**Supplementary Material**

**Application of *Forsskaolea tenacissima* mediated gold nanoparticles in dyes discolouration, antibiotics removal, and metal ions detection**

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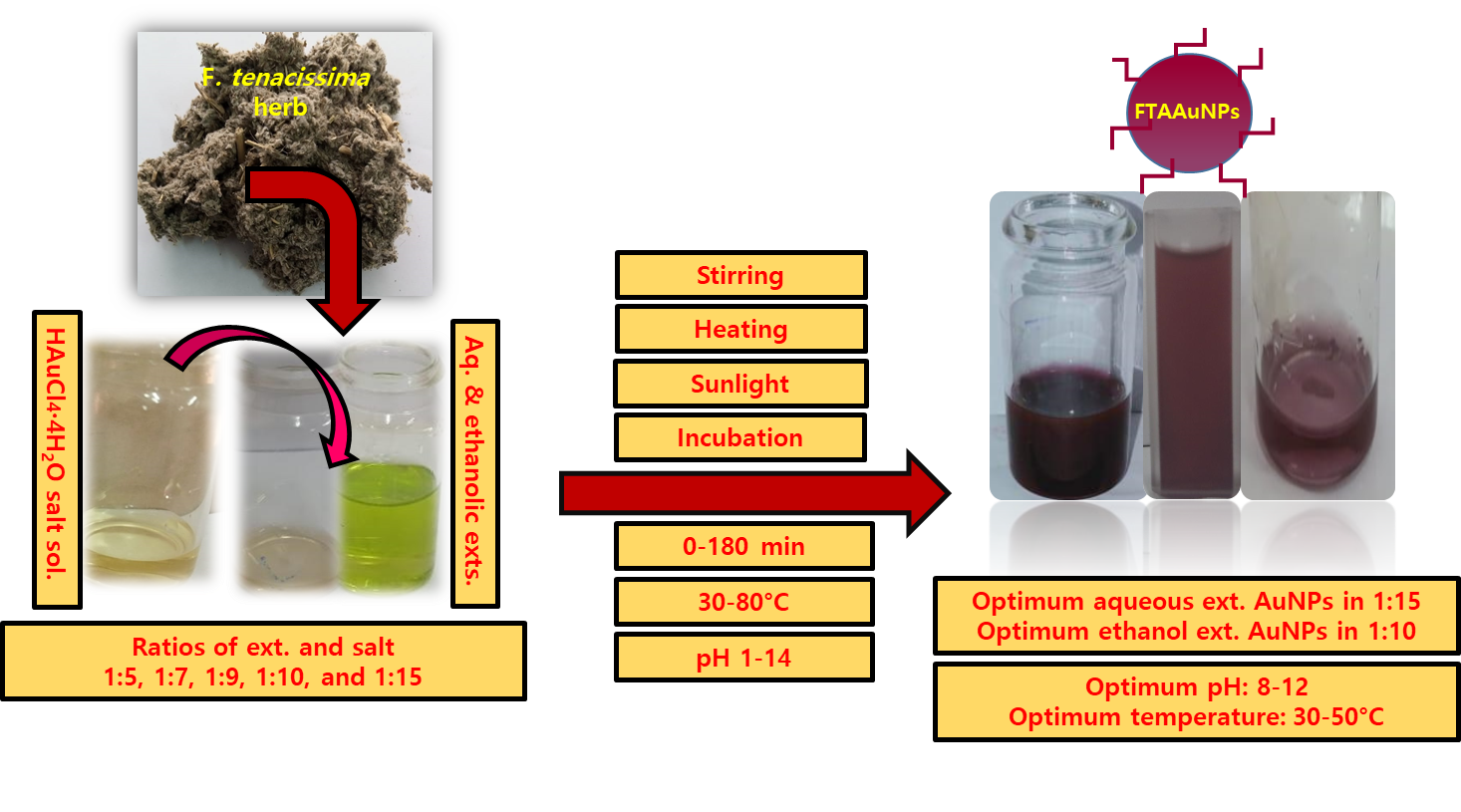
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**Figure S1**. FTAAuNPs formation from aqueous and natural ethanolic extracts of *F. tenacissima* aerial part and Au salt (1:15 and 1:10, respectively) in sunlight

|  |  |
| --- | --- |
| **a** | **b** |
| **c** | **d** |

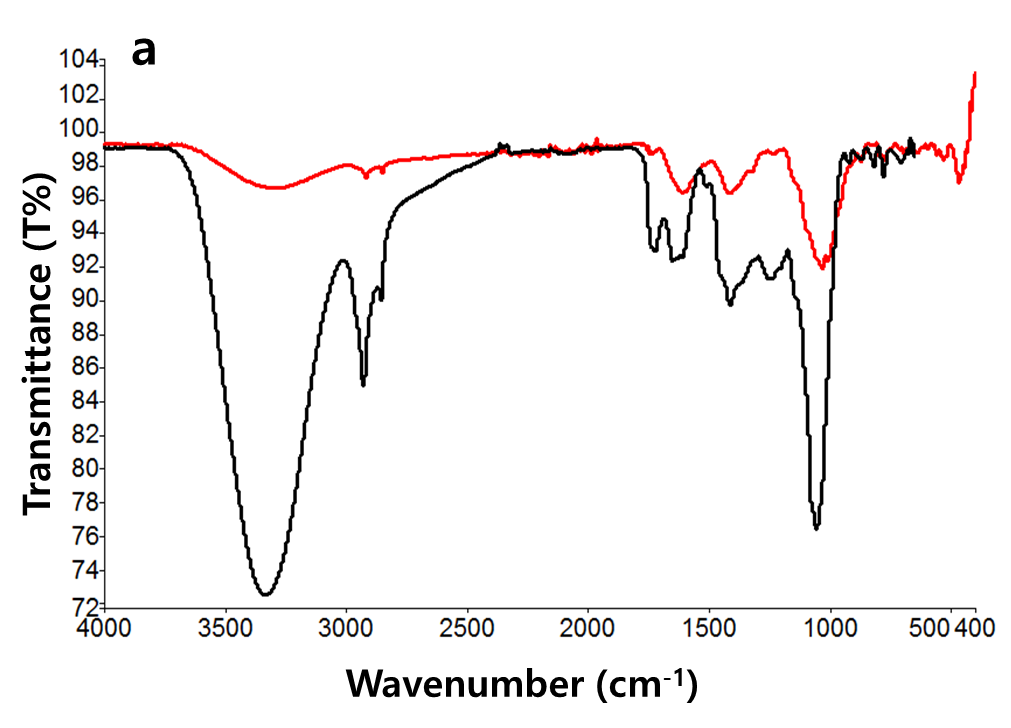
**Figure S2.** Successive UV–Vis absorption spectra for FTAAuNPs formation in (a) 1:5, (b) 1:7, (c) 1:9, and (d) 1:10 under sunlight, stirring, heating, and incubation from aqueous extract of *F. tenacissima* aerial part

|  |  |
| --- | --- |
| **a** | **b** |
| **c** | **d** |

**Figure S3.** Successive UV–Vis absorption spectra for FTAAuNPs formation in (a) 1:5, (b) 1:7, (c) 1:9 under sunlight, stirring, heating, and incubation, and (d) 1:10 at incubation from ethanolic extract of *F. tenacissima* aerial part

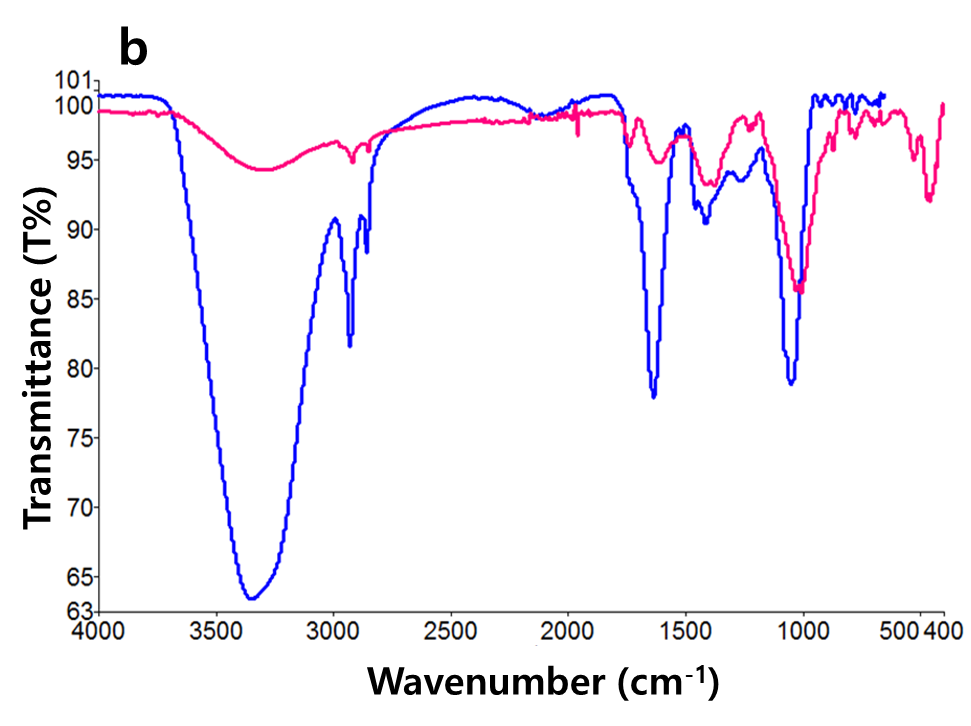
|  |
| --- |
| **a** |
| **b** |

**Figure S4.** UV-Vis spectra of FTAAuNPs at different (a) pH (1-14), and (b) temperature (30-80°C)



**\_\_ FTAE**

**\_\_ FTAAuNPs**



**\_\_ FTAE**

**\_\_ FTAAuNPs**

**Figure S5**. FT-IR spectra of (a) aqueous extract and aqueous extract mediated FTAAuNPs (b) ethanol extract and ethanol extract mediated FTAAuNPs

**Table S1**. %removal, Linear relationship (equation, *R*2, and rate constant) based on pseudo-first-order kinetics of dyes/nitrophenols (MB, CR, RdB, MO, PNP, and ONP) at intervals of 0 to 80 min, and antibiotics (AMX, DXC, LFX, and ORX) at 0-180 min

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample** | **% reduction/removal** | **Linear equation** | ***R*2** | **Rate constant (k)** |
| **Dyes/nitrophenols** | | | | |
| **MB** | 70 | y = -0.0076x+0.0433 | 0.9931 | 1.45 x10-1 |
| **CR** | 85 | y = -0.0206x+0.1228 | 0.9919 | 1.72 x 10-1 |
| **RdB** | 50 | y = -0.0014x-0.0083 | 0.9428 | 0.72 x 10-1 |
| **MO** | 90 | y = 0.0126x+0.1087 | 0.9684 | 1.03 x 10-1 |
| **PNP** | 85 | y = -0.012x+0.08 | 0.9927 | 0.97 x 10-1 |
| **ONP** | 85 | y = -0.0199x+0.296 | 0.9957 | 1.80 x 10-1 |
| **Antibiotics** | | | | |
| **AMX** | 95 | y = -0.0029x+0.9031 | 0.9173 | 1.02 x 10-1 |
| **DXC** | 95 | y = -0.003x+1.009 | 0.9928 | 1.31 x 10-1 |
| **LFX** | 95 | y = -0.003x+1.0024 | 0.9974 | 0.975 x 10-1 |
| **ORX** | 80 | y = -0.004x+0.9777 | 0.9746 | 0.815 x 10-1 |

|  |
| --- |
| **a** |
| **b** |

**Figure S6.** Successive UV–Vis absorption for effect of pH on the removal of (a) LFX and DXC, and (b) AMX and ORX by FTAAuNPs

|  |  |
| --- | --- |
|  | **b** |
| **c** | **d** |
| **e** | **f** |

**Figure S7**. Successive UV–Vis absorption spectra for metal ion solutions (a) Fe+++, (b) Pd++, (c) Sn++, (d) K+,(e) Na+,and (f) Mg++ detection by FTAAuNPs