

Nano-pesticide formulation based on fluorescent organic photoresponsive nanoparticles: for controlled release of 2,4-D and real time monitoring of morphological changes induced by 2,4-D in plant system

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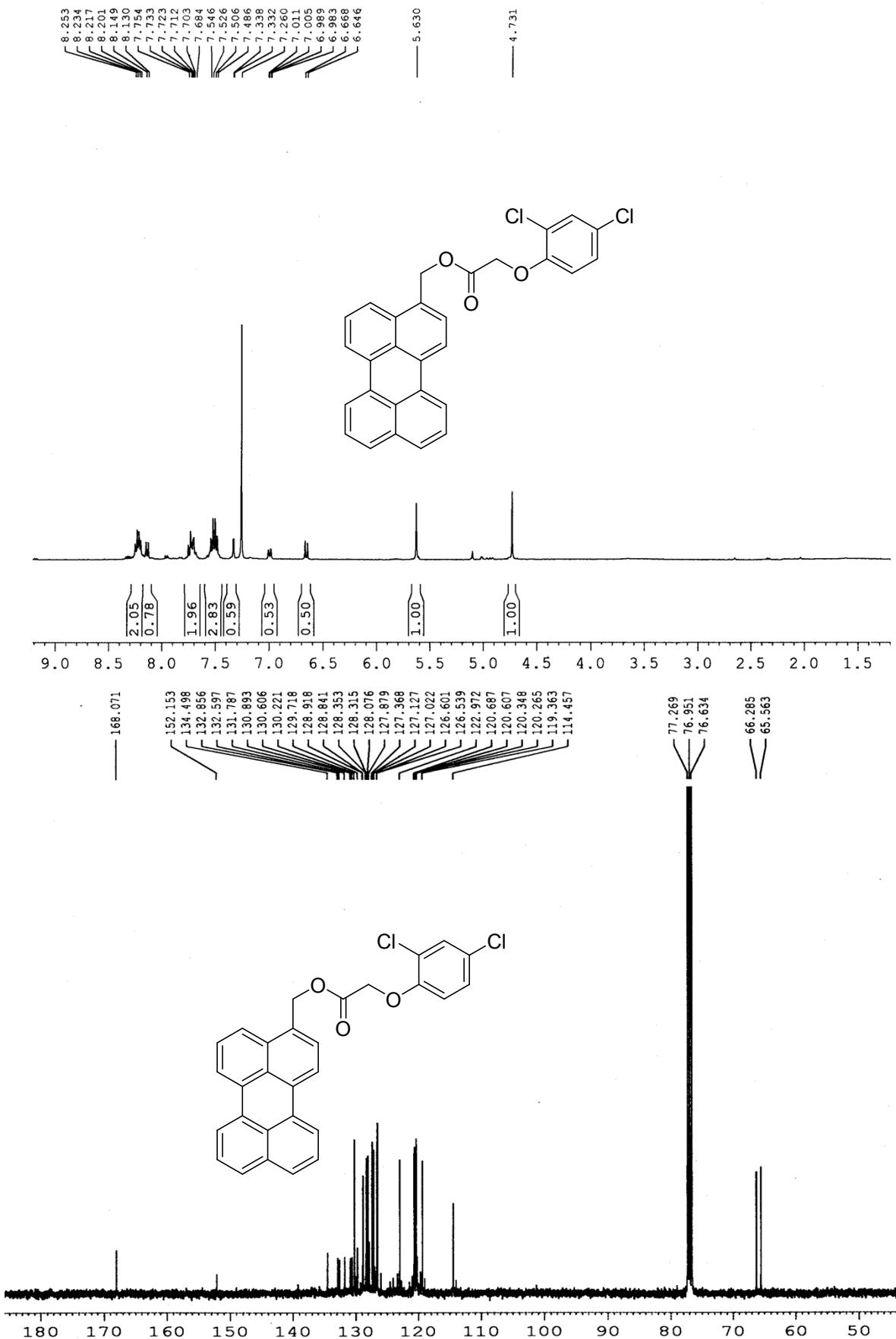
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Content:	Pages
(1) ^1H NMR and ^{13}C NMR spectra of perylene 2,4-D ester conjugate.	3
(2) TEM image of perylene-2,4-D nano pesticide and perylene-3-yl-methanol nano particles (Figure S1)	4
(3) DLS data of perylene-2,4-D nano pesticide at different interval of irradiation (Figure S2):	5
4) Effect of 2,4-D, perylene-2,4-D nano pesticide and perylene-3-yl-methanol nano particles on shoot length of <i>Cicer arietinum</i> (Table S1).	6
(5) Effect of 2,4-D, perylene-2,4-D nano pesticide and perylene-3-yl-methanol nano particles on shoot length of <i>Cicer arietinum</i> (Table S2).	7

¹H NMR and ¹³C NMR spectra of perylene 2,4-D ester conjugate.



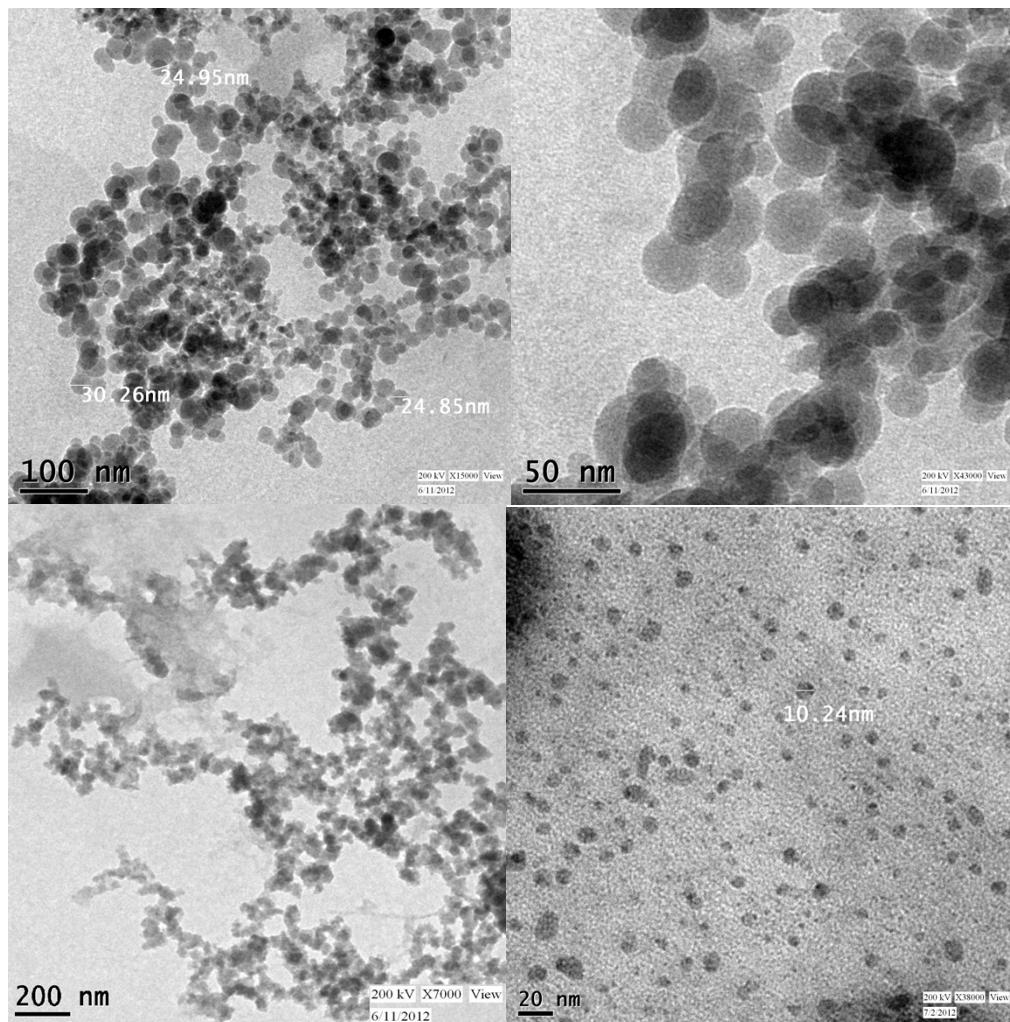


Figure S1: TEM image of perylene-2,4-D nano pesticide and perylene-3-yl-methanol nano particles

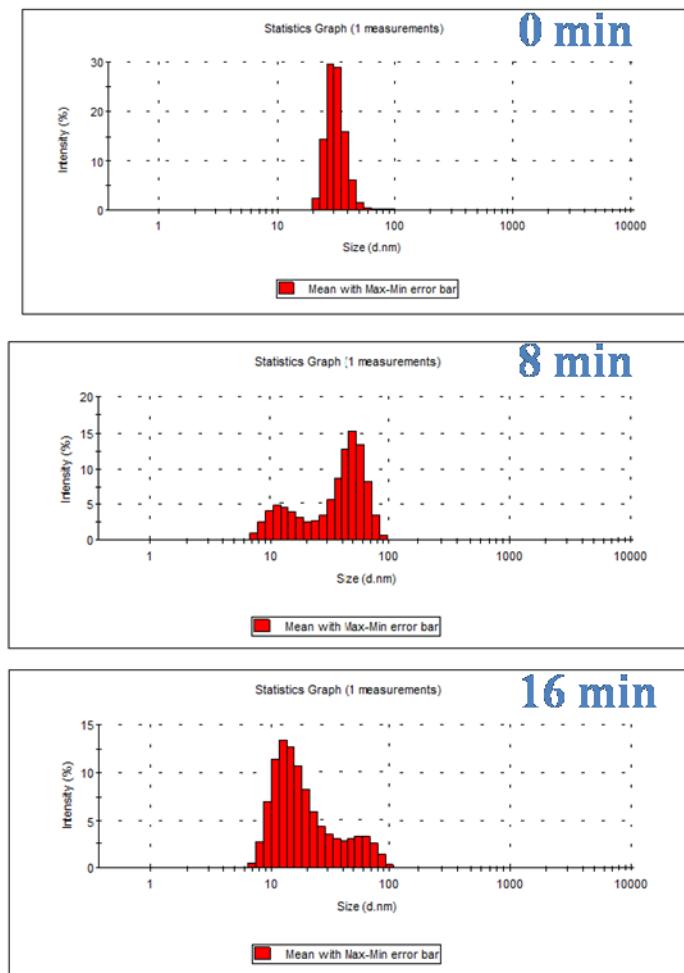


Figure S2: DLS data of perylene-2,4-D nano pesticide at different interval of irradiation

Table S1: Effect of 2,4-D, Pe-2,4-D nano-pesticides and perylene 3-ylethanol nano particles on the root length of *Cicer arietinum*.

Comp. conc.(M)	Root length (cm)				
	Culture period (days)				
	2	4	6	8	10
Control	3.2 ± 0.45 ^e	6.5 ± 0.32 ^g	8.8 ± 0.51 ^g	10.5 ± 0.28 ^d	11.7 ± 0.44 ^d
2,4-D	10 ⁻⁴	2.2 ± 0.23 ^a	2.6 ± 0.36 ^b	-	-
	10 ⁻⁵	2.5 ± 0.18 ^b	2.8 ± 0.25 ^b	2.9 ± 0.22 ^b	-
	10 ⁻⁶	2.6 ± 0.12 ^c	3.1 ± 0.15 ^c	3.5 ± 0.17 ^c	3.8 ± 0.21 ^a
Pe-2,4-D	10 ⁻⁴	2.2 ± 0.11 ^a	2.5 ± 0.15 ^a	2.5 ± 0.20 ^a	-
	10 ⁻⁵	2.6 ± 0.19 ^{bc}	3.2 ± 0.33 ^c	3.5 ± 0.17 ^c	-
	10 ⁻⁶	2.8 ± 0.26 ^c	4.6 ± 0.32 ^e	5.5 ± 0.26 ^d	5.7 ± 0.19 ^b
Pe	10 ⁻⁴	2.6 ± 0.18 ^c	4.3 ± 0.22 ^d	6.5 ± 0.20 ^e	8.9 ± 0.11 ^c
	10 ⁻⁵	2.8 ± 0.13 ^c	4.5 ± 0.12 ^e	7.7 ± 0.25 ^f	10.5 ± 0.37 ^d
	10 ⁻⁶	3.0 ± 0.08 ^d	5.3 ± 0.34 ^f	8.5 ± 0.43 ^g	12.3 ± 0.23 ^e
					12.9 ± 0.56 ^f

Foot note: Means in each column followed by the different letters shows significant difference ($P \leq 0.05$) as determined by Duncan's multiple range test. Values are mean ± SE of 3 replicates.

Table S2: Effect of 2,4-D, Pe-2,4-D nano-pesticides and perylene 3-ylethanol nano particles on the shoot length of *Cicer arietinum*.

Comp.	conc.(M)	Shoot length (cm)				
		Culture period (days)				
		2	4	6	8	10
Control		2.9 ± 0.45 ^e	8.9 ± 0.32 ^g	9.9 ± 0.51 ^g	11.10 ± 0.28 ^d	11.4 ± 0.44 ^d
2,4-D	10 ⁻⁴	1.2 ± 0.23 ^a	1.4 ± 0.36 ^b	-	-	-
	10 ⁻⁵	1.3 ± 0.18 ^b	2.6 ± 0.25 ^b	3.2 ± 0.22 ^b	-	-
	10 ⁻⁶	2.3 ± 0.12 ^c	3.5 ± 0.15 ^c	4.5 ± 0.17 ^c	4.8 ± 0.21 ^a	5.2 ± 0.30 ^a
Pe-2,4-D	10 ⁻⁴	1.7 ± 0.11 ^a	2.5 ± 0.15 ^a	3.0 ± 0.20 ^a	-	-
	10 ⁻⁵	1.8 ± 0.19 ^{bc}	3.0 ± 0.33 ^c	3.4 ± 0.17 ^c	-	-
	10 ⁻⁶	2.8 ± 0.26 ^c	4.0 ± 0.32 ^e	4.7 ± 0.26 ^d	5.4 ± 0.19 ^b	6.4 ± 0.32 ^b
Pe	10 ⁻⁴	1.6 ± 0.18 ^c	3.7 ± 0.22 ^d	9.2 ± 0.20 ^e	10.5 ± 0.11 ^c	11.0 ± 0.29 ^c
	10 ⁻⁵	1.8 ± 0.13 ^c	5.5 ± 0.12 ^e	9.5 ± 0.25 ^f	10.7 ± 0.37 ^d	12.1 ± 0.42 ^e
	10 ⁻⁶	2.4 ± 0.08 ^d	6.7 ± 0.34 ^f	9.9 ± 0.43 ^g	11.8 ± 0.23 ^e	12.9 ± 0.56 ^f

Foot note: Means in each column followed by the different letters shows significant difference ($P \leq 0.05$) as determined by Duncan's multiple range test. Values are mean ±SE of 3 replicates.