nanomaterials

MDPI

Supplementary Material

Green synthesized magnetic nanoparticles as effective nanosupport for the immobilization of lipase: Application for the synthesis of lipophenols

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Received: date; Accepted: date; Published: date

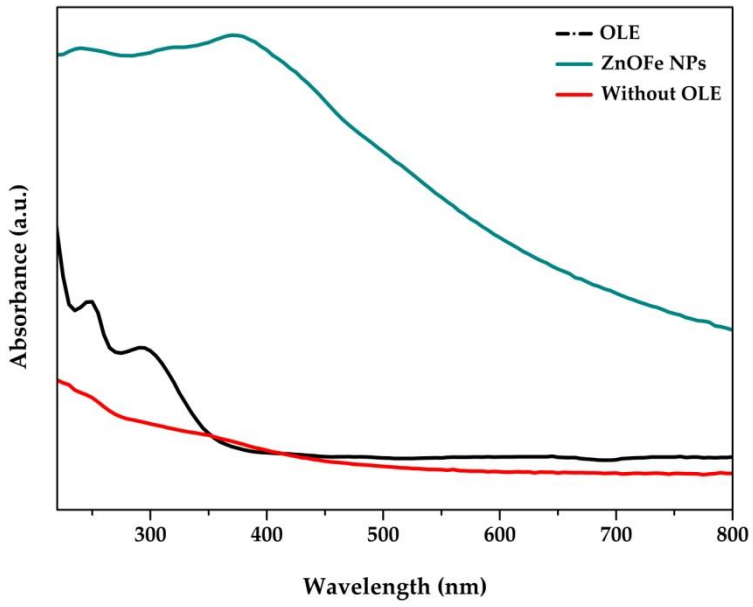


Figure S1. UV-Vis absorption spectrum of aqueous OLE, ZnOFe nanoparticles and metal ions solution without extract (RT, 15µg mL^{-1})

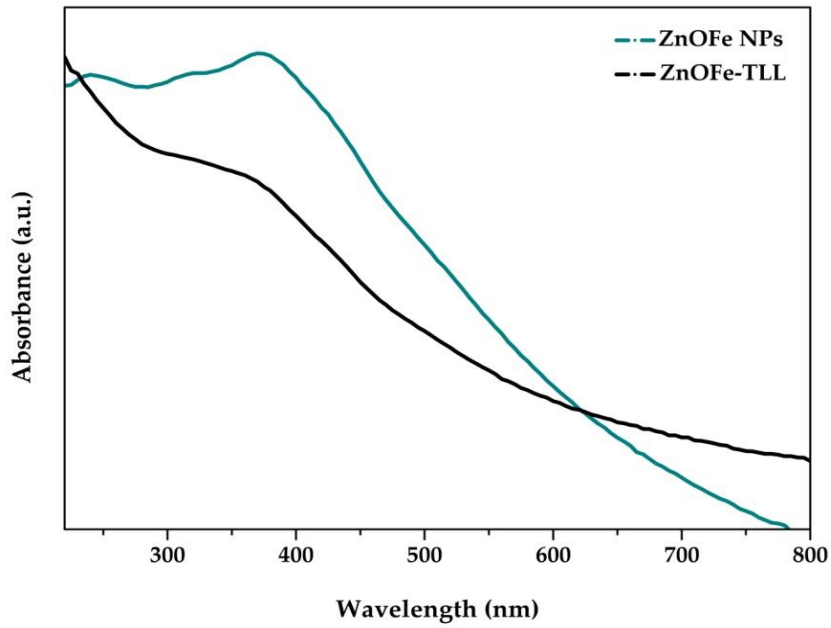


Figure S2. UV-Vis absorption spectrum of aqueous ZnOFe nanoparticles and ZnOFe-TLL (RT, 15μg mL^{-1})

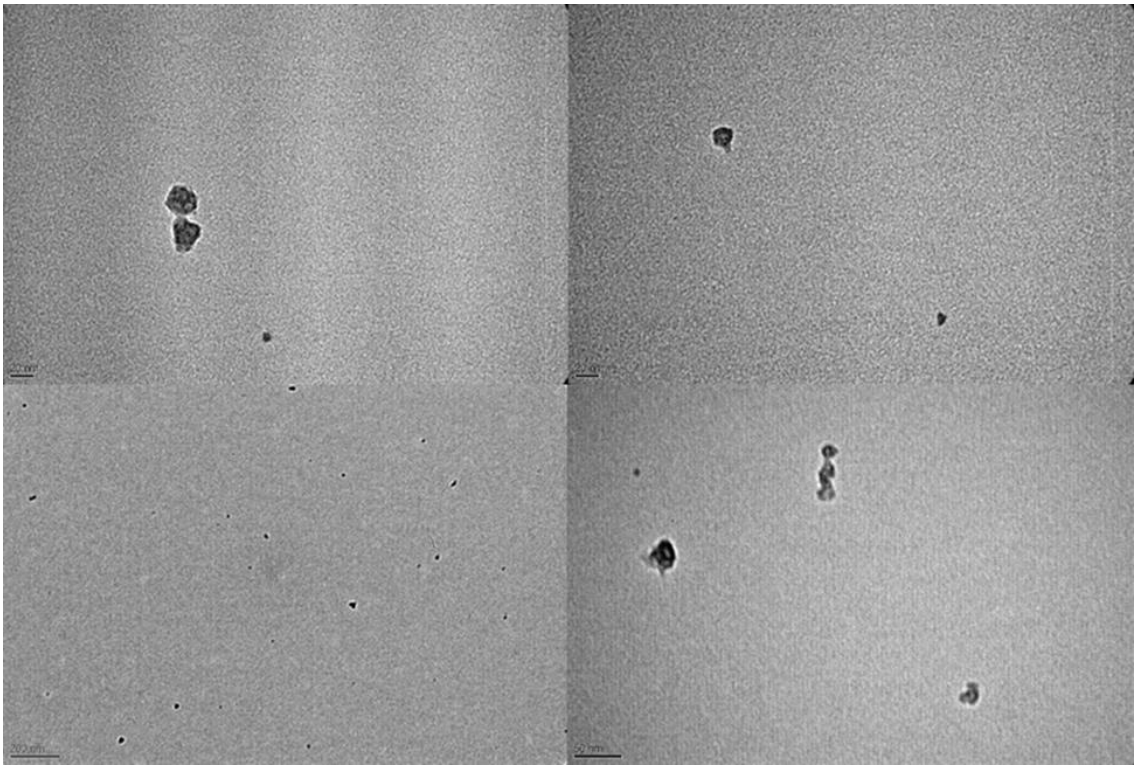


Figure S3. Representative TEM images of ZnOFe nanoparticles with the incorporation of the enzyme, TLL

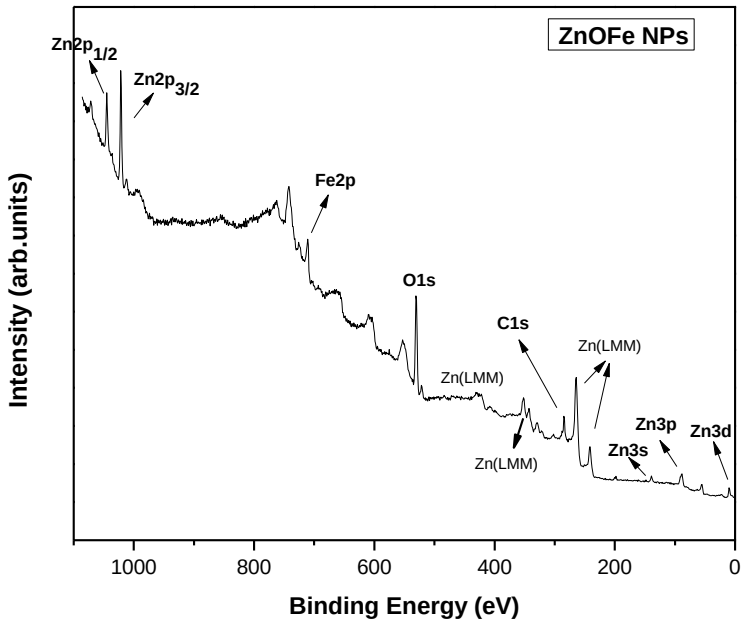


Figure S4. XPS survey of ZnOFe hybrid nanoparticles

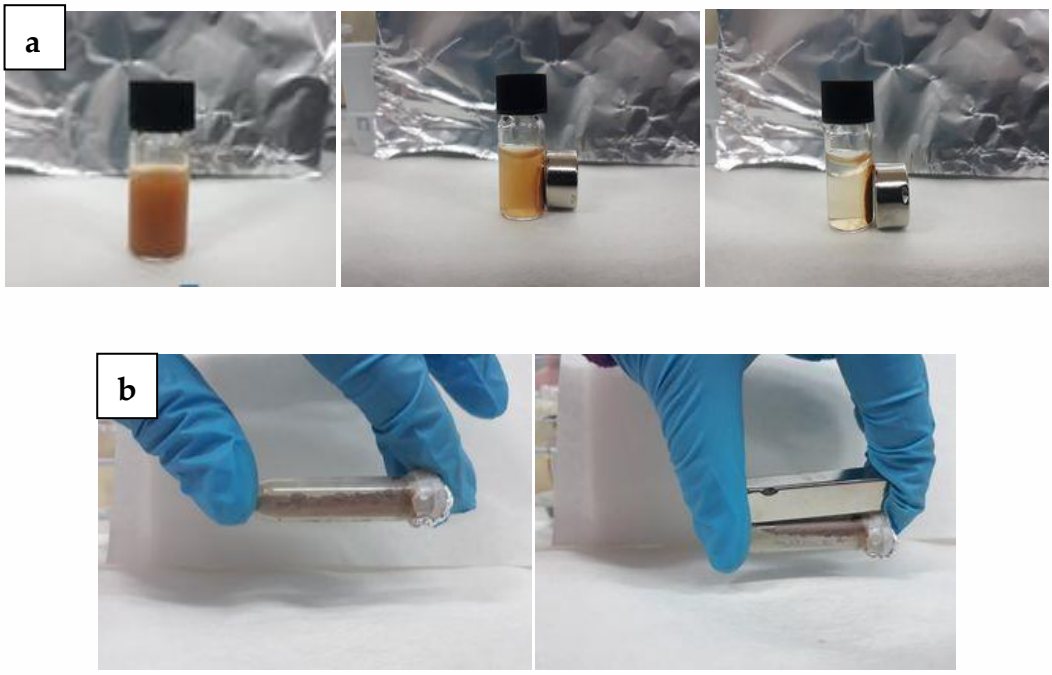
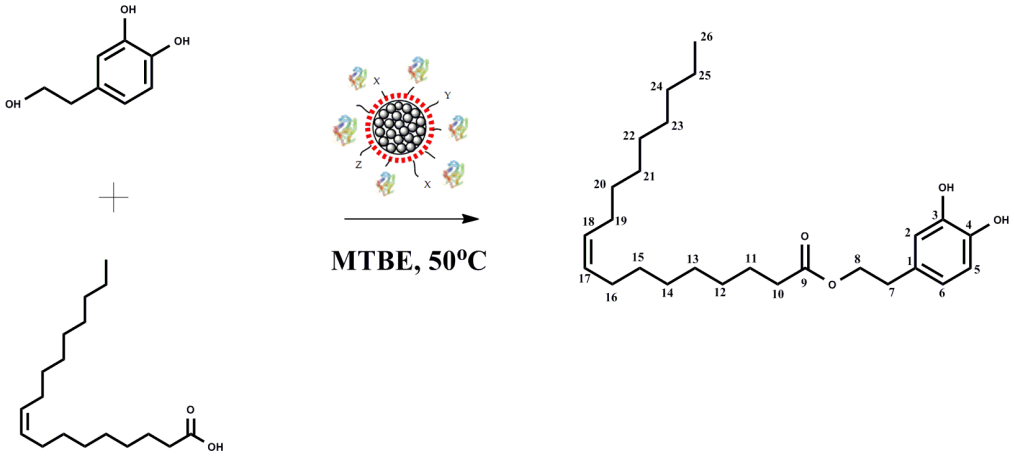


Figure S5. Magnetization of the ZnOFe NPs in a) aqueous solution and b) powder phase by a N42 magnet

Table S1. Enzyme loading per mg support and enzyme activity of the nanobiocatalytic system at 40ºC and pH 7.5, using *p*-NPB as the substrate.

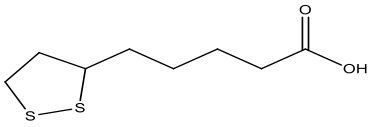
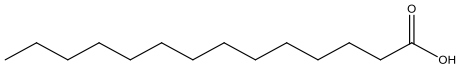
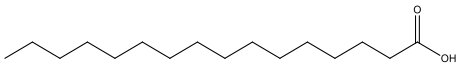
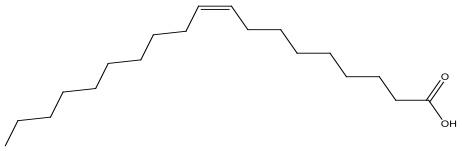
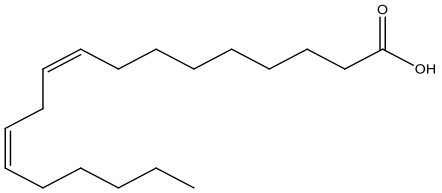
Initial enzyme concentration (mg)	U mg^{-1} nanobiocatalyst	Enzyme loading mg^{-1} nanosupport
0.5	0,699	0,170
1	1,546	0,240
2,5	1,829	0,308
3,75	2,150	0,403
5	2,528	0,450
6,25	3,650	0,578
7,5	4,885	0,600
10	8,221	1,01

One unit of enzymatic activity (U) was defined as the amount of lipase that liberates 1 µmol of *p*-NP per minute per mL of reaction at 40ºC.



Scheme S1. Enzymatic synthesis of Hydroxytyrosyl Oleate catalyzed by ZnOFe-TLL in MTBE, 50ºC and 72h of incubation. The product was characterized by ^{1}H-^{13}C HSQC and ^{1}H-^{13}C HMBC NMR.

Table S2. Structures of saturated and unsaturated fatty acids utilized as acyl donors for hydroxytyrosol bioconversion by ZnOFe-TLL. The number of double bonds and the effect on the molecular structure are depicted in the Table.

Fatty acid	Acyl chain	Structure
Lipoic acid	C8:0	
Myristic acid	C14:0	
Palmitic acid	C16:0	
Oleic acid	C18:1	
Linoleic acid	C18:2	
Eicosapentaenoic acid	C20:5