Supplementary materials

Supplementary figures

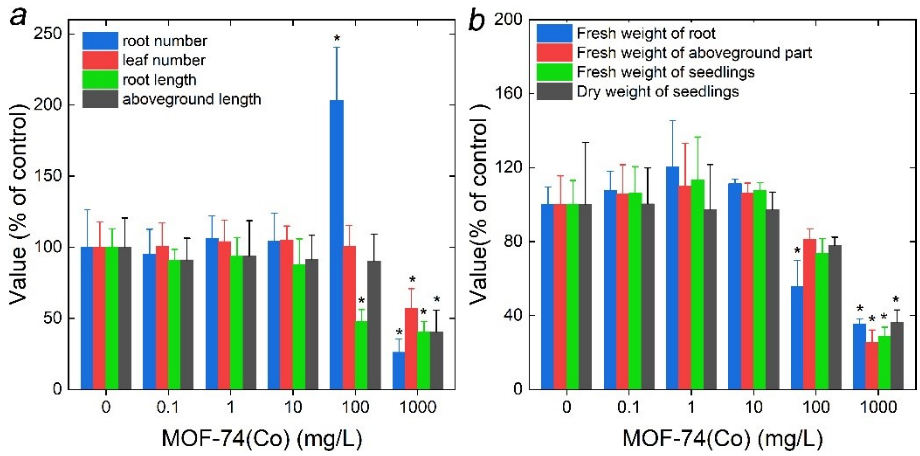

Fig. S1. Influence of MOF-74(Co) on the seedling growth. Data represent mean ± SD (n=3). * $p < 0.05$ compared with the control group.

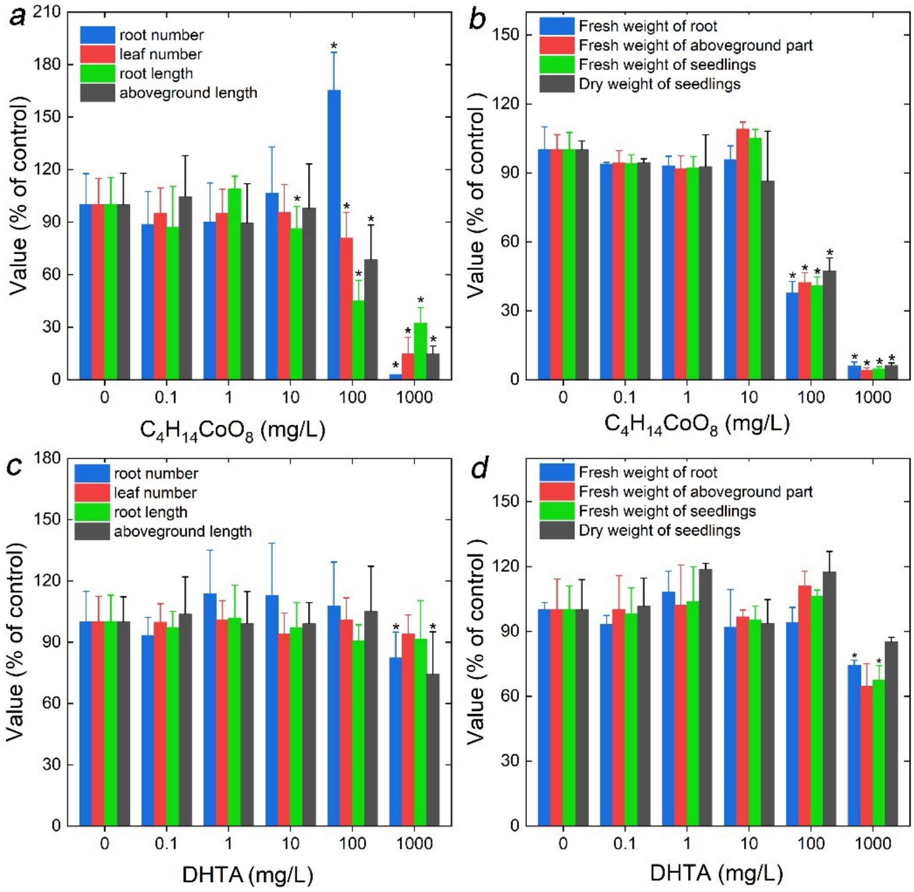

Fig. S2. Influence of Co^{2+} (a, b) and DHTA on the seedling growth at MOF-74(Co) equivalent concentrations. Data represent mean ± SD (n=3). * p <0.05 compared with the control group.

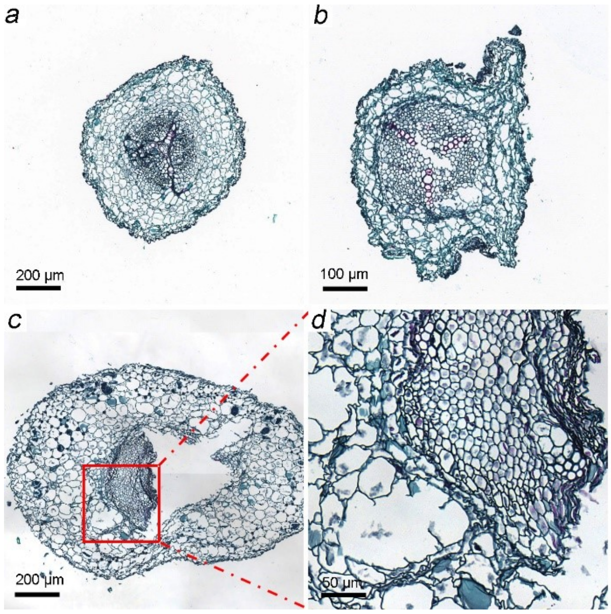

Fig. S3. Structural changes of pea root after the exposure to MOF-74(Co). (a) Control group; (b) 10 mg/L of MOF-74(Co); (c, d) 1000 mg/L of MOF-74(Co).

Supplementary table

Table S1. Formulae and glossary of terms used by the JIP-test for the analysis of the fluorescence transient *O-J-I-P* (Figs. 5&S4). Adapted from Strasser et al. (2004)

Glossary of terms used by the JIP -test for the fluorescence transient *O-J-I-P*	
PS II	Photosystem II
Q_A and Q_B	Q_A: Primary quinone acceptor of PS II and Q_B: Secondary quinone acceptor of PS II
RC	PS II reaction center
CS	Excited cross section
ABS	Absorption of solar flux
TR	Trapped energy flux
ET	Electron transport flux
DI	Dissipated energy flux
PI	Performance indexes
Data extracted from the recorded fluorescence transient *O-J-I-P*	
F_t	Fluorescence at time t after onset of actinic illumination
$F_P \equiv (F_M)$	Maximal recorded (=maximal possible) Fluorescence, at the peak P of *O-J-I-P*
t_{FM}	Time (in ms) to reach maximal Fluorescence F_M

Area	Total complementary area between Fluorescence induction curve and F=F_M
Fluorescence parameters derived from the extracted data	
$F_v \equiv F_t - F_0$	Variable fluorescence at time t
$F_m \equiv F_M - F_0$	Maximal variable fluorescence
$V_j \equiv (F_J - F_0)/(F_M - F_0)$	Relative variable fluorescence at the *J*-step
$S_m = (Area)/(F_M - F_0)$	Normalized total complementary area above the *O-J-I-P* transient (reflecting multiple-turnover Q_A reduction events)
$N \equiv S_m/S_s = S_m M_0 (1/V_j)$	Turnover number: number of Q_A reduction events between time 0 and t_{FM}
Specific energy fluxes (per Q_A-reducing PS II reaction center-*RC*)	
$ABS/RC = M_0(1/V_j)(1/\varphi_{P0})$	Absorption flux per *RC*
$TR_0/RC = M_0(1/V_j)$	Trapped energy flux per *RC* (at t=0)
$ET_0/RC = M_0(1/V_j)\Psi_0$	Electron transport flux per *RC* (at t=0)
$DI_0/RC = ABS/RC - TR_0/RC$	Dissipated energy flux per *RC* (at t=0)
Yields or flux ratios	
$\varphi_{Po} = TR_0/ABS = [1-(F_0/F_M)]$	Maximum quantum yield of primary photochemistry (at t = 0)
$\Psi_0 = ET_0/TR_0 = (1-V_j)$	Probability (at t = 0) that a trapped

	exciton moves an electron into the electron transport chain beyond Q_A^-
$\varphi_{E0}=ET_0/ABS=[1-(F_0/F_M)]\Psi_0$	Quantum yield of electron transport (at $t = 0$)
$\varphi_{D0}=1-\varphi_{P0}=F_0/F_M$	Quantum yield of energy dissipation (at $t = 0$)

Supplementary reference

Strasser, R. J., Tsimilli-Michael, M., Srivastava, A., 2004. Analysis of the chlorophyll *a* fluorescence transient, in Papageorgiou, G.C., Govindjee (Eds), Chlorophyll a Fluorescence A Signature of Photosynthesis. Springer, Dordrecht, pp. 321-362.