

## Electronic Supporting Information

### **Biosynthesis of Magnetite and Cobalt Ferrite Nanoparticles using Extracts of ‘Hairy’ Roots: Preparation, Characterization, Estimation for Environmental Remediation and Biological Application**

*Natalia Kobylinska<sup>1</sup>, Dmytro Klymchuk<sup>3</sup>, Anatolij Shakhovsky<sup>2</sup>, Olena Khainakova<sup>4</sup>, Yakiv Ratushnyak<sup>2</sup>, Volodymyr Duplij<sup>2</sup>, Nadiia Matvieieva<sup>2</sup>*

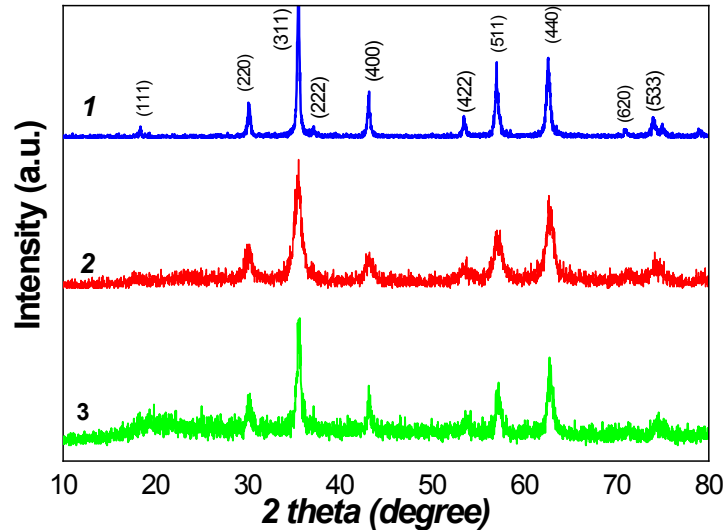
*<sup>1</sup>A.V. Dumansky Institute of Colloid Chemistry and Water Chemistry NAS of Ukraine, Ak. Vernadsky blv. 42, Kyiv, 03142, Ukraine*

*<sup>2</sup>Institute of Cell Biology and Genetic Engineering, NAS of Ukraine, 148 Zabolotnogo Str, Kyiv, 03143, Ukraine*

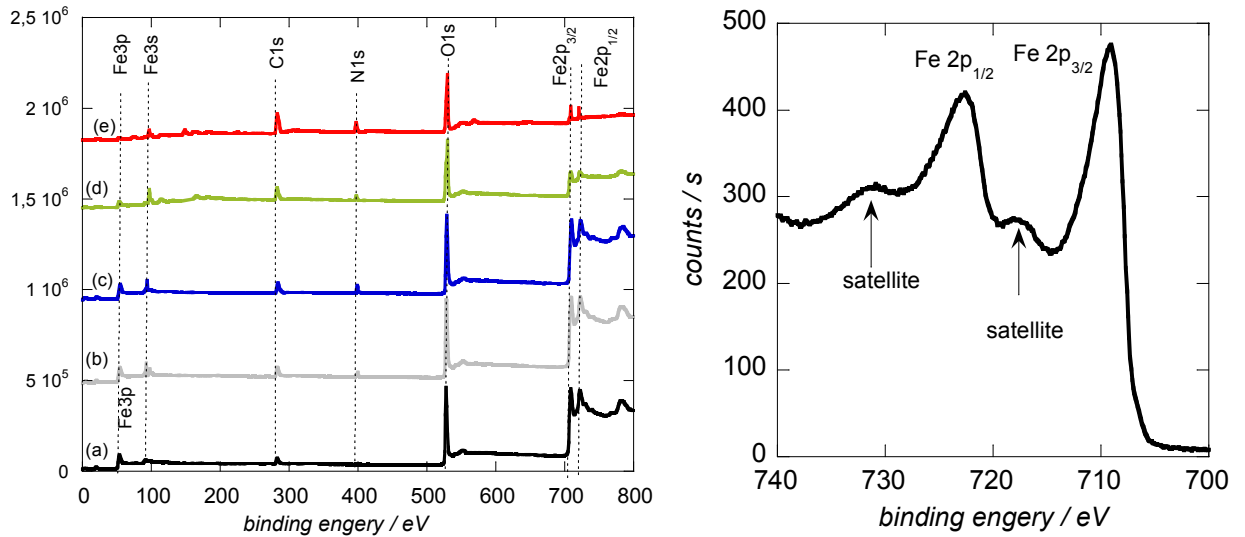
*<sup>3</sup>M.G.Kholodny Institute of Botany, NAS of Ukraine, 2 Tereshchenkivska Str, Kyiv, 02000, Ukraine*

*<sup>4</sup>University of Oviedo, 8 Julián Clavería Av., Oviedo, 33006, Spain*

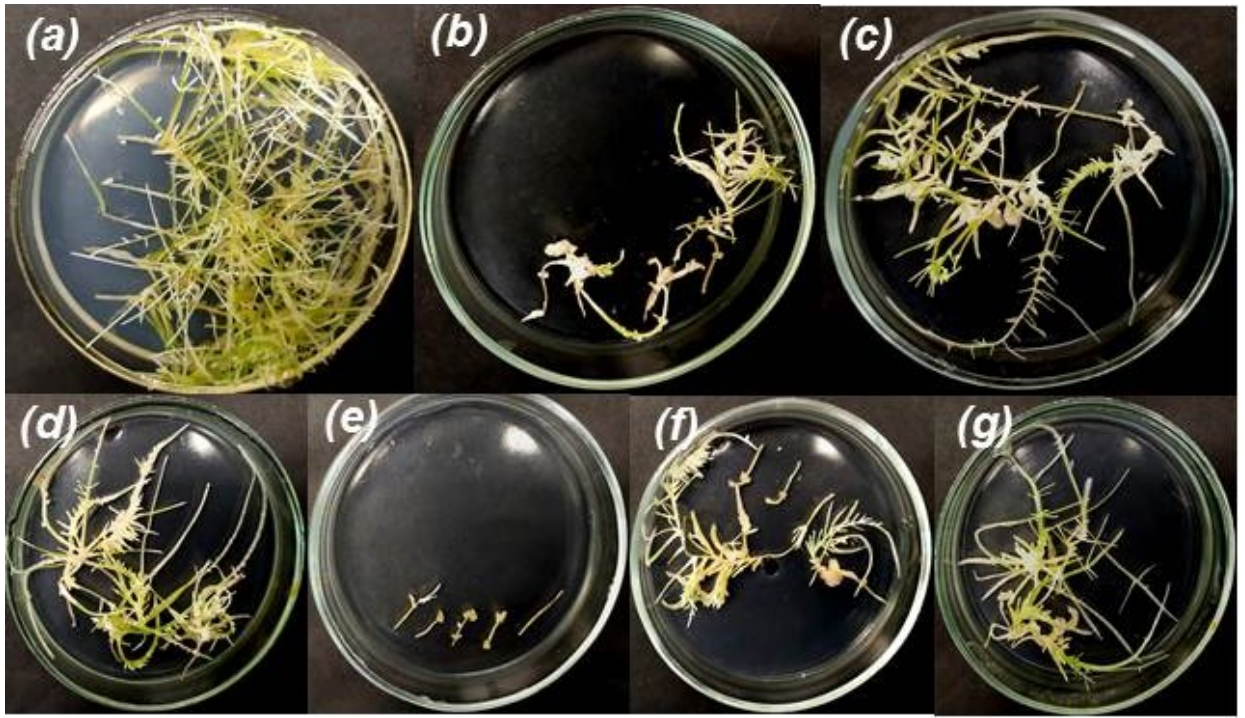
*Corresponding author: [kobilinskaya@univ.kiev.ua](mailto:kobilinskaya@univ.kiev.ua)*



**Fig. S1.** Powder XRD patterns of  $\text{Fe}_3\text{O}_4$ -NPs (*Fe 4-1*) samples: 1 - washing by water and dried in vacuum; c - washing by water and dried in air at 25 °C; d - dried in air at 25 °C.



**Fig. S2.** XPS survey spectra (a) of as-prepared (wash-free) MNPs (a - *Fe 1-1*, b - *Fe 2-1*, c - *Fe 3-1*, d - *Fe 4-1* and e - *Fe 6-1* samples) and high resolution Fe2p spectrum (b) of as-synthesized MNPs (sample *Fe 4-1*).



**Fig. S3.** Effect of MNPs to inhibit growth of *Althaea officinalis* 'hairy' roots: *a* – control without MNPs; *b* – Fe 1-1; *c* – Fe 2-1; *d* - Fe 3-1; *e* - Fe 4-1; *f*- Fe 5-1; *g* - Fe 6-1.