Table S1. Soil physical and chemical properties prior to the first season 2019

Soil property	Value	Soil property		Value	
Particle size distribution (%)		Soluble ions (mmol$_c$L^{-1})			
		Cations		Anions	
Coarse sand	11.0	Ca^{2+}	6.8	CO$_3^{2-}$	0.0
Fine sand	19.4	Mg^{2+}	3.2	HCO$_3^-$	4.5
Silt	20.2	Na$^+$	4.3	Cl$^-$	6.4
Clay	49.4	K$^+$	1. 8	SO$_4^{2-}$	5.2
Texture class*	Heavy Clay	Nutrients (mg kg^{-1})			
Soil pH (1:2:5 w/v – soil/water)	7.8				
EC (dS m^{-1})	1.65	N		119	
OM (%)	12	P		7.4	
Calcium carbonate (%)	23	K		57	
		Cu		2.3	
		Zn		4.3	
		Fe		2.2	

* texture class is according to international soil triangle; O.M: soil organic matter; EC: soil electrical conductivity
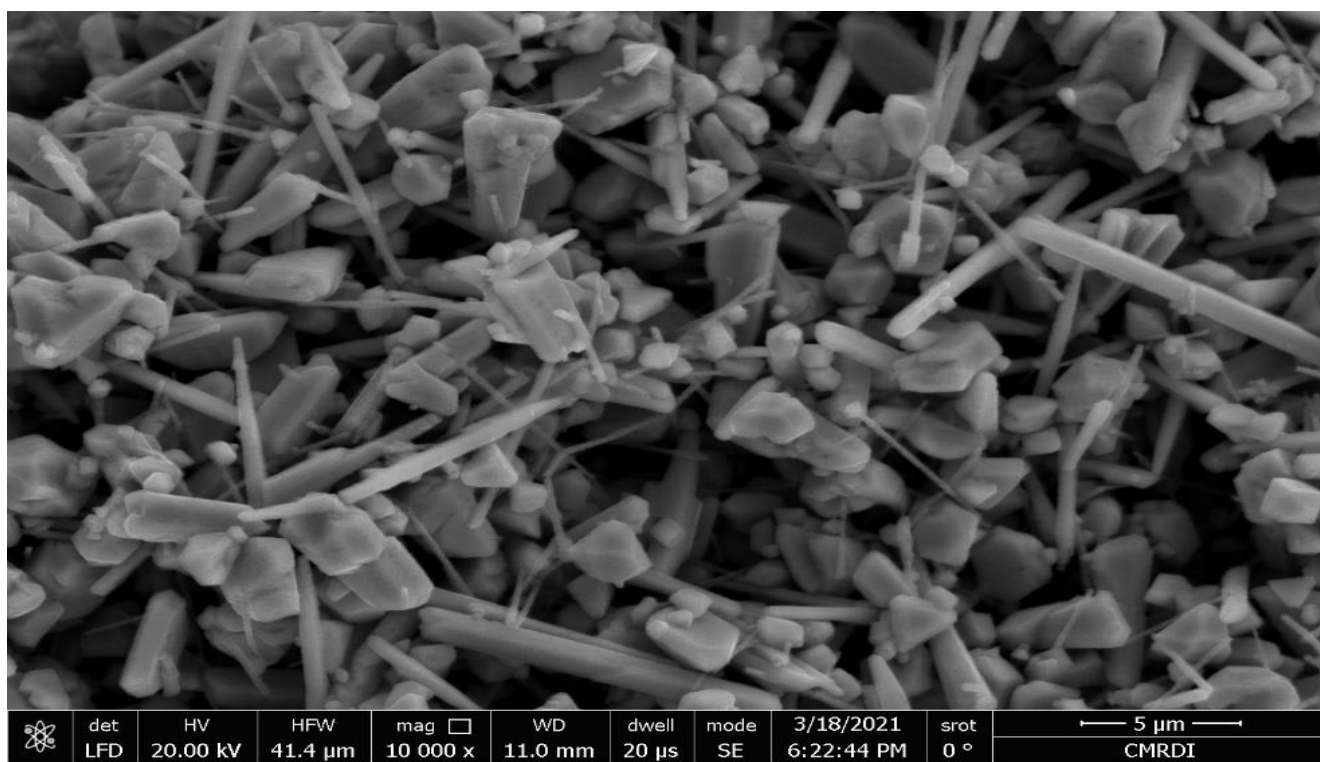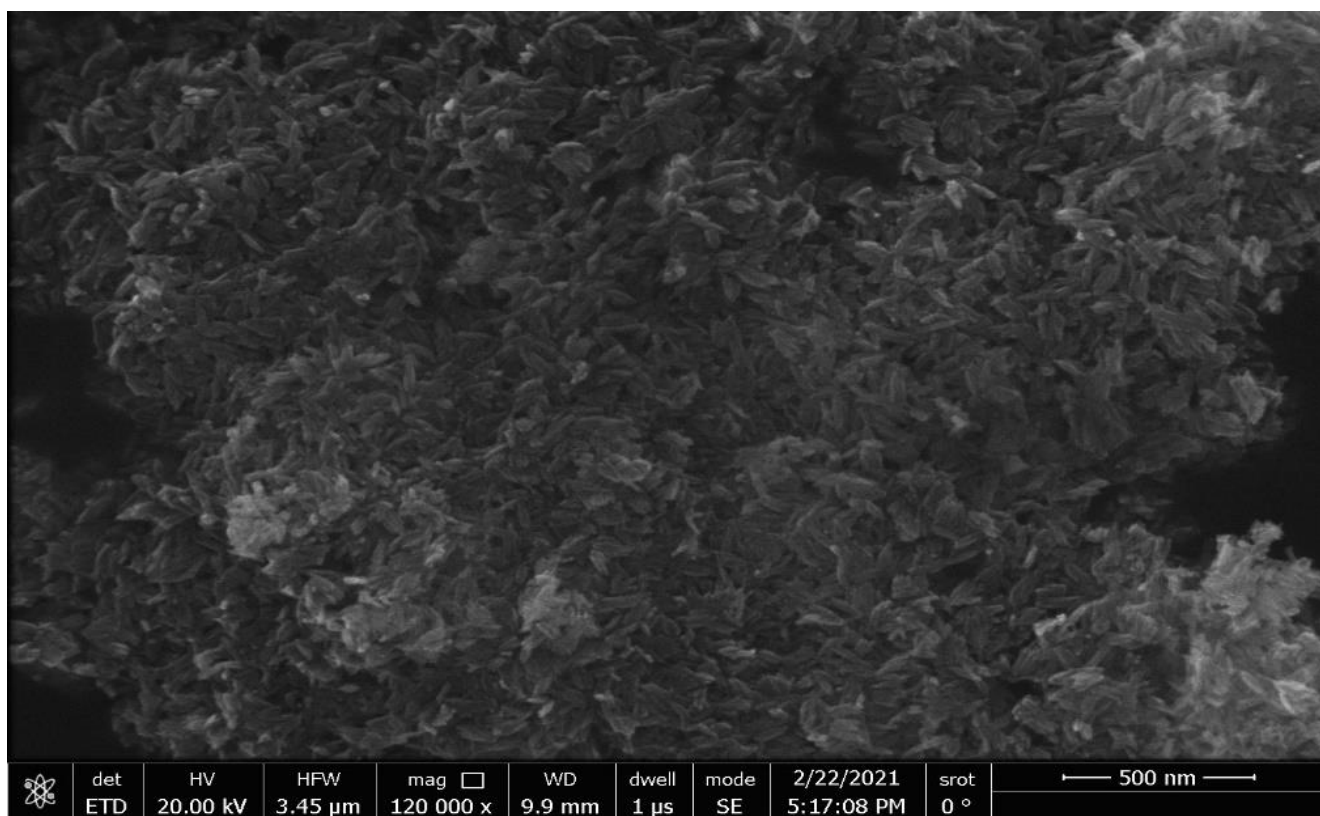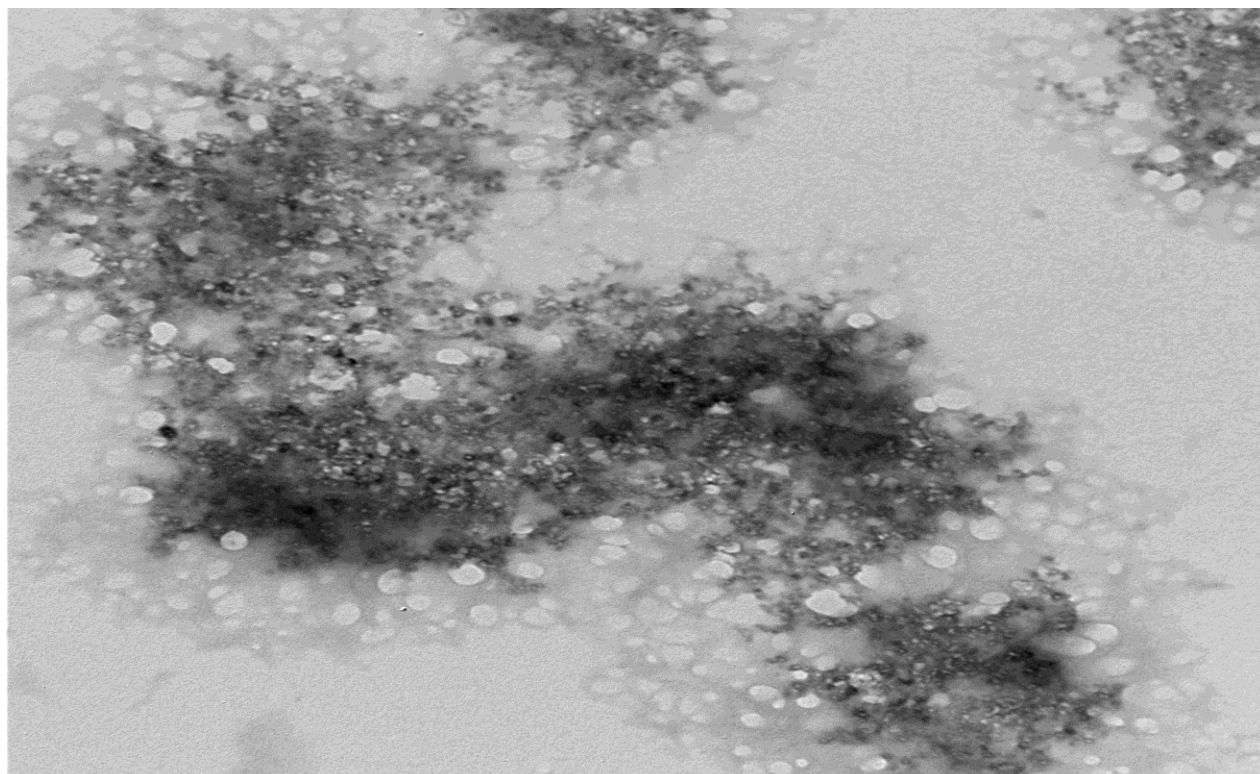
Figure S1. Scanning electron microscopy (SEM) images of the prepared Fe-NPs

25.tif
Print Mag: 105000x @ 211 mm
TEM Mode: Imaging

100 nm
HV=80.0kV
Direct Mag: 50000x

26.tif
Print Mag: 105000x @ 211 mm
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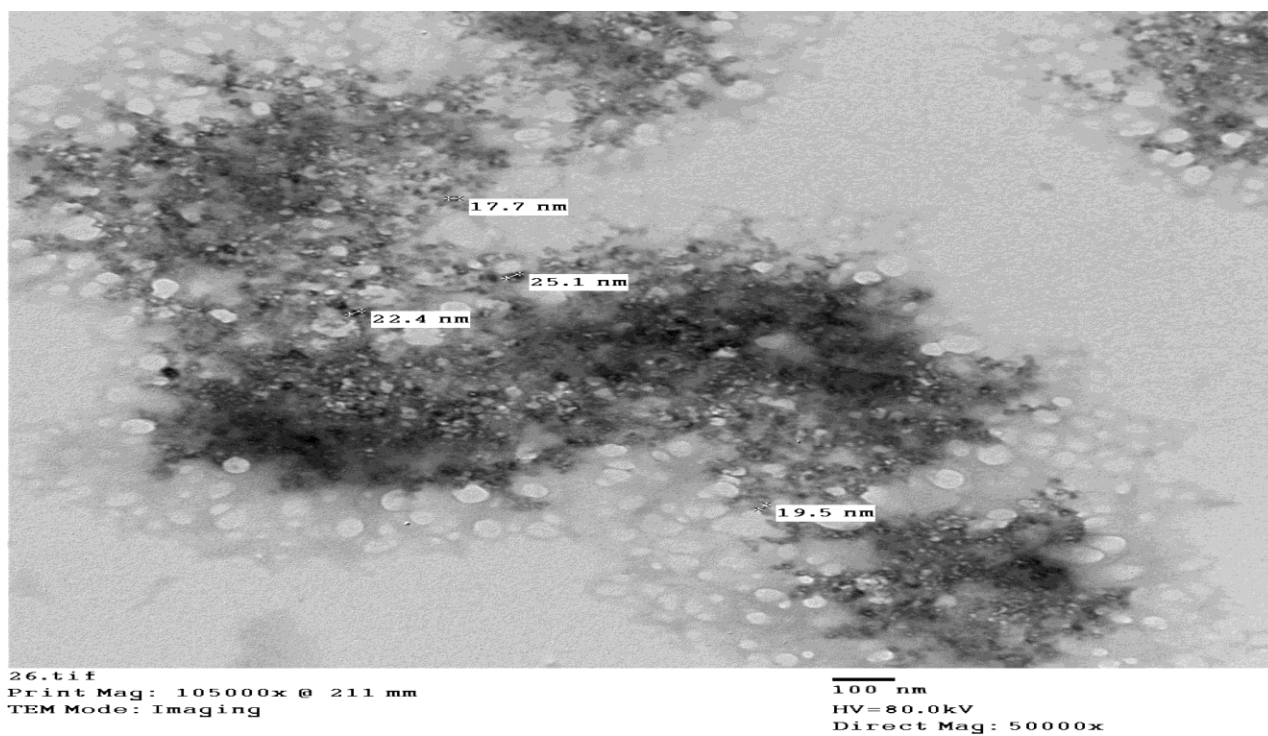100 nm
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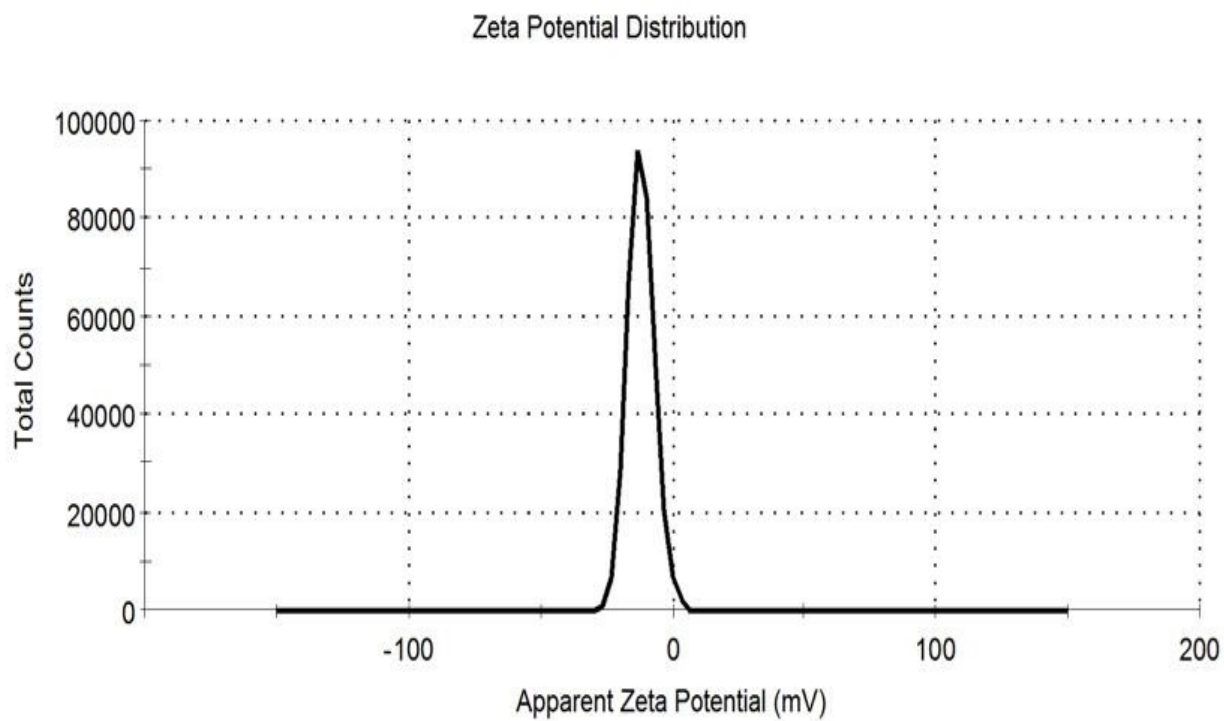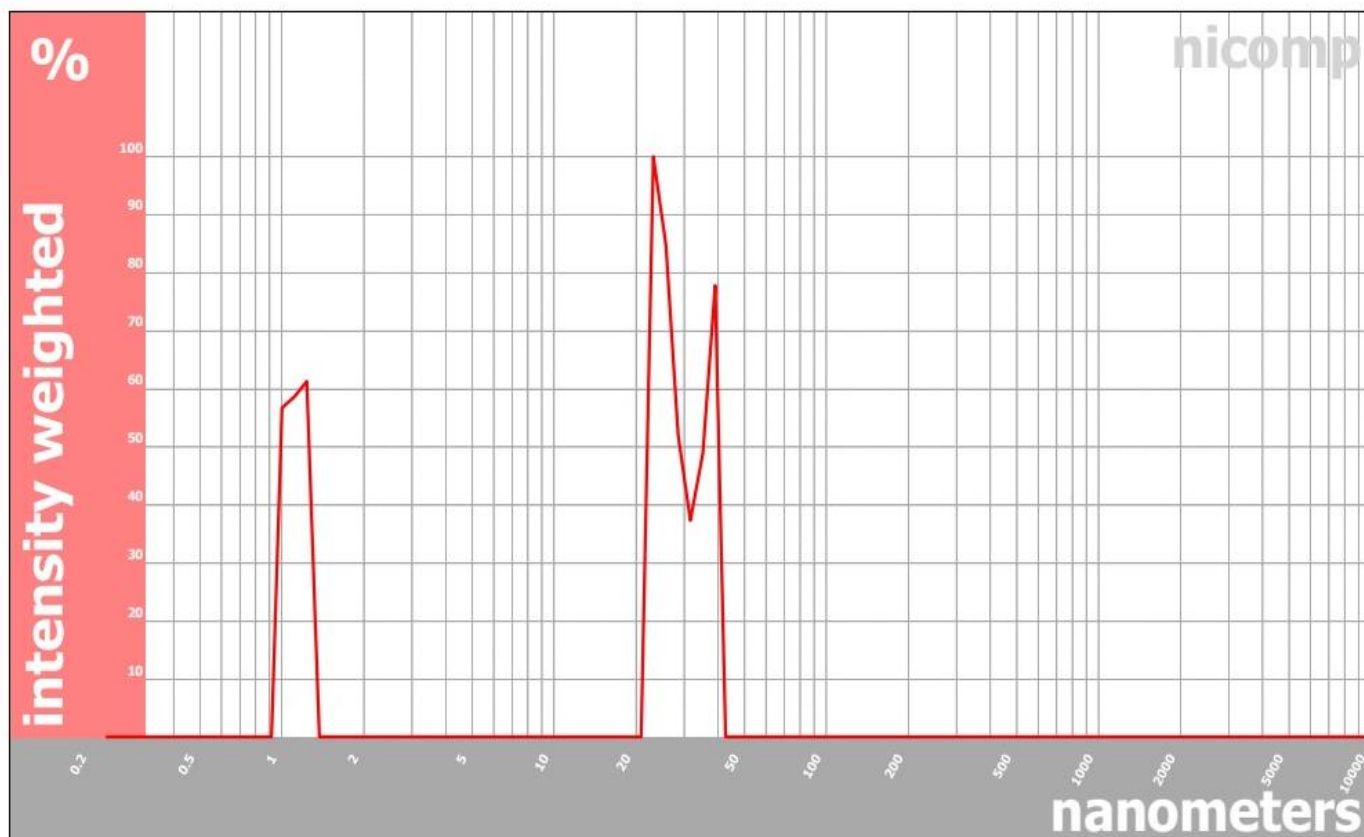Figure S2 TEM micrograph of prepared Fe nanoparticles

Figure S3. Zeta potential of the iron nanoparticles

Figure S4. Dynamic light scattering (DLS)