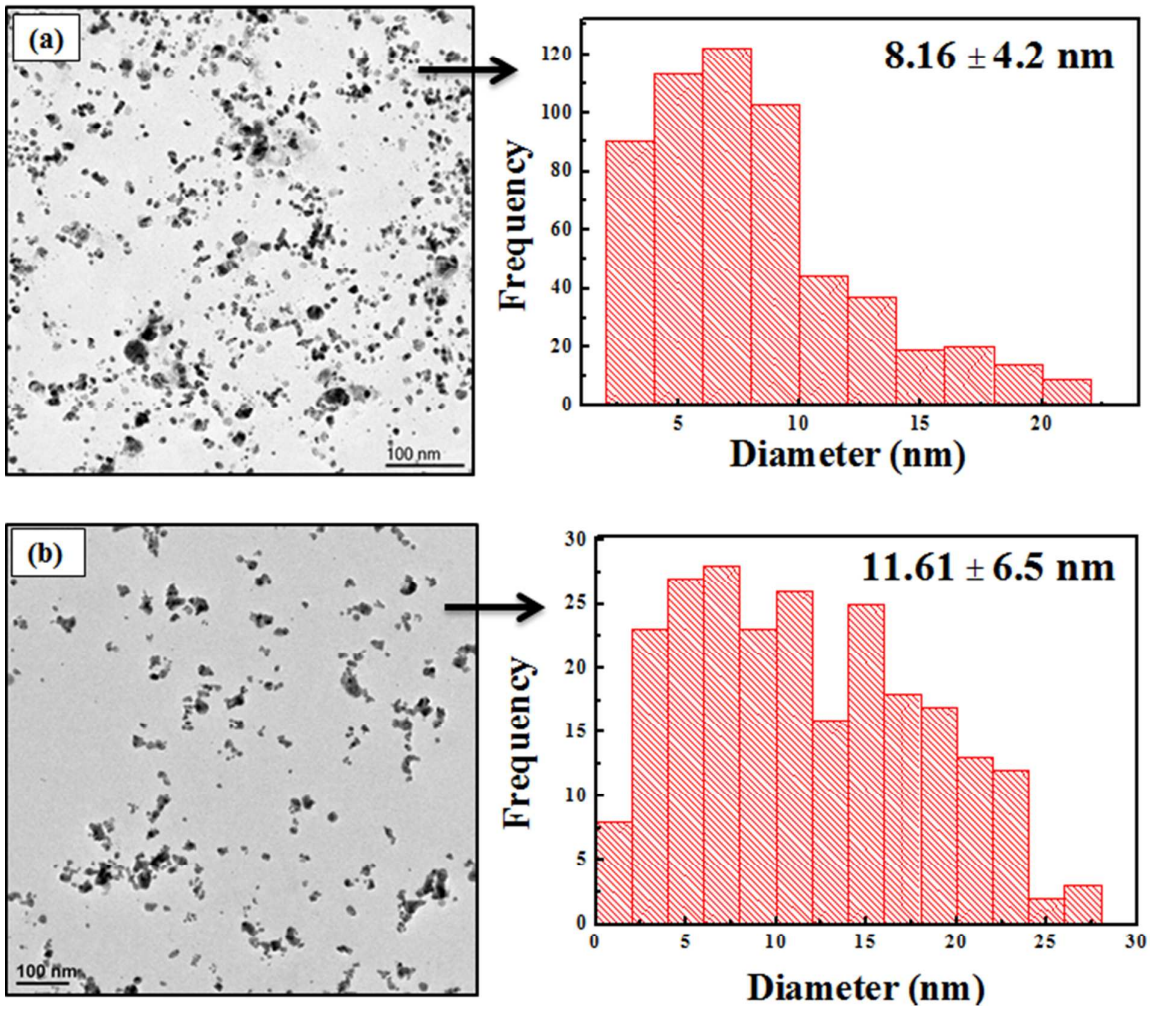


Figure S1. TEM images and size distribution of the trimetallic nanoparticles obtained from LE (a) and LE+CE (b). Particle size histograms are constructed using Image J 1.44p software.

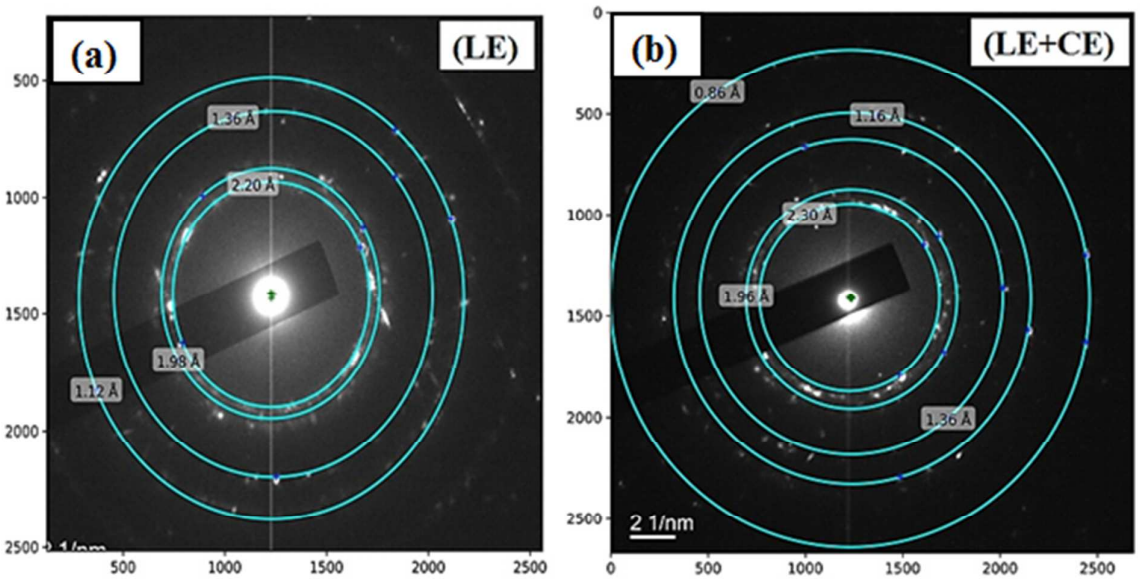


Figure S2. SAED pattern and the calculated d-spacing values of the synthesized trimetallic NPs from LE (a) and LE+CE (b).

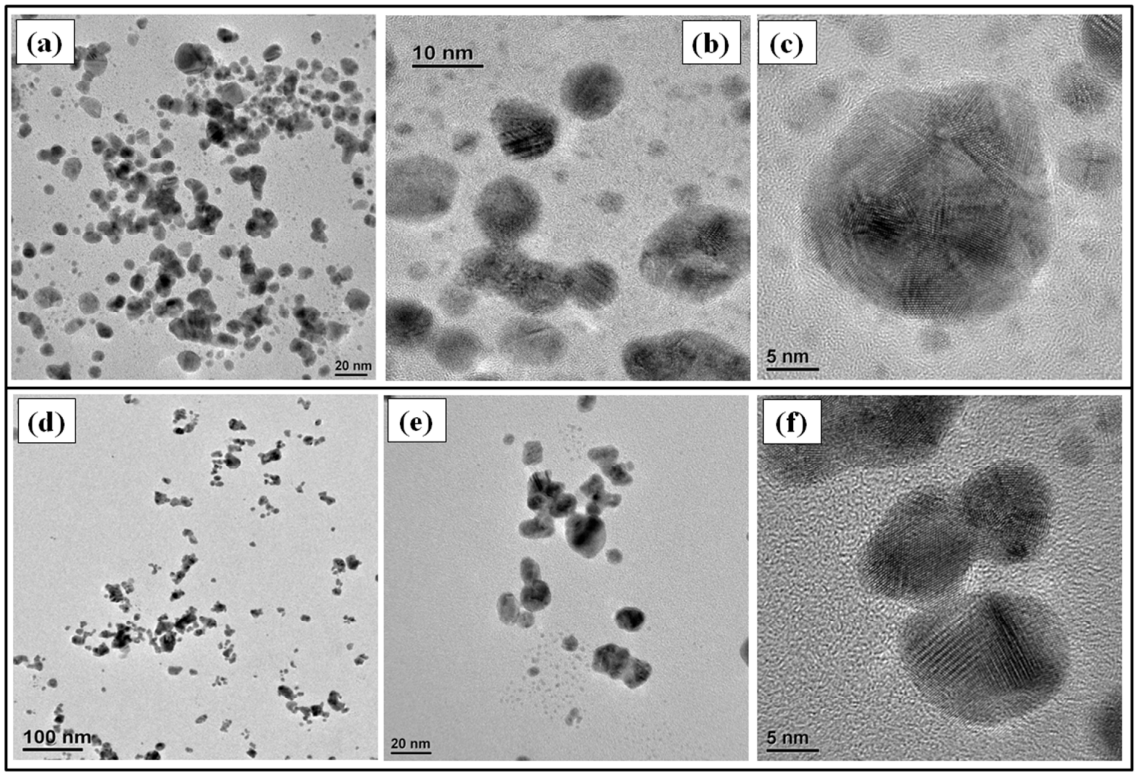


Figure S3. Higher and lower magnification TEM images of the trimetallic nanoparticles obtained from LE (a-c) and LE+CE (d-e).

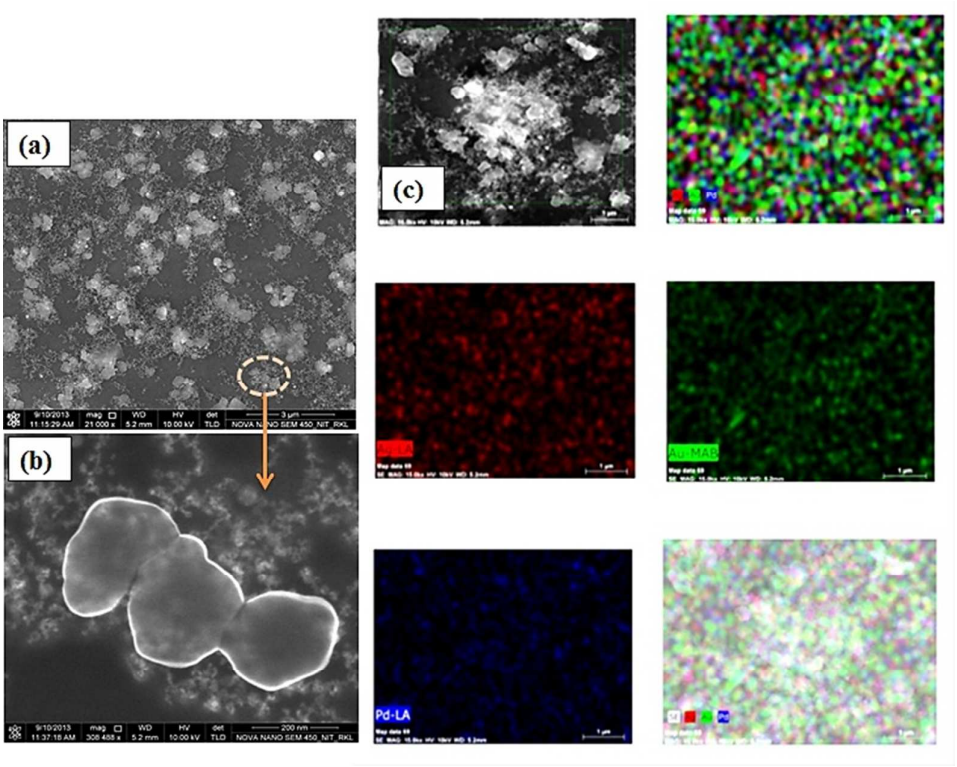
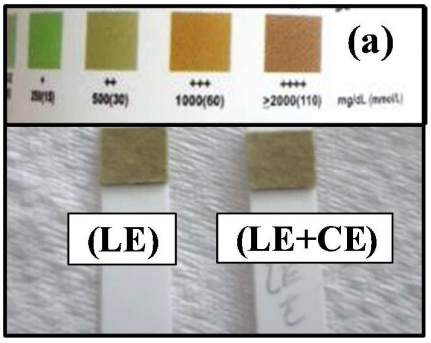
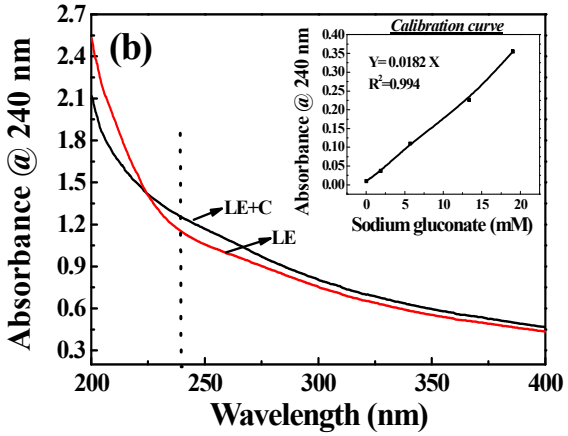


Figure S4. FESEM images of low (a) and high (b) magnification images of trimetallic NPs synthesized from 0:1 proportion of LE+CE. Mapping of the formed NPs from FESEM analysis (c).





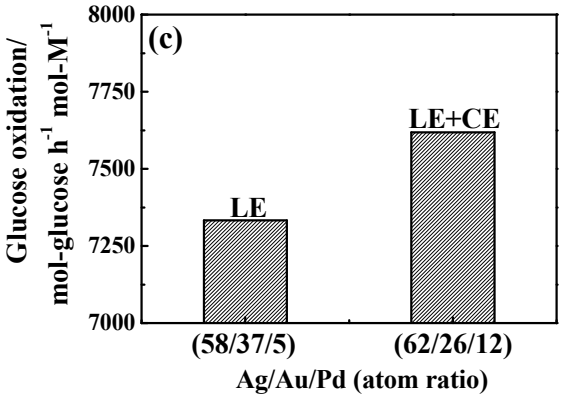


Figure S5. (a) Shows the color change of the glucose strips in the reaction media (LE and LE+CE) with NPs after 190 min. (b) UV-visible spectra of aluminum sulfate solution after the exposure to the reaction media after 190 min treatment with NPs. Inset figure of (b) shows the calibration curve of absorbance of aluminum sulfate with the addition of increasing

amount of sodium gluconate. (c) Catalytic activity of glucose oxidation by the synthesized compositionally different trimetallic NPs.

Table S1. Major functional groups of the plant systems used and trimetallic NPs from LE and LE+CE upon water wash.

Functional groups	**Wavenumber (cm^{-1})**				
	LE	**Acacia**	**Trimetallic NPs from LE**	**Trimetallic NPs from LE+CE**	**CE**
OH	3246	3346	3246	3236	3270
C-H	2931	2927			2930
C=O		1700			1715
C=C of aromatic ring	1592	1619	1579	1561	1608
O-H	1372		1354		
Germinal methyl group -CH_3		1365		1353	1354
C-O-C					1216
C-O	1065	1061, 1006	1062	1061	1034

	961		864		
C-H out of plane bend substitutions	765		765		758
	662		602	600	
#LE-*A. marmelos* leaf extract; CE- *S.aromaticum bud extract*; Acacia-*A. auriculiformis*					