

Supplementary data

Facile synthesis of silver/iron-TiO₂ nanoparticles for sterilization of Nodal ex plants of *Dracaena sanderiana* Sander ex Mast. cvs ‘Gold’ and ‘Victory’ and growth regulator effects on *in vitro* growth

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Contents of the Supporting Information

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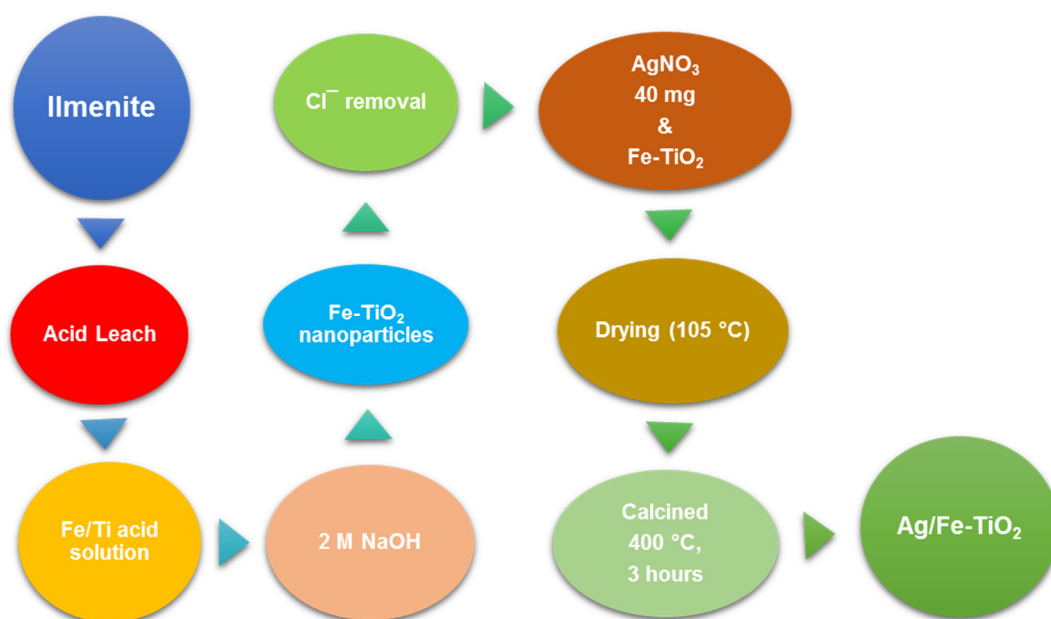


Figure S1: Synthesizing method of Ag/Fe-TiO₂ nanohybrid.



Figure S2: *Dracaena* cultivars 'Gold' and 'Victory' stems.

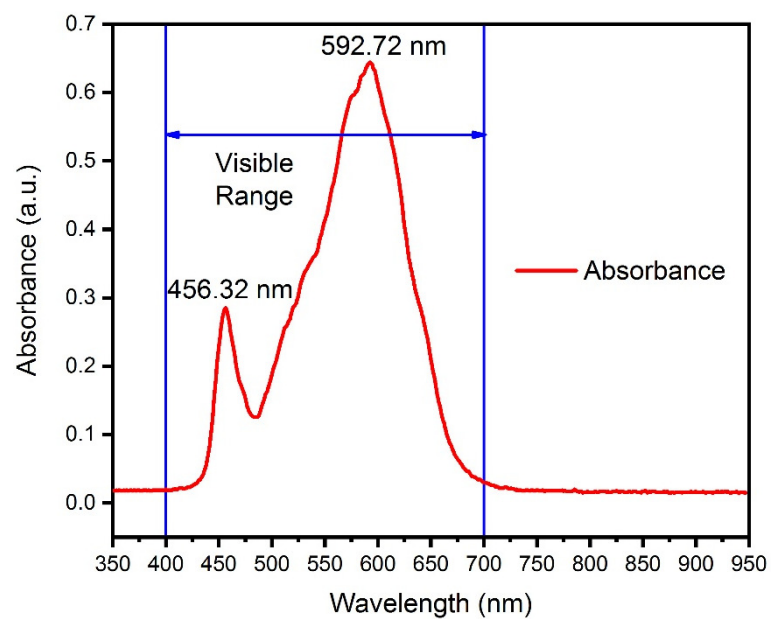


Figure S3: LED light wavelength graph

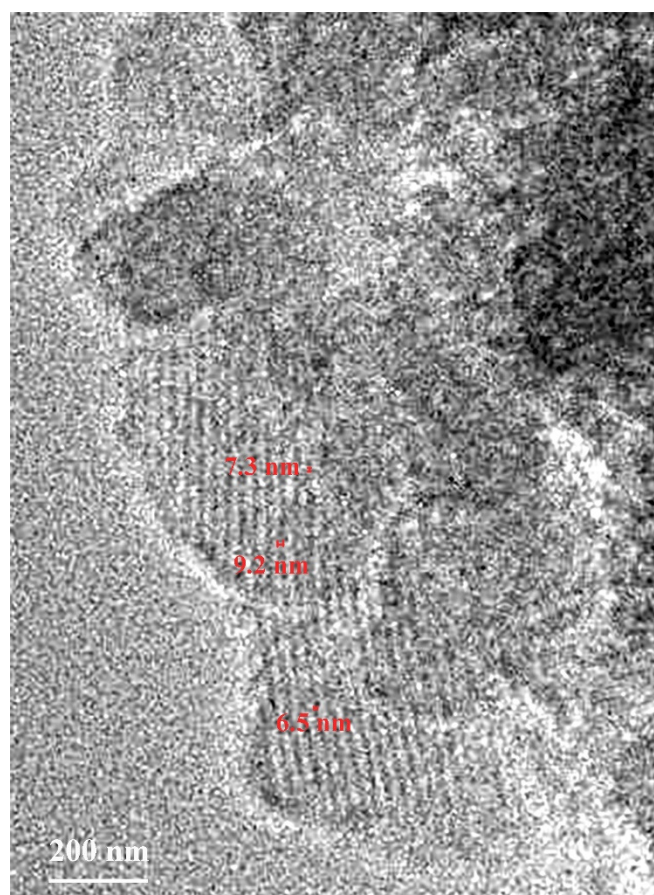


Figure S4: A high-resolution transmission electron microscopic image of Ag/Fe-TiO₂

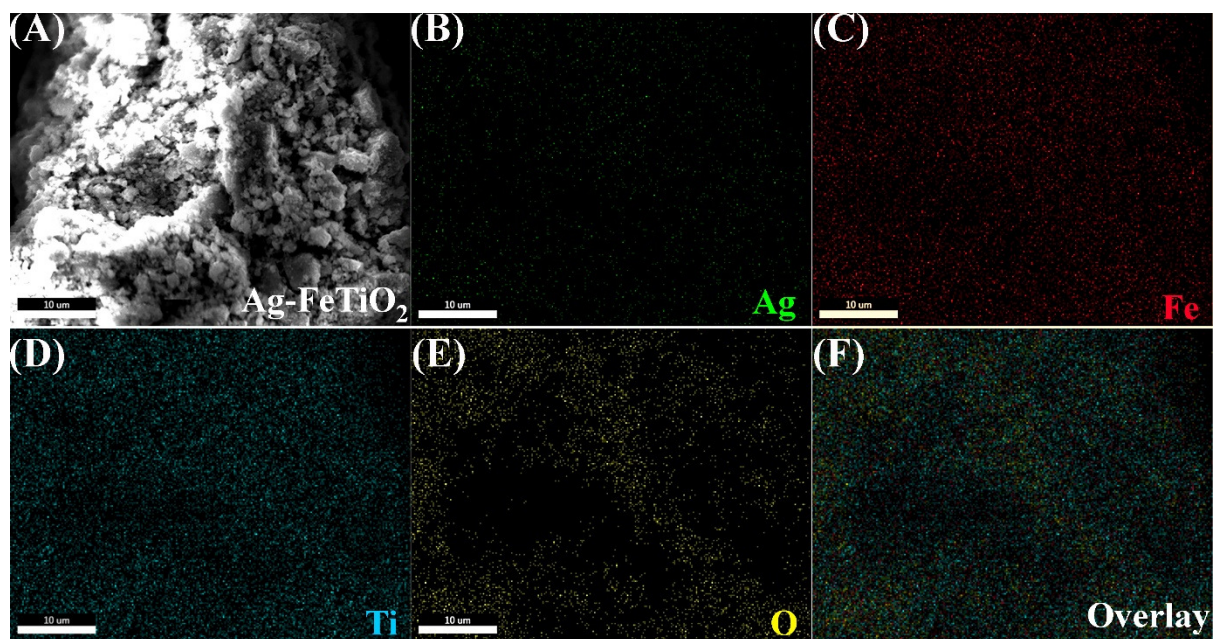


Figure S5: Elemental mapping of Ag-FeTiO₂(A) Original image (B) Silver (C) Iron (D) Titanium (E) Oxygen and (F) Overlay

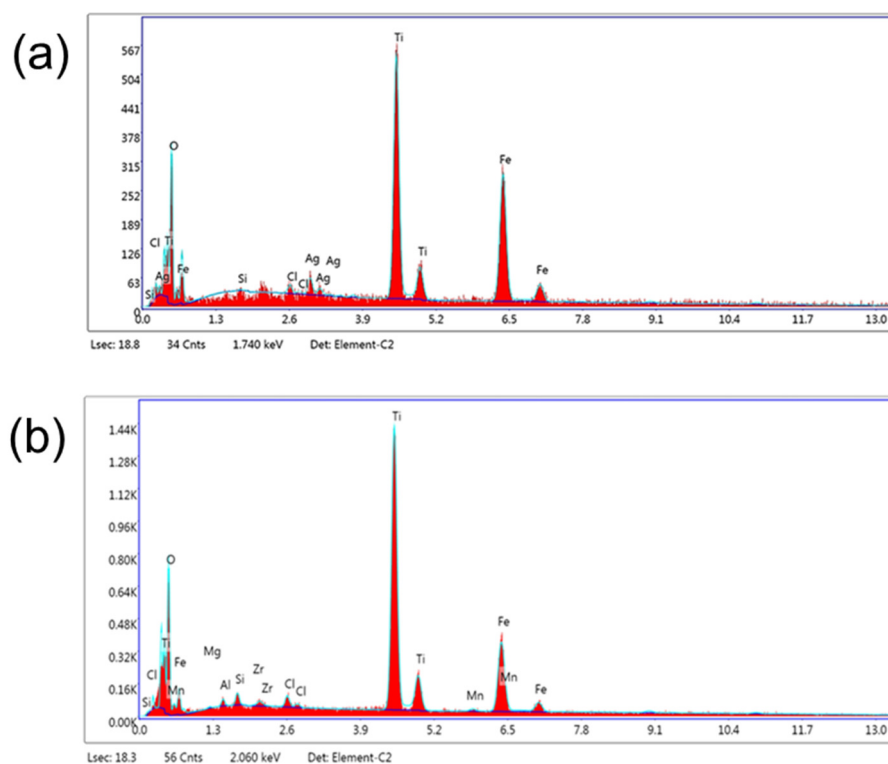


Figure S6: EDAX spectra of (a) raw ilmenite and (b) Ag/Fe-TiO₂ nanoparticles

Methodology: Band Gap Calculations

Band Gap Calculation Formula

The band gap energy (E_g) can be determined using the Tauc plot method, which involves the Kubelka-Munk function.

Kubelka-Munk Function

The Kubelka-Munk function [$F(R)$] is used to convert diffuse reflectance data into absorption coefficients:

$$F(R) = \frac{(1 - R)^2}{2R}$$

.....equation 1

where (R) is the reflectance.

Tauc Plot

The Tauc plot is constructed by plotting $[(F(R) \cdot h\nu)^n]$ versus ($h\nu$), where ($h\nu$) is the photon energy and (n) depends on the type of electronic transition (e.g., ($n = 1/2$) for direct allowed transitions and ($n = 2$) for indirect allowed transitions). The Tauc equation is:

$$(F(R) \cdot h\nu)^n = A(h\nu - E_g)$$

.....equation 2

where:

(A) is a constant.

(E_g) is the band gap energy.

By extrapolating the linear portion of the Tauc plot to the photon energy axis, the band gap energy can be determined.

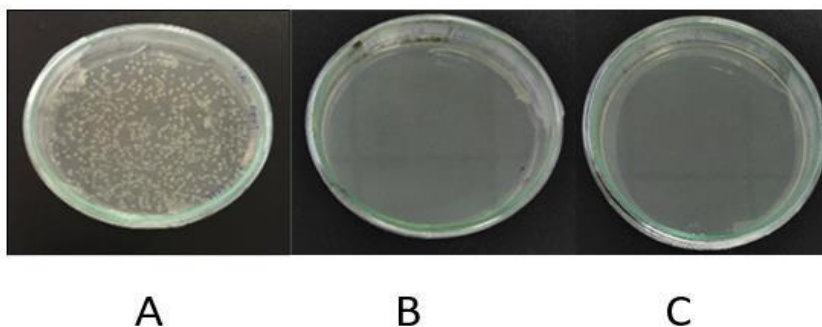


Figure S7. Effects of Ag/Fe-TiO₂ NPs against the *Escherichia coli*. (A) The control, (B) High intensity 420 $\mu\text{mol m}^{-2} \text{s}^{-1}$, (C) Low intensity 5.04 $\mu\text{mol m}^{-2} \text{s}^{-1}$.

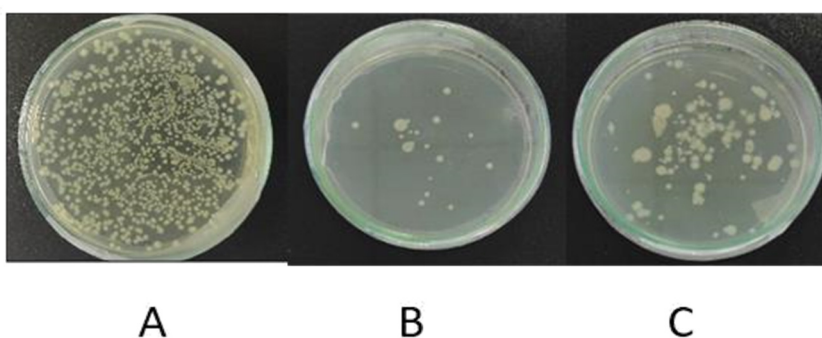


Figure S8. Effects of Ag/Fe-TiO₂ NPs against the *Staphylococcus aureus* under (A) Control, (B) High light intensity 420 $\mu\text{mol m}^{-2} \text{s}^{-1}$, (C) Low light intensity 5.04 $\mu\text{mol m}^{-2} \text{s}^{-1}$.

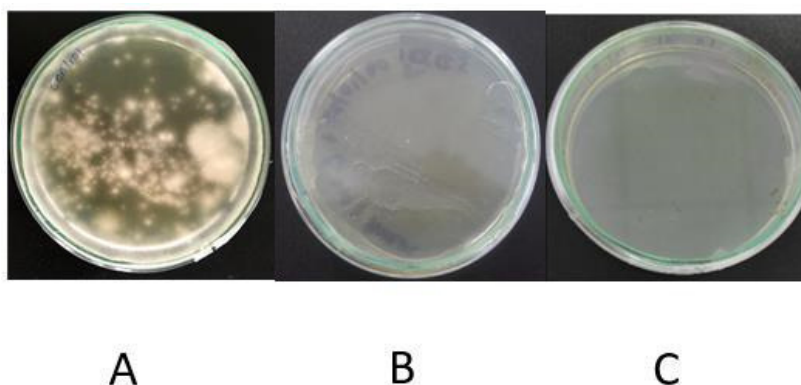


Figure S9. Effect of Ag/Fe-TiO₂ NPs against the *Fusarium oxysporum* under (A) Control, (B) High light intensity 420 $\mu\text{mol m}^{-2} \text{s}^{-1}$, (C) Low light intensity 5.04 $\mu\text{mol m}^{-2} \text{s}^{-1}$.

Table S1: List of different nodal stems in different beakers

Beaker Number	Content
1	Control
2	Ag/Fe-TiO ₂ “high light- 420 $\mu\text{mol m}^{-2} \text{s}^{-1}$
3	Ag/Fe-TiO ₂ “low light- 5.04 $\mu\text{mol m}^{-2} \text{s}^{-1}$
4	raw ilmenite “high light- 420 $\mu\text{mol m}^{-2} \text{s}^{-1}$
5	raw ilmenite “low light- 5.04 $\mu\text{mol m}^{-2} \text{s}^{-1}$
6	10% Clorox TM

Table S2: Chemical composition of agar media

Chemicals	Composition	Amount in 500 ml stock solution (mg)	Required volume from stock
Macro	Ammonium Nitrate (NH ₄ NO ₃)	16500	50 mL
	Potassium Nitrate (KNO ₃)	19000	
	Potassium Phosphate (KH ₂ PO ₄)	1700	
	Magnesium Sulphate (MgSO ₄ .7H ₂ O)	3700	
	Calcium Chloride (CaCl ₂ .2H ₂ O)	4400	
Micro-I	Boric Acid (H ₃ BO ₃)	620	5 mL
	Manganese Sulphate (MnSO ₄ .7H ₂ O)	2230	
	Zinc Sulphate (ZnSO ₄ .7H ₂ O)	860	
Micro-II	Potassium Iodide (KI)	83	5 mL
	Sodium Molybdate (Na ₂ MoO ₄ .2H ₂ O)	25	
	Cupric Sulphate (CuSO ₄ .5H ₂ O)	2.5	
	Cobalt Chloride (CoCl ₂ .6H ₂ O)	2.5	
Ferrous Source	Na ₂ EDTA.2H ₂ O	372	5 mL
	Ferrous Sulphate (FeSO ₄ .7H ₂ O)	278	
Organics	Glycine	200	2.5 mL
	Niacin	50	
	Pyridoxine.HCl	50	
	Thiamine.HCl	10	
Growth Regulator	BAP (6-Benzylaminopurine)	1 mg/L	10 mL
Vitamin	Myo-Inositol	100 mg/L	100 mg
Fungicide	Folicur tebuconazole EW	250 g/L	5 μ L

Other Ingredients	White Sugar	-	30 g
	Agar powder	-	4.5 g