

Appendix Experimental Data

Table 1 General information including age, leaf area, photosynthesis, fresh weight, and stomata number of 8 ornamental plants.

Plant species	Age	Leaf area	Photosynthesis	Fresh weight (g)			Stomata number
	(month)	(cm ²)	(Fv/Fm)	shoot	root	total	n/cm ²
<i>S. aureus</i>	2	149.67±25.5 ^{b,c}	0.81±0.01 ^c	10.44±1.86 ^{a,b}	3.38±0.87 ^a	13.82±2.45 ^{a,b}	3750±901 ^{b,c}
<i>C. seifrizii</i>	1	110±10 ^{a,b}	0.79±0.02 ^c	4.63±0.13 ^a	1.68±0.23 ^a	6.31±0.22 ^a	5917±382 ^d
<i>S. trifasciata</i>	2	97.67±25.42 ^a	0.57±0.29 ^{a,b}	31.4±17.58 ^e	8.06±4.06 ^{b,c}	39.47±14.5 ^d	1167±382 ^a
<i>P. domesticum</i>	3	180±0.00 ^c	0.8±0.00 ^c	14.32±2.77 ^{a,b,c}	11.4±0.70 ^{c,d}	25.72±3.21 ^c	4667±191 ^c
<i>D. sanderiana</i>	3	131.67±25.07 ^{a,b}	0.45±0.04 ^a	18.22±3.73 ^{b,c,d}	4.68±0.08 ^{a,b}	22.9±3.77 ^{b,c}	10583±1134 ^e
<i>I. ebarbata</i>	3	240±36.06 ^d	0.74±0.01 ^{b,c}	25.93±6.02 ^{c,d,e}	12.18±3.68 ^d	38.11±6.68 ^d	18444±509 ^f
<i>M. acuminata</i>	2	128.67±24.85 ^{a,b}	0.84±0.05 ^c	10.37±2.02 ^{a,b}	4.38±2.26 ^a	14.74±3.5 ^{a,b}	6083±505 ^d
<i>E. aureum</i>	2	135±22.27 ^{a,b}	0.78±0.03 ^c	7.69±1.19 ^{a,b}	2.27±0.51 ^a	9.96±1.7 ^a	3750±250 ^{b,c}

Data are list as average ± SD for three replications. Duncan's multiple range tests with 95% confident level was used to classify the group of data. Values in the same column with the superscripted same letter are not significantly different.

Table 2 Dilution of benzene concentration for calibration curve preparation.

Benzene concentration (ppm)	Peak Area
1	2054
5	8913
10	19784
20	39754
30	58902
40	79771
50	98408

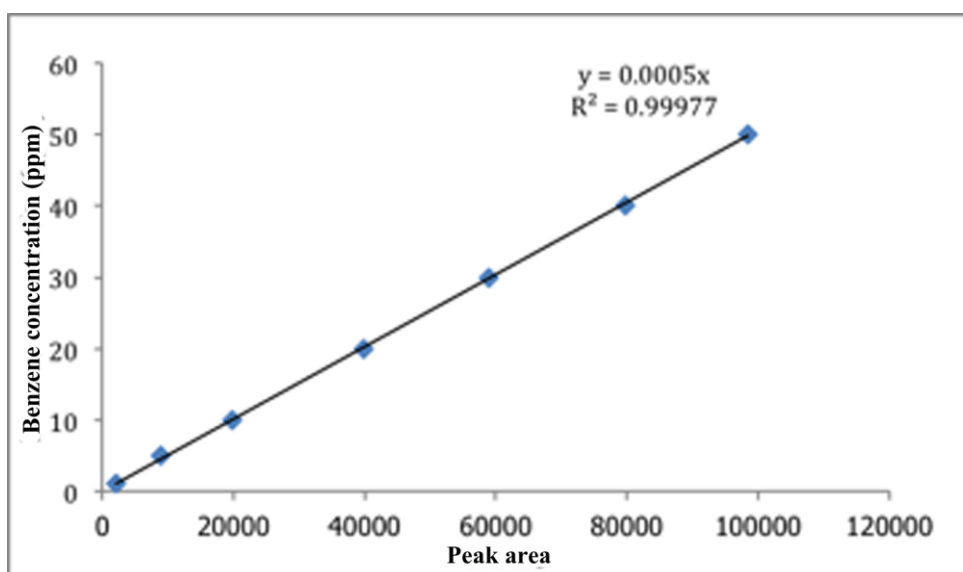
**Figure 1** Standard curves of dilution of benzene concentration related with peak area.

Table 3 Benzene removal (μg) of 8 ornamental plants under indoor growing condition at 4 – 72 hours.

Plant species	Benzene removal (μg)					
	4 h	6 h	8 h	24 h	48 h	72 h
<i>S. aureus</i>	143.42 $\pm$ 41.65 ^a	124.16 $\pm$ 79.47 ^b	128.59 $\pm$ 45.95 ^{b,c}	347.98 $\pm$ 40.97 ^b	301.4 $\pm$ 23.28 ^a	313.39 $\pm$ 17.06 ^a
<i>C. seifrizii</i>	143.25 $\pm$ 97.04 ^a	194.67 $\pm$ 50.74 ^b	330.1 $\pm$ 88.14 ^e	392.54 $\pm$ 108.17 ^b	434.74 $\pm$ 52.43 ^b	492.85 $\pm$ 46.64 ^b
<i>S. trifasciata</i>	117.79 $\pm$ 84.24 ^a	115.54 $\pm$ 40.36 ^b	98.14 $\pm$ 85.26 ^{a,b}	381.59 $\pm$ 119.48 ^b	437.75 $\pm$ 110.71 ^b	746.86 $\pm$ 93.83 ^{c,d}
<i>P. domesticum</i>	353.31 $\pm$ 59.69 ^b	373.6 $\pm$ 88.11 ^d	343.53 $\pm$ 87.16 ^{e,f}	323.53 $\pm$ 77.1 ^b	456.46 $\pm$ 54.02 ^b	444.38 $\pm$ 34.35 ^b
<i>D. sanderiana</i>	303.18 $\pm$ 723.98 ^b	296.72 $\pm$ 85.74 ^{c,d}	433.31 $\pm$ 58.94 ^f	613.96 $\pm$ 68.39 ^d	777.46 $\pm$ 67.65 ^c	843.72 $\pm$ 171.66 ^d
<i>I. ebarbata</i>	46.34 $\pm$ 0.00 ^a	214.2 $\pm$ 115.77 ^{b,c}	302.7 $\pm$ 124.7 ^{d,e}	499.34 $\pm$ 33.42 ^c	457.87 $\pm$ 69.56 ^b	632.65 $\pm$ 157.37 ^c
<i>M. acuminata</i>	75.3 $\pm$ 29.11 ^a	377.16 $\pm$ 102.94 ^d	223.15 $\pm$ 97.5 ^{c,d}	493.25 $\pm$ 81.4 ^c	481.61 $\pm$ 66.159 ^b	688.71 $\pm$ 156.05 ^c
<i>E. aureum</i>	87.1 $\pm$ 55.24 ^a	2.76 $\pm$ 4.79 ^a	22.62 $\pm$ 30 ^a	125.88 $\pm$ 50.53 ^a	403.85 $\pm$ 5.57 ^b	485.76 $\pm$ 12.26 ^b

Data are list as average $\pm$ SD for three replications. Duncan's multiple range tests with 95% confident level was used to classify the group of data. Values in the same column with the superscripted same letter are not significantly different.

Table 4 Benzene removal (μmole) of 8 ornamental plants under indoor growing condition at 4 – 72 hours.

Plant species	Benzene removal (μmole)					
	4 h	6 h	8 h	24 h	48 h	72 h
<i>S. aureus</i>	1.84 $\pm$ 0.53 ^a	1.59 $\pm$ 1.02 ^b	1.65 $\pm$ 0.59 ^{b,c}	4.46 $\pm$ 0.52 ^b	3.86 $\pm$ 0.30 ^a	4.01 $\pm$ 0.22 ^a
<i>Z. Zamifolia</i>	1.83 $\pm$ 1.24 ^a	2.49 $\pm$ 0.65 ^b	4.23 $\pm$ 1.13 ^e	5.03 $\pm$ 1.39 ^b	5.57 $\pm$ 0.67 ^b	6.31 $\pm$ 0.60 ^b
<i>C. seifrizii</i>	1.51 $\pm$ 1.08 ^a	1.48 $\pm$ 0.52 ^b	1.26 $\pm$ 1.09 ^{a,b}	4.89 $\pm$ 1.53 ^b	5.61 $\pm$ 1.42 ^b	9.56 $\pm$ 1.20 ^{c,d}
<i>S. trifasciata</i>	4.52 $\pm$ 0.76 ^b	4.78 $\pm$ 1.13 ^d	4.40 $\pm$ 1.12 ^{e,f}	4.14 $\pm$ 0.99 ^b	5.84 $\pm$ 0.69 ^b	5.69 $\pm$ 0.44 ^b
<i>P. domesticum</i>	3.88 $\pm$ 0.93 ^b	3.80 $\pm$ 1.10 ^{c,d}	5.55 $\pm$ 0.75 ^f	7.86 $\pm$ 0.88 ^d	9.95 $\pm$ 0.87 ^c	10.80 $\pm$ 2.20 ^d
<i>D. sanderiana</i>	0.59 $\pm$ 0.00 ^a	2.74 $\pm$ 1.48 ^{b,c}	3.88 $\pm$ 1.60 ^{d,e}	6.39 $\pm$ 0.43 ^c	5.86 $\pm$ 0.89 ^b	8.10 $\pm$ 2.02 ^c
<i>I. ebarbata</i>	0.96 $\pm$ 0.37 ^a	4.83 $\pm$ 1.32 ^d	2.86 $\pm$ 1.25 ^{c,d}	6.32 $\pm$ 1.04 ^c	6.17 $\pm$ 0.85 ^b	8.82 $\pm$ 2.00 ^c
<i>M.acuminata</i>	1.12 $\pm$ 0.71 ^a	0.04 $\pm$ 0.06 ^a	0.29 $\pm$ 0.38 ^a	1.61 $\pm$ 0.65 ^a	5.17 $\pm$ 0.07 ^b	6.22 $\pm$ 0.16 ^b

Data are list as average $\pm$ SD for three replications. Duncan's multiple range tests with 95% confident level was used to classify the group of data. Values in the same column with the superscripted same letter are not significantly different.

Table 5 Benzene removal ($\mu\text{g}/\text{cm}^2$) of 8 ornamental plants under indoor growing condition at 4 – 72 hours.

Plant species	Benzene removal ($\mu\text{g}/\text{cm}^2$)					
	4 h	6 h	8 h	24 h	48 h	72 h
<i>S. aureus</i>	0.96 $\pm$ 0.28 ^{a,b}	0.86 $\pm$ 0.31 ^b	0.86 $\pm$ 0.31 ^{a,b}	2.32 $\pm$ 0.27 ^b	2.01 $\pm$ 0.16 ^a	2.09 $\pm$ 0.11 ^a
<i>C. seifrizii</i>	1.30 $\pm$ 0.88 ^{b,c}	1.77 $\pm$ 0.46 ^c	3.00 $\pm$ 0.80 ^e	3.57 $\pm$ 0.98 ^c	3.95 $\pm$ 0.48 ^c	4.48 $\pm$ 0.42 ^{b,c}
<i>S. trifasciata</i>	1.14 $\pm$ 0.82 ^b	1.12 $\pm$ 0.39 ^b	0.95 $\pm$ 0.83 ^b	3.69 $\pm$ 1.16 ^c	4.27 $\pm$ 1.07 ^c	7.23 $\pm$ 0.91 ^{d,e}
<i>P. domesticum</i>	1.96 $\pm$ 0.33 ^{c,d}	2.08 $\pm$ 0.49 ^{c,d}	1.91 $\pm$ 0.48 ^{c,d}	1.8 $\pm$ 0.43 ^b	2.54 $\pm$ 0.3 ^{a,b}	2.47 $\pm$ 0.19 ^a
<i>D. sanderiana</i>	2.3 $\pm$ 0.55 ^d	2.25 $\pm$ 0.65 ^{c,d,e}	3.29 $\pm$ 0.45 ^e	4.66 $\pm$ 0.52 ^d	5.90 $\pm$ 0.51 ^d	6.41 $\pm$ 1.30 ^d
<i>I. ebarbata</i>	0.19 $\pm$ 0.00 ^a	0.89 $\pm$ 0.48 ^b	1.26 $\pm$ 0.52 ^{b,c}	2.08 $\pm$ 0.14 ^b	1.91 $\pm$ 0.29 ^a	2.64 $\pm$ 0.66 ^a
<i>M. acuminata</i>	0.58 $\pm$ 0.23 ^{a,b}	2.92 $\pm$ 0.8 ^e	1.73 $\pm$ 0.76 ^c	3.82 $\pm$ 0.63 ^{c,d}	3.73 $\pm$ 0.51 ^c	5.34 $\pm$ 1.21 ^c
<i>E. aureum</i>	0.65 $\pm$ 0.41 ^{a,b}	0.02 $\pm$ 0.04 ^a	0.17 $\pm$ 0.22 ^a	0.93 $\pm$ 0.37 ^a	2.99 $\pm$ 0.04 ^b	3.60 $\pm$ 0.09 ^b

Data are list as average $\pm$ SD for three replications. Duncan's multiple range tests with 95% confident level was used to classify the group of data. Values in the same column with the superscripted same letter are not significantly different.

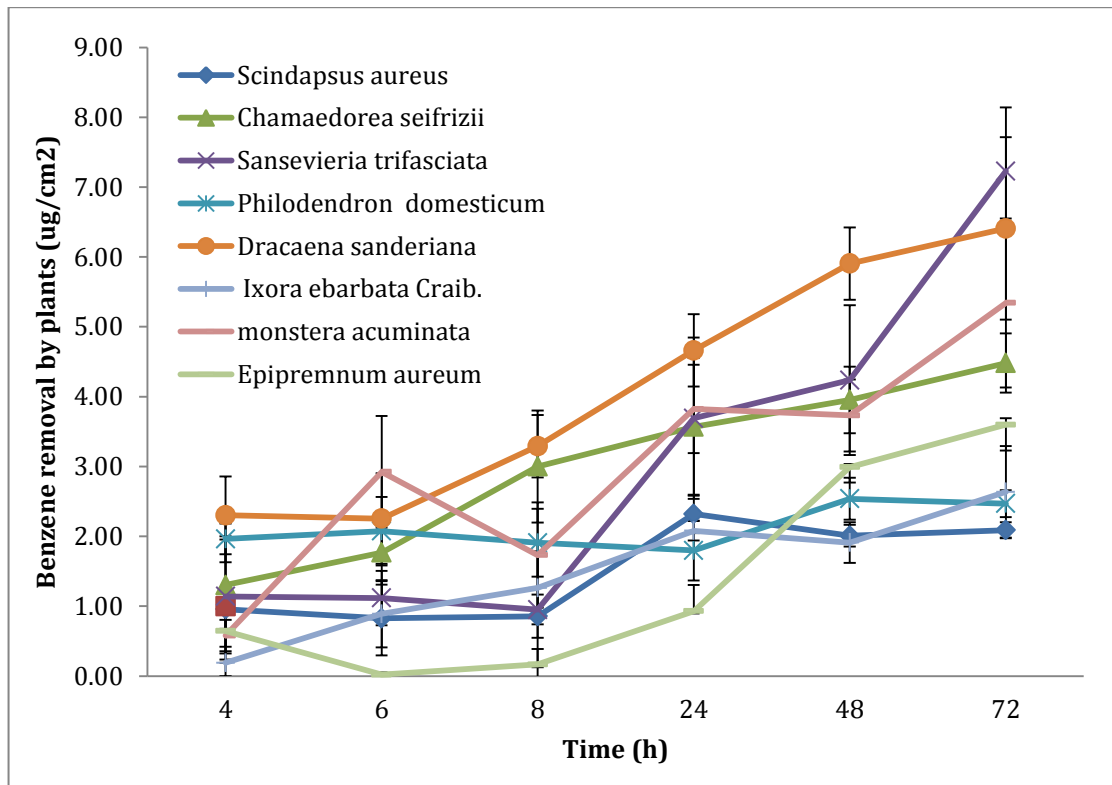


Figure 2 Benzene removal ($\mu\text{g}/\text{cm}^2$) of 8 ornamental plants under indoor growing condition at 4 – 72 hours.

Table 6 Benzene remaining (ppm) in the chamber after treatment by *D. sanderiana* classifying by growing condition at 1st cycle

	Cycle 1					
	Day 0	Day 1	Day 2	Day 3	Day 5	Day 7
24 h light	20.00±0.00	17.70±0.25	12.65±0.97	7.73±0.45	5.59±0.26	0.00±0.00
24 h dark	20.00±0.00	16.93±0.36	13.60±1.11	12.98±0.99	10.86±0.19	0.00±0.00
Control in 24 h light condition	20.00±0.00	19.48±0.43	20.56±0.85	19.49±0.33	19.29±0.29	19.00±0.00
Control in 24 h dark condition	20.00±0.00	19.40±0.52	19.63±0.26	19.90±0.26	19.38±0.44	19.23±0.27

Data are list as average ± SD for three replications.

Table 7 Benzene remaining (ppm) in the chamber after treatment by *D. sanderiana* classifying by growing condition at 2nd cycle

	Cycle 2					
	Day 8	Day 9	Day 10	Day 11	Day 13	Day 15
24 h light	20.00±0.00	13.40±0.26	9.43±1.76	6.83±0.88	3.45±0.41	0.00±0.00
24 h dark	20.00±0.00	16.49±0.35	12.39±0.16	12.46±0.34	10.49±0.15	10.29±0.13
Control in 24 h light condition	20.00±0.00	21.31±0.35	20.41±0.50	20.19±0.07	18.81±0.67	19.19±0.07
Control in 24 h dark condition	20.00±0.00	20.40±0.54	19.61±0.64	19.25±0.12	19.49±0.07	19.86±0.12

Data are list as average ± SD for three replications.

Table 8 Benzene remaining (ppm) in the chamber after treatment by *D. sanderiana* classifying by growing condition at 3rd cycle

	Cycle 3					
	Day 16	Day 17	Day 18	Day 19	Day 21	Day 23
24 h light	20.00±0.00	10.66±0.17	7.33±0.40	3.98±0.45	0.00±0.00	0.00±0.00
24 h dark	20.00±0.00	17.64±0.43	14.43±0.35	12.44±0.96	10.50±0.41	9.36±0.90
Control in 24 h light condition	20.00±0.00	21.33±0.43	21.01±0.28	20.52±0.37	20.49±0.23	20.24±0.19
Control in 24 h dark condition	20.00±0.00	20.89±1.16	20.60±0.24	20.33±0.19	20.20±0.13	20.22±0.01

Data are list as average ± SD for three replications.

Table 9 Benzene remaining (ppm) in the chamber after treatment by *D. sanderiana* classifying by growing condition at 4th cycle

	Cycle 4					
	Day 24	Day 25	Day 26	Day 27	Day 29	Day 31
24 h light	20.00±	10.51±0.53	7.87±0.55	4.33±0.29	0.00±0.00	0.00±0.00
24 h dark	20.00±	17.41±0.51	13.25±0.13	11.33±1.10	10.50±0.15	10.18±0.06
Control in 24 h light condition	20.00±	22.33±0.21	21.07±1.61	20.57±0.35	19.67±0.58	20.03±1.25
Control in 24 h dark condition	20.00±	20.57±0.50	20.27±0.01	20.20±0.12	20.31±0.18	20.49±0.32

Data are list as average ± SD for three replications.

Table 10 The ratio of benzene uptake by wax and stomata of *D. sanderiana* at day1 – day3.

		μmole	Percent
Day 1	Wax extraction from 130 cm² sized leaves of <i>D. sanderiana</i>	2.50±0.29	31.81
	Stomata from 130 cm² sized leaves of <i>D. sanderiana</i>	5.36±0.29	68.19
Day 2	Wax extraction from 130 cm² sized leaves of <i>D. sanderiana</i>	3.25±0.02	32.68
	Stomata from 130 cm² sized leaves of <i>D. sanderiana</i>	6.70±0.02	67.32
Day 3	Wax extraction from 130 cm² sized leaves of <i>D. sanderiana</i>	4.59±0.38	46.17
	Stomata from 130 cm² sized leaves of <i>D. sanderiana</i>	5.36±0.38	53.83

Data are list as average ± SD for three replications.

Table 11 Benzene remaining (ppm) in the chamber after adsorption by wax of *D. sanderiana* classifying by quantity of wax at day1 – day7.

	Leaf area			
	Control	65 cm ²	131 cm ²	260 cm ²
Day 0	20.00±0.00	20.00±0.00	20.00±0.00	20.00±0.00
Day 1	20.00±1.38	16.19±1.49	16.08±0.51	12.00±0.49
Day 2	20.00±0.47	16.07±0.58	14.90±0.03	11.71±0.36
Day 3	20.00±0.06	15.63±0.83	12.79±0.59	11.17±0.53
Day 5	20.00±0.65	15.15±0.87	12.64±0.08	10.35±0.61
Day 7	20.01±1.33	13.77±1.09	11.53±0.28	8.41±2.02

Data are list as average ± SD for three replications.

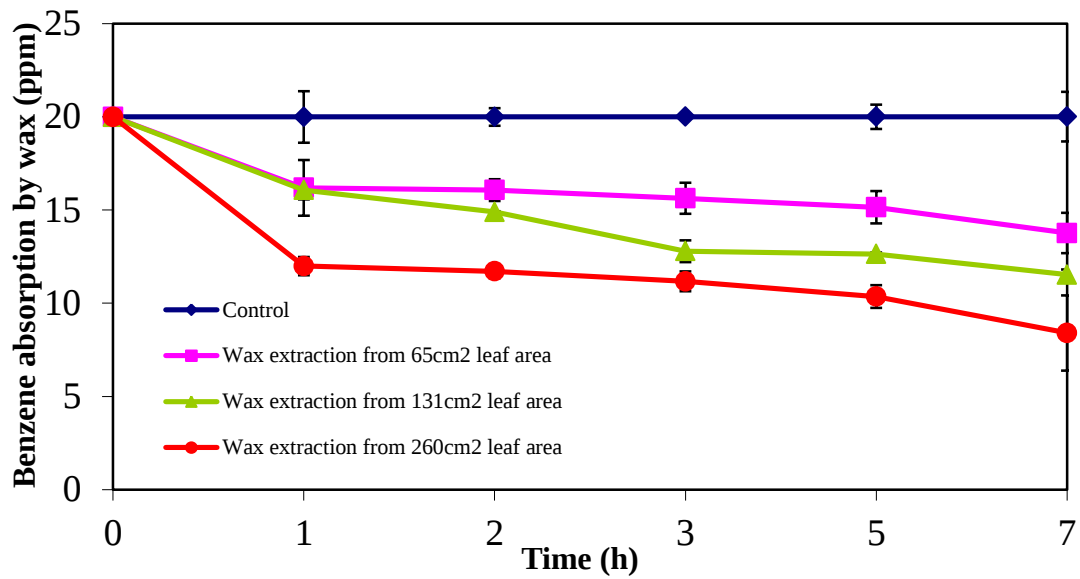


Figure 3 Benzene remaining (ppm) in the chamber after adsorption by wax of *D. sanderiana* classifying by quantity of wax at day1 – day7.

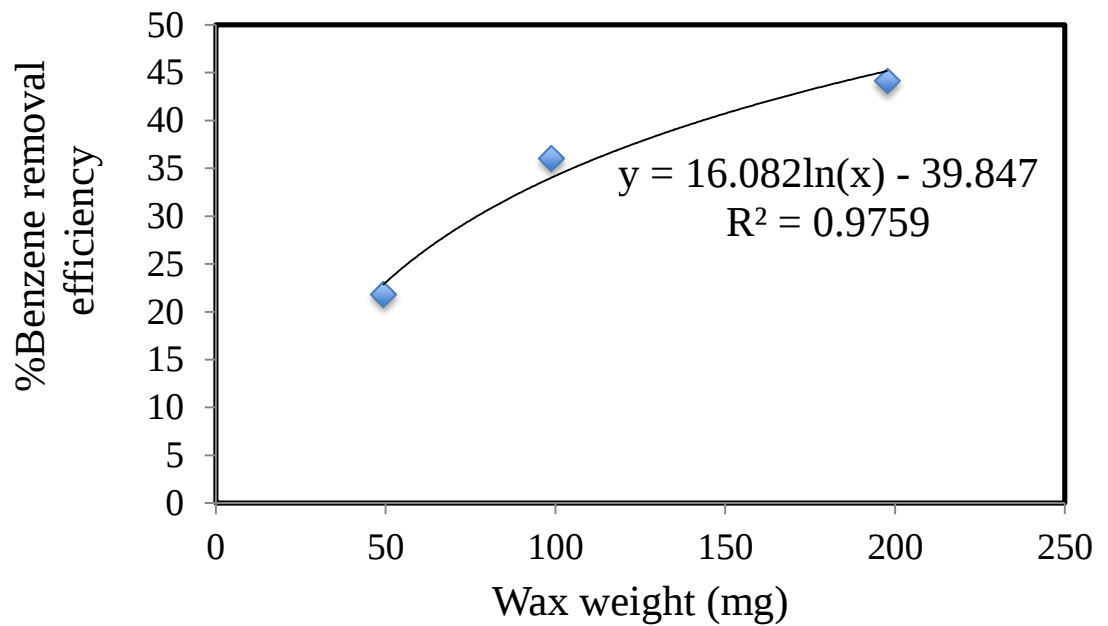


Figure 4 The relationship between benzene uptake efficiency and quantity of wax of *D. sanderiana* at day3.

Table 11 Benzene remaining (ppm) in the chamber after adsorption by leaf, grinded leaf, and wax of *D. sanderiana* at 0 – 168 hours.

	Time					
	0 h	24 h	48 h	72 h	120 h	168 h
260 cm² dry leaf of <i>D.sanderiana</i>	20.00±0.00	18.73±0.09	18.05±0.30	15.61±0.43	13.23±0.39	12.90±0.18
260 cm² fresh leaf of <i>D.sanderiana</i>	20.00±0.00	19.30±0.43	17.50±0.09	15.15±0.51	14.90±0.30	13.32±0.54
Wax extraction from 260 cm² of leaf area	20.00±0.00	16.08±0.51	14.90±0.03	12.79±0.59	12.64±0.08	11.53±0.28
Grinded 260 cm² dry leaf of <i>D.sanderiana</i>	20.00±0.00	17.33±1.15	15.67±0.58	15.46±0.87	10.77±0.74	9.54±0.33
Control	20.00±0.00	20.01±0.10	20.00±0.17	20.00±0.14	19.00±0.12	19.20±0.33

Data are list as average ± SD for three replicas.

Table 12 Dilution of benzene concentration for calibration curve preparation.

Benzene concentration (ppm)	Peak hight
0	0
0	0
0	0
50	538.7
50	536.8
50	590.7
50	565.5
50	604.2
50	641.6
100	1304.4
100	1258.5
100	1338.1
100	1349.2

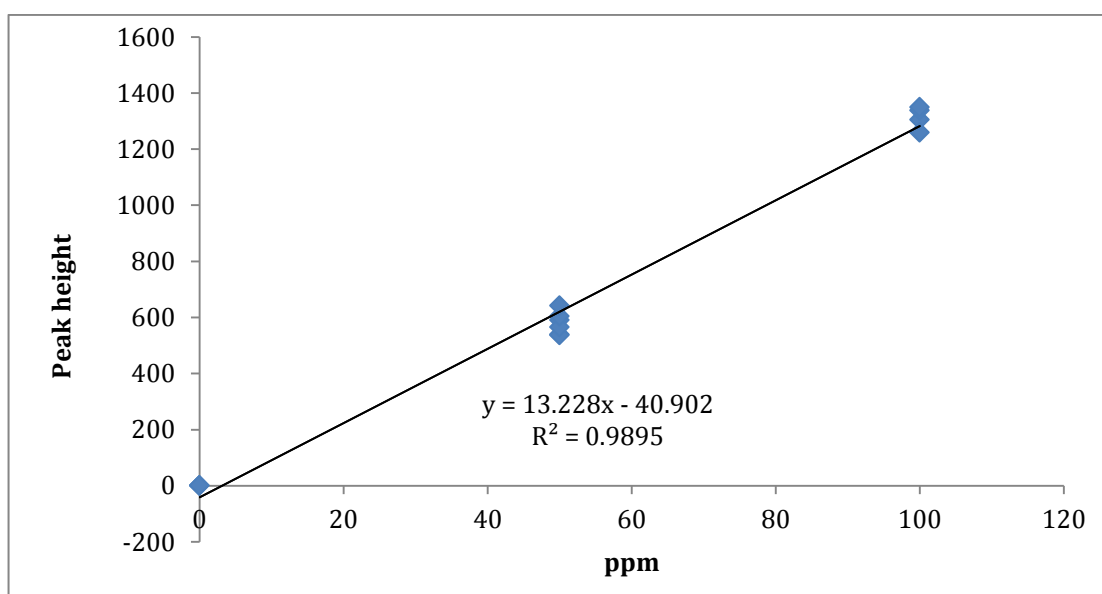
**Figure 5** Standard curves of dilution of benzene concentration related with peak height.

Table 13 Benzene remaining (ppm) in the chamber after adsorption by 22 plant leaf materials at day 0 – 3.

Plant species	Day			
	0	1	2	3
<i>H. rubescens</i>	20.00±0.00	19.74±0.00	19.73±0.01	19.68±0.08
<i>C. hystrix</i>	20.00±0.00	17.81±0.09	17.51±2.50	17.36±0.76
<i>M. paradisiaca</i>	20.00±0.00	17.41±0.57	15.63±0.94	15.68±0.33
<i>M. indica</i>	20.00±0.00	17.80±0.99	17.83±1.02	18.05±0.88
<i>C. meter</i>	20.00±0.00	19.59±0.05	18.92±0.15	18.97±0.01
<i>L. inermis</i>	20.00±0.00	18.91±0.05	18.21±1.04	17.29±0.25
<i>C. odorata</i>	20.00±0.00	18.66±0.07	18.39±0.38	18.17±0.07
<i>C. siamea</i>	20.00±0.00	18.99±0.10	18.67±0.32	17.80±0.05
<i>B. villeda</i>	20.00±0.00	19.03±0.11	18.31±0.09	17.97±0.34
<i>L. chinensis</i>	20.00±0.00	19.06±0.17	16.86±0.07	13.26±0.60
<i>C. grandis</i>	20.00±0.00	18.67±0.53	18.75±0.65	18.09±0.09
<i>D. picta</i>	20.00±0.00	16.92±0.07	15.47±0.05	14.44±0.07
<i>A. atlas</i>	20.00±0.00	19.00±0.11	14.98±0.13	15.09±0.06
<i>P. longifolia</i>	20.00±0.00	18.18±0.26	17.71±0.13	17.30±0.15
<i>A. aureum</i>	20.00±0.00	16.85±0.18	15.81±0.16	14.57±0.16
<i>F. religiosa</i>	20.00±0.00	16.95±0.03	16.98±0.12	14.74±0.32
<i>L. macrocarpa</i>	20.00±0.00	16.86±0.16	16.38±0.01	13.54±0.25
<i>A. scholaris</i>	20.00±0.00	17.24±0.15	15.91±0.11	14.09±0.47
<i>A. andraeanum</i>	20.00±0.00	16.40±1.35	16.39±0.06	16.44±0.13
<i>P. indicus</i>	20.00±0.00	16.01±0.72	15.40±0.81	14.88±1.25
<i>D. sanderiana</i>	20.00±0.00	16.84±1.34	15.40±0.47	15.41±0.81

Data are list as average ± SD for three replicas.

Table 13 Composition of fatty acid of 8 selected plant leaf material.

RT	Fatty acid	<i>D. picta</i>	<i>A. aureum</i>	<i>C. siamea</i>	<i>A. scholaris</i>	<i>D. sanderiana</i>	<i>L. Macrocarpa</i>	<i>P. longifolia</i>	<i>M. paradisiaca</i>	logKow
16.82	Octanoic acid or Decanoic acid	2.47	0.00	0.00	0.00	0.00	1.79	6.30	0.00	3.05
17.95	Dodecanoic acid	3.57	0.00	0.00	0.00	7.31	0.00	5.82	0.00	4.60
20.38	Tetradecanoic acid	5.90	8.06	29.32	0.00	25.54	26.07	27.56	3.70	6.11
21.71	Pentadecanoic acid	14.74	15.40	0.00	0.00	9.04	0.00	0.00	19.86	6.47
23.28	Hexadecanoic acid	24.59	30.46	49.74	0.00	15.24	23.03	27.16	21.36	7.17
25.24	Heptadecanoic acid	14.10	0.00	5.81	0.00	0.00	5.42	0.00	0.00	7.45
27.11	Alpha.-Linoleic acid	17.88	22.32	0.00	81.36	27.18	43.69	17.72	16.62	6.46
27.70	Octadecanoic acid	16.74	23.77	15.14	18.64	15.69	0.00	15.43	38.46	7.94

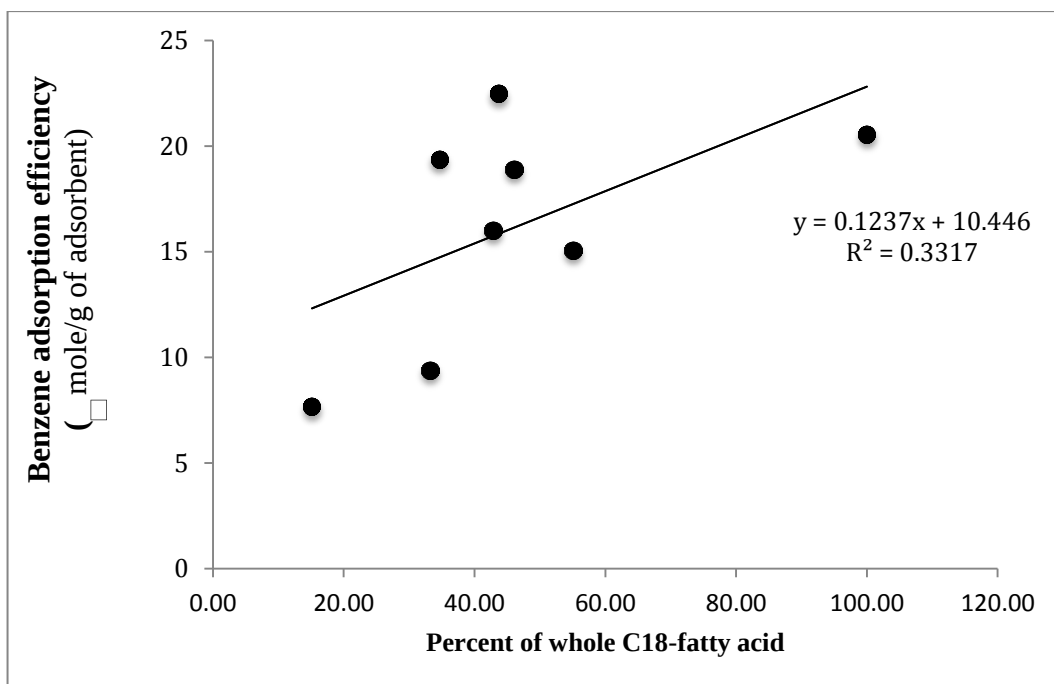


Figure 6 The relationship between benzene adsorption efficiency and percent of C18-fatty acid composition of all fatty acid.

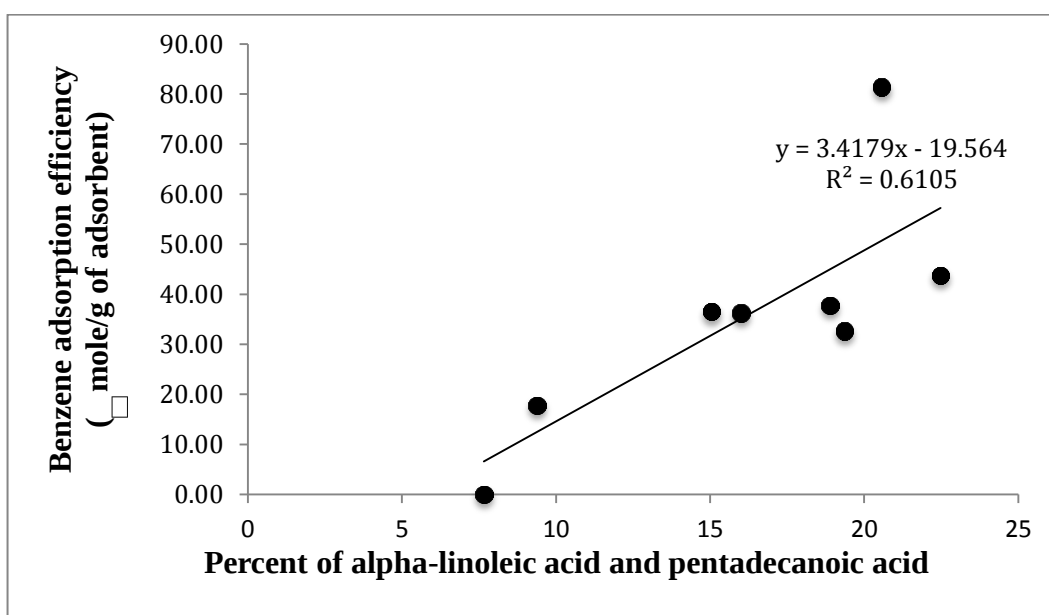


Figure 7 The relationship between benzene adsorption efficiency and percent of alpha-linoleic and pentadecanoic acid composition of all fatty acid.

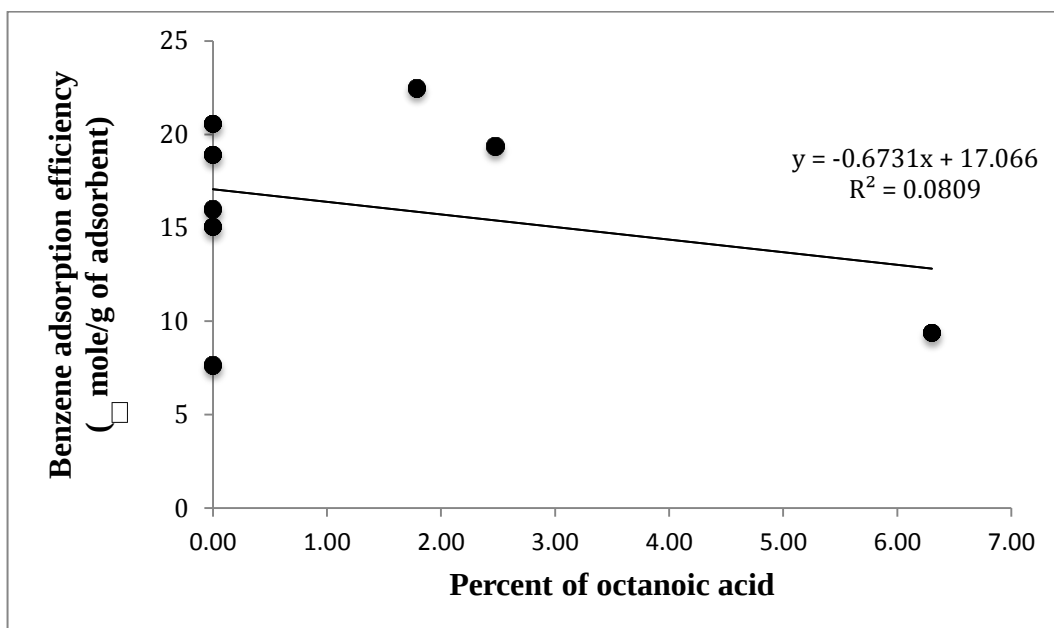


Figure 8 The relationship between benzene adsorption efficiency and percent of octanoic acid composition of all fatty acid.

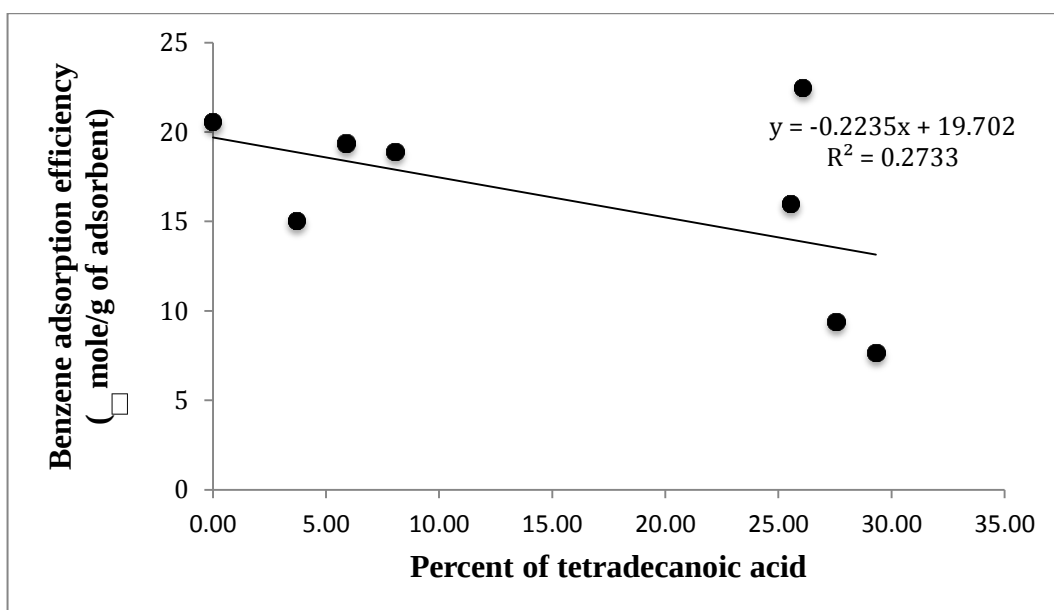


Figure 9 The relationship between benzene adsorption efficiency and percent of tetradecanoic acid composition of all fatty acid.

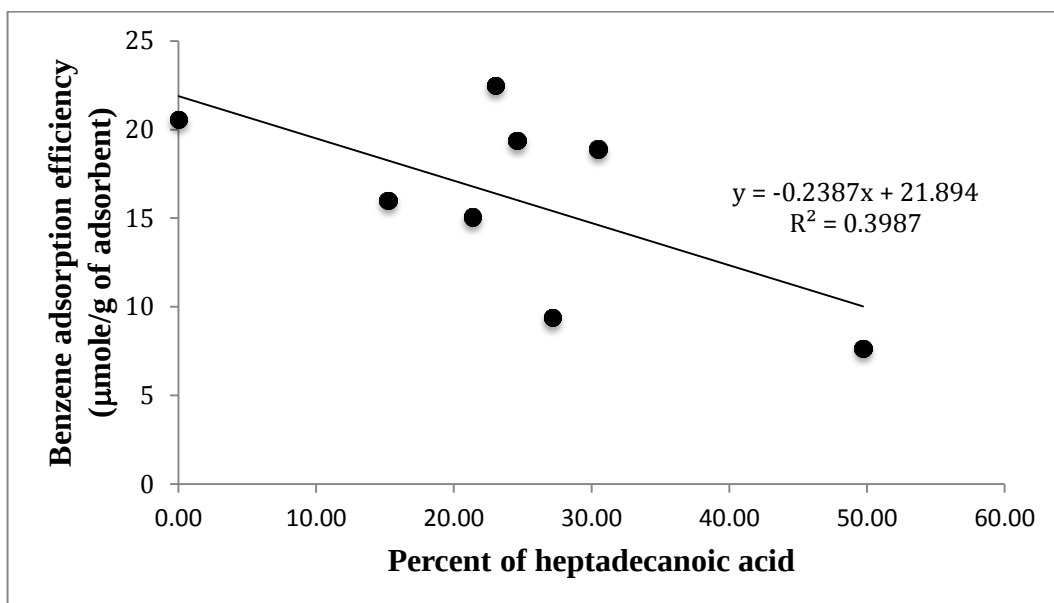


Figure 10 The relationship between benzene adsorption efficiency and percent of heptadecanoic acid composition of all fatty acid.

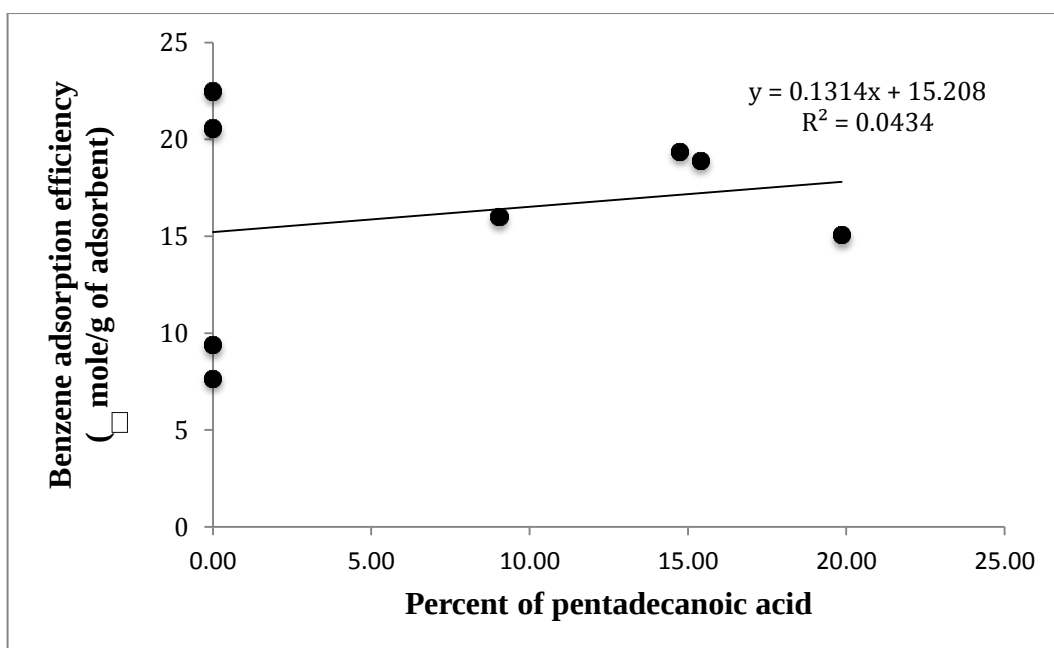


Figure 11 The relationship between benzene adsorption efficiency and percent of pentadecanoic acid composition of all fatty acid.

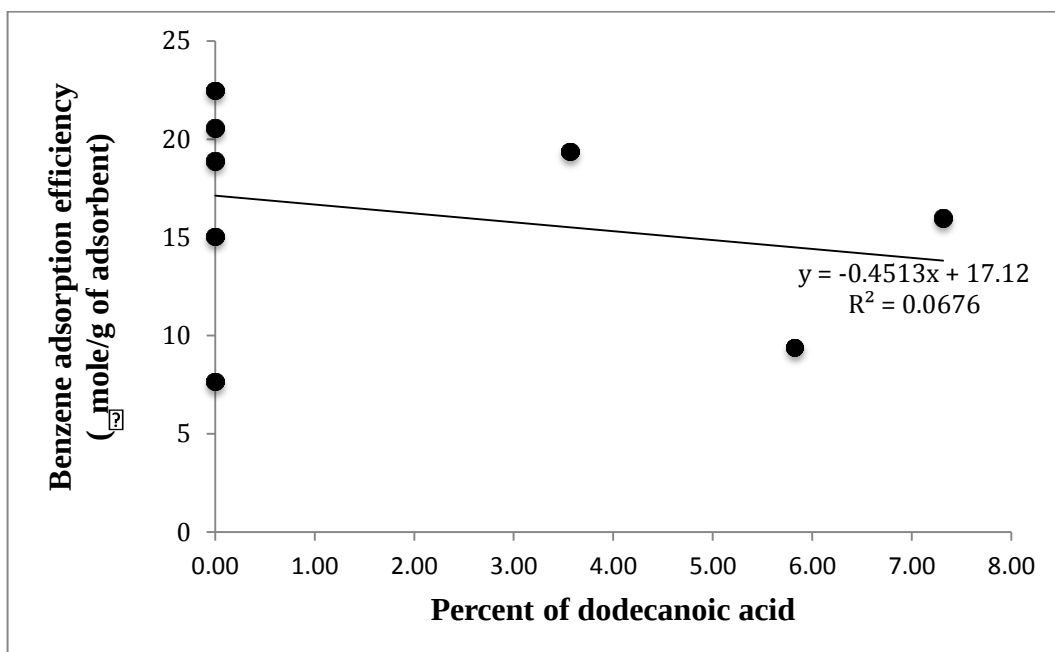


Figure 12 The relationship between benzene adsorption efficiency and percent of dodecanoic acid composition of all fatty acid.

Table 14 Dilution of benzene concentration for calibration curve preparation.

Concentration (ppm)	Peak area
0	0
0	0
0	0
17	140
17	133
17	107
34	280
34	266
34	214

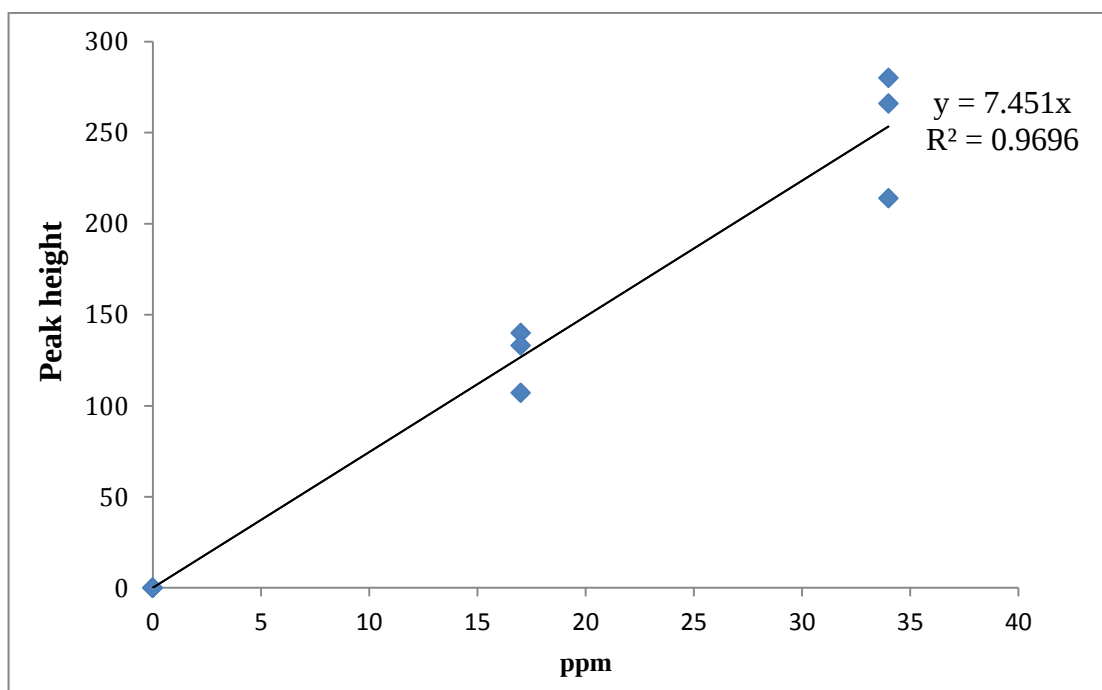
**Figure 13** Standard curves of dilution of benzene concentration related with peak height.

Table 15 The percentage of benzene adsorption efficiency of leaf materials from 6 selected plant species.

	Time (h)																									
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126	132	138	144	150	156
<i>D.sanderiana</i>	88.1	70.8	93.5	82.8	82.5	81.3	78.3	83.4	79.4	82.5	87.3	83.5	83.5	77.0	87.1	70.0	57.1	24.9	8.93	10.5	18.3	24.8	0.0	0.0	0.0	0.0
	5±8.	7±9.	9±4.	7±1	3±3.	0±6.	7±1	5±5.	9±1.	0±9.	1±4.	8±2.	8±2.	3±9.	3±7.	7±8.	4±0.	7±1	±3.4	4±6.	4±1	5±8.	0±0	0±0	0±0	0±0
	26	12	17	6.08	94	93	4.87	49	78	29	04	90	90	25	83	56	53	3.02	5	97	8.69	62	.00	.00	.00	.00
<i>D.picta</i>	78.6	82.6	67.6	68.7	85.4	84.5	77.7	84.7	76.7	72.4	88.3	80.3	80.3	85.8	72.1	65.8	48.8	22.0	23.8	7.31	7.31	8.83	0.0	0.0	0.0	0.0
	0±1	1±5.	2±3.	1±3.	4±7.	6±1	7±1	4±1	1±1	5±7.	3±4.	3±7.	3±7.	1±1	4±2.	4±0.	3±0.	5±1	8±1.	±5.6	±5.6	±1.0	0±0	0±0	0±0	0±0
	1.91	73	43	25	94	0.00	6.27	2.52	4.92	73	39	78	78	3.48	40	97	21	6.48	42	1	1	7	.00	.00	.00	.00
<i>F.religioza</i>	48.7	63.1	55.9	44.8	63.7	55.4	67.6	57.4	56.9	41.1	74.2	55.3	55.3	60.2	48.0	60.7	51.1	38.8	36.8	32.4	21.7	0.32	0.0	0.0	0.0	0.0
	6±1.	5±7.	6±9.	3±2.	9±5.	0±1	4±9.	8±0.	0±3.	6±1.	9±2.	4±2.	4±2.	2±6.	9±2.	0±5.	3±1	1±4.	6±6.	7±5.	8±1	±0.3	0±0	0±0	0±0	0±0
	11	24	17	96	50	0.34	59	70	79	98	42	93	93	08	35	75	1.62	19	21	55	1.92	9	.00	.00	.00	.00
<i>L.macrocarpa</i>	45.0	53.7	58.5	45.7	70.4	48.0	76.6	61.9	55.0	60.3	71.4	74.5	74.5	68.8	62.2	43.9	25.7	3.68	5.04	12.6	10.0	11.0	0.0	3.2	0.0	0.0
	2±2.	0±7.	4±2.	9±3.	2±5.	3±2	5±9.	4±6.	1±0.	3±1.	4±2.	4±0.	4±0.	3±1	0±1	2±1.	9±3.	±11.	±3.8	2±0.	0±1.	0±6.	0±0	5±0	0±0	0±0
	49	35	26	41	47	2.32	18	81	67	11	97	93	93	3.08	1.64	18	08	74	5	79	31	05	.00	.00	.00	.00
<i>A.scholaris</i>	82.0	71.9	85.5	75.8	88.7	61.2	66.4	58.7	59.8	71.4	82.6	87.2	87.2	79.0	79.4	53.6	68.5	71.0	71.0	62.1	16.9	0.00	0.0	0.0	0.0	0.0
	3±9.	6±2.	9±4.	7±1	5±1	3±8.	4±5.	7±1	1±0.	3±6.	2±6.	3±4.	3±4.	5±6.	1±7.	5±4.	7±1	0±9.	3±1	3±1	4±0.	±0.0	0±0	0±0	0±0	0±0
	08	33	90	2.17	8.53	11	44	0.83	75	04	34	69	69	66	12	32	3.26	57	0.91	1.98	67	0	.00	.00	.00	.00
<i>A.aureum</i>	82.9	76.9	77.3	81.6	84.5	63.2	86.2	77.0	83.3	60.5	77.9	79.7	79.7	81.7	74.4	65.6	72.9	79.2	61.7	30.0	26.6	0.00	0.0	0.0	0.0	0.0
	4±6.	6±6.	1±1	2±8.	9±1	9±7.	7±1	1±2.	3±2	9±4.	5±8.	7±5.	7±5.	6±7.	5±4.	0±2	3±1	1±1	4±2.	0±1.	3±0.	±0.0	0±0	0±0	0±0	0±0
	94	38	1.22	73	0.85	72	0.33	69	2.14	45	77	88	88	73	77	3.02	0.41	4.90	28	02	29	0	.00	.00	.00	.00

Table 16 Dilution of benzene concentration for calibration curve preparation.

Benzene concentration (ul/0.5ml)	Peak area
0	0
0	0
0	0
1	999889
1	999863
1	999000
2	1999976
2	2065097
2	1999999

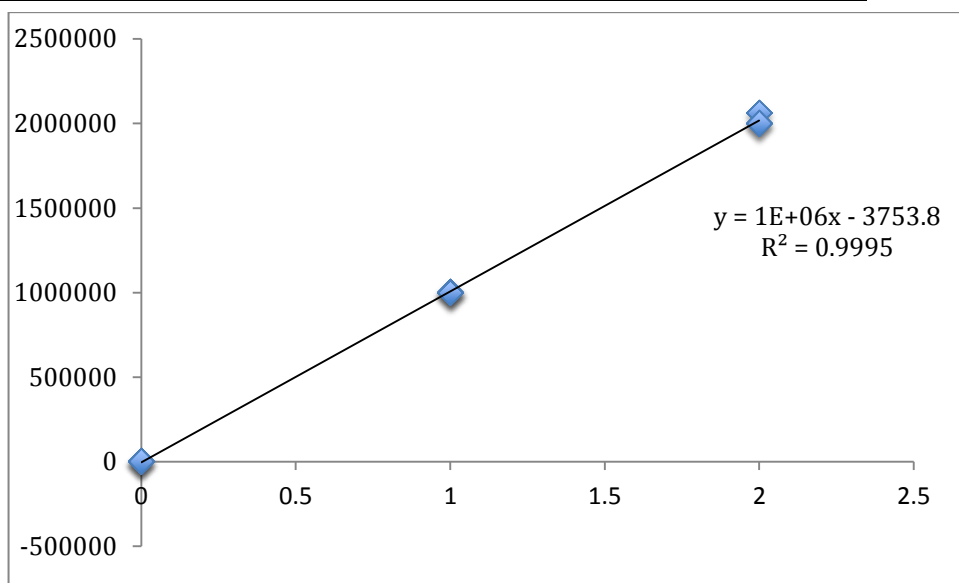
**Figure 14** Standard curves of dilution of benzene concentration related with peak height.

Table 17 The benzene removal percentage of biofilter with *P.putida* inoculation classifying by packing beads from various plant leaf materials.

	Time (day)																				
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Glass bead immobilized with <i>P.putida</i>																		9.5			
	9.6	0.4	10.0	13.2	1.94	3.86	5.9	2.02	7.16	3.05	10.1	14.1	0.00	1.7	1.5	8.15	0.0	3±2	13.0	10.0	12.0
	8±3	3±2	0±1.	2±1.	±12.	±6.3	2±0	±2.2	±0.1	±0.5	4±0.	0±1.	±2.6	0±0	4±1	±4.2	0±1	3.4	8±5.	0±2	0±5.
	.79	.81	64	80	68	3	.52	5	9	0	88	49	9	.65	.04	3	.03	1	25	3.41	25
Cassava-bead immobilized with <i>P.putida</i>	55.	71.					37.							14.	31.		26.	35.			
	56±	37±	65.0	62.7	70.4	41.5	77±	45.2	56.1	60.1	60.9	32.9	20.5	26±	49±	45.1	83±	51±	27.9	30.0	35.0
	2.3	4.8	3±6.	1±1	5±1	0±1.	3.1	8±3.	4±2	9±2	6±3.	7±3.	1±1	5.1	3.0	7±2.	3.7	2.4	5±8.	0±2.	0±8.
	4	0	85	8.29	1.18	86	6	01	0.28	6.21	62	89	4.55	0	5	01	6	4	42	44	42
<i>A.aureum</i> cassava-bead immobilized with <i>P.putida</i>	68.	86.					70.							54.	71.		47.	32.			
	85±	71±	100.	100.	100.	100.	46±	85.2	87.0	100.	100.	56.8	46.5	37±	65±	78.5	05±	60±	34.5	33.0	35.0
	2.6	4.7	00±	00±	00±	00±	6.5	4±0.	2±1	00±	00±	7±1	8±4.	9.1	3.1	9±1	2.2	0.8	6±2	0±0.	0±2
	0	6	0.00	0.00	0.00	0.00	5	00	6.00	0.00	0.00	4.44	07	2	5	8.63	1	2	1.73	82	1.73
<i>A.scholaris</i> cassava-bead immobilized with <i>P.putida</i>	70.	89.					64.							51.	69.		46.	43.			
	00±	80±	100.	100.	100.	100.	13±	82.8	88.7	100.	100.	63.4	48.7	64±	68±	86.2	64±	72±	49.9	44.0	50.0
	2.2	9.7	00±	00±	00±	00±	7.8	8±1	2±6.	00±	00±	3±3	8±1	3.0	3.5	2±1	1.5	5.5	2±1.	0±5.	0±1.
	7	5	0.00	0.00	0.00	0.00	1	5.25	47	0.00	0.00	2.74	2.99	8	7	1.77	2	8	92	58	92
<i>A.aureum</i> cassava-bead	35.	28.					12.											16.			
	09±	00±	25.0	21.0	26.0	24.0	00±	13.0	11.0	2.04	11.4	20.8	0.27	1.7	1.5	8.15	0.0	80±	2.25	0.00	0.00
	3.7	2.4	0±3.	0±4.	0±2.	0±7.	1.1	0±7.	0±7.	±4.4	5±2.	8±4.	±8.5	0±0	4±1	±4.2	0±1	3.5	±11.	±3.5	±11.
	2	5	28	39	75	91	7	51	96	6	70	13	8	.65	.04	3	.03	0	55	0	55
<i>A.scholaris</i> cassava-bead	43.	21.					12.														
	29±	81±	22.0	22.0	20.0	20.0	00±	13.0	15.0	12.4	0.17	0.25	3.29	1.7	1.5	8.15	0.0	3.9	0.00	0.00	0.00
	3.7	4.2	0±4.	0±3.	0±1.	0±1.	2.9	0±5.	0±8.	0±6.	±0.7	±0.4	±1.2	0±0	4±1	±4.2	0±1	6±9	±20.	±9.2	±0.0
	4	5	08	03	95	72	0	27	20	06	9	3	0	.65	.04	3	.03	.20	34	0	0

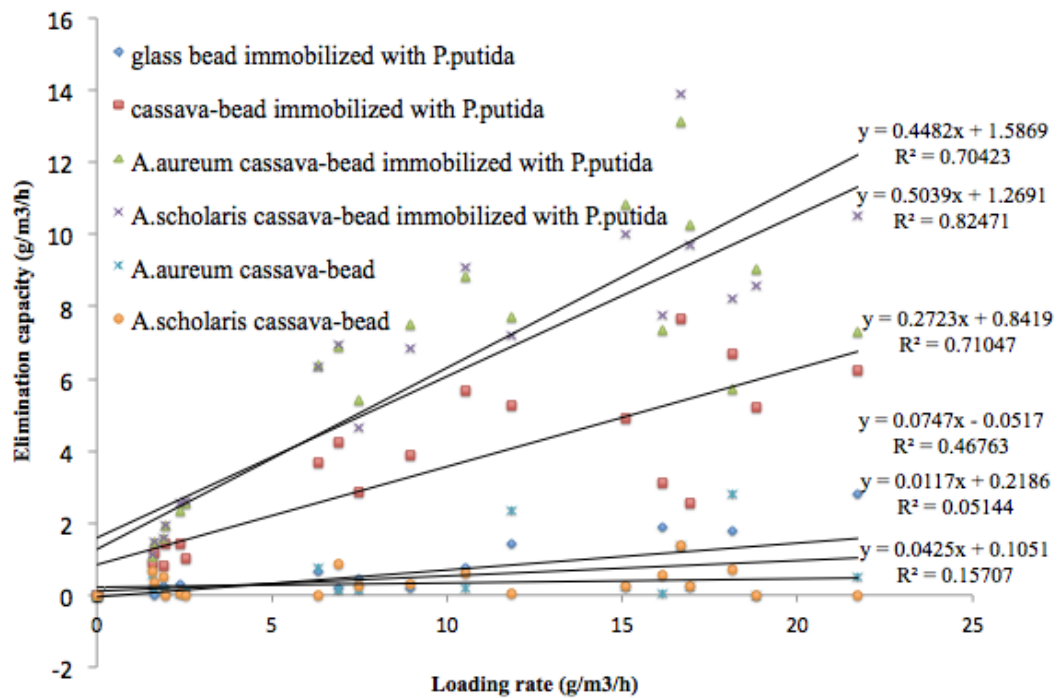


Figure 15 The relationship between elimination capacities (g/m³/h) and loading rate (g/m³/h) of 4 phases benzene removal by biofilter with various packing bead from different plant leaf materials.

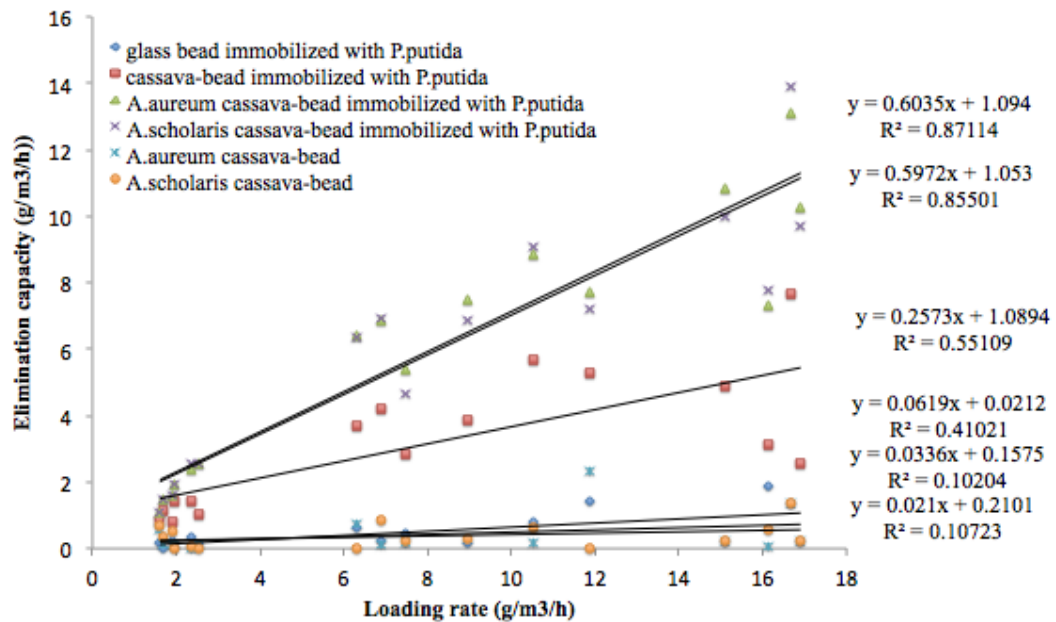


Figure 16 The relationship between elimination capacities (g/m³/h) and loading rate (g/m³/h) of 3 phases benzene removal by biofilter with various packing bead from different plant leaf materials.

Table 18 The benzene removal percentage of biofilter with *P.putida* inoculation classifying by various supporting medium.

	Time (day)																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>A.aureum</i> cassava-bead immobilized with <i>P.putida</i> (minimum medium)	80.45 ±4.44	82.06 ±15.0 0	83.06 ±13.0 0	73.21 ±18.0 2	72.92 ±12.9 6	56.07 ±7.99	76.1 0±2. 28	76.10 ±2.28	85.71 ±3.85	61.29 ±10.9 3	66.59 ±9.52	59.81 ±9.92	55.00 ±8.52	59.81 ±9.62	50.00 ±2.28	66.59 ±7.52	59.81 ±11.7 2	55.00 ±5.52	59.81 ±8.92	50.00 ±2.28
<i>A.aureum</i> cassava-bead immobilized with <i>P.putida</i> (sterile water)	69.59 ±5.15	71.60 ±8.50	75.60 ±8.40	52.19 ±0.91	53.48 ±0.36	36.63 ±0.27	56.4 9±1. 62	55.49 ±1.22	82.50 ±6.25	42.36 ±1.44	57.12 ±17.1 8	38.07 ±11.2 8	56.12 ±20.1 8	38.07 ±11.2 8	45.00 ±1.22	52.12 ±17.1 8	38.07 ±11.2 8	55.12 ±19.1 8	37.07 ±1.28	45.00 ±2.32
<i>A.aureum</i> cassava-bead immobilized with <i>P.putida</i> (enrichment medium)	86.71 ±4.76	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	70.46 ±0.00	85.2 4±0. 00	87.02 ±16.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0
<i>A.scholaris</i> cassava-bead immobilized with <i>P.putida</i> (enrichment medium)	89.80 ±9.75	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	64.13 ±0.00	82.8 8±5. 25	88.72 ±6.47	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0	100.0 0±0.0 0
<i>A.scholaris</i> cassava-bead immobilized with <i>P.putida</i> (minimum medium)	77.41 ±11.7 0	80.82 ±6.72	81.92 ±6.72	68.97 ±19.7 7	71.58 ±23.8 0	46.42 ±12.6 2	58.6 6±4. 56	57.76 ±5.56	80.24 ±10.0 4	58.71 ±9.93	70.06 ±9.95	74.66 ±8.09	69.06 ±11.9 5	73.66 ±7.09	48.00 ±4.56	68.06 ±6.95	69.00 ±8.09	60.00 ±11.0 9	44.00 ±8.09	48.02 ±6.56
<i>A.scholaris</i> cassava-bead immobilized with <i>P.putida</i> (sterile water)	72.41 ±7.59	70.18 ±12.2 2	69.18 ±13.2 2	58.12 ±9.88	58.50 ±9.70	33.34 ±6.04	54.1 7±0. 41	53.17 ±1.41	61.65 ±2.57	33.60 ±13.9 0	63.78 ±3.95	51.02 ±3.60	49.00 ±3.95	51.62 ±4.36	33.00 ±1.41	52.00 ±3.95	52.32 ±4.45	50.07 ±4.85	50.02 ±3.69	34.10 ±1.59

Appendix Calculation Data

Calculation of quantity of plant used for home or office

From the experiment, 130 cm² *D. sanderiana* can remove 70% of 20 ppm benzene within 24 h. Starting with Eq 1, V(L), volume of experimental system, is 15.6 L.

$$\text{mole of benzene} = \frac{0.7 \times 20 \times V(L)}{24.45 \times 10^6} \quad (\text{Eq 1})$$

$$\text{mole of benzene} = \frac{0.7 \times 20 \times 15.6}{24.45 \times 10^6} = 8.93 \mu\text{mole}$$

From the calculation, 8.93 μmole of benzene can be removal within 24 h.

Normally, maximum benzene contamination in ambient air in Bangkok, Thailand is around 7 $\mu\text{g}/\text{m}^3$. This benzene concentration can be converted to unit of ppm by Eq 2.

$$\text{Concentration (ppm)} = \frac{10^6 \times 24.45}{M_w} \times \left(\frac{W(g)}{V(L)} \right) \quad (\text{Eq 2})$$

W(g) is weight of benzene, and M_w is molecular weight of benzene that is 78.1.

$$\text{Concentration (ppm)} = \frac{10^6 \times 24.45}{78.1} \times \left(\frac{7 \times 10^{-6}}{1000} \right) = 0.0021$$

Number of 130 cm² *D. sanderiana* living plant for removing of 0.0021 ppm benzene concentration in the 6x4x3 m³ room within 24 h can be calculated by eq 3.

$$\text{Benzene } (\mu\text{mole}) = \frac{\text{Benzene concentration (ppm)} \times 0.7 \times V(L)}{24.45 \times 10^6} \quad (\text{Eq 3})$$

$$\text{Benzene } (\mu\text{mole}) = \frac{0.0021 \times 0.7 \times 6 \times 4 \times 3 \times 1000}{24.45 \times 10^6} = 4.32 \mu\text{mole}$$

From the calculation, eq 1 showed that 8.93 μmole of benzene can be removed within 24 h by 130 cm² *D. sanderiana*, so it is possible that 1 plant of 130 cm² *D. sanderiana* is enough for removing of 0.0021 ppm benzene concentration in the 6x4x3 m³ room within 24 h.

Calculation of quantity of plant used for industries

From the experiment, 130 cm² *D. sanderiana* can remove 70% of 20 ppm benzene within 24 h. Starting with Eq 1, V(L), volume of experimental system, is 15.6 L.

$$\text{mole of benzene} = \frac{0.7 \times 20 \times V(L)}{24.45 \times 10^6} \quad (\text{Eq 1})$$

$$\text{mole of benzene} = \frac{0.7 \times 20 \times 15.6}{24.45 \times 10^6} = 8.93 \mu\text{mole}$$

From the calculation, 8.93 μmole of benzene can be removal within 24 h.

Benzene contamination in work space in industries is around 50 ppm. Number of 130 cm^2 *D. sanderiana* living plant for removing of 50 ppm benzene concentration in the 6x4x3 m^3 room within 24 h can be calculated by eq 3.

$$\text{Benzene } (\mu\text{mole}) = \frac{\text{Benzene concentration (ppm)} \times 0.7 \times V(L)}{24.45 \times 10^6}$$

(Eq 3)

$$\text{Benzene } (\mu\text{mole}) = \frac{50 \times 0.7 \times 6 \times 4 \times 3 \times 1000}{24.45 \times 10^6} = 103,067.5 \mu\text{mole}$$

From the calculation, eq 1 showed that 8.93 μmole of benzene can be removed within 24 h by 130 cm^2 *D. sanderiana*, so it is possible that 11,541.8 plants of 130 cm^2 *D. sanderiana* is enough for removing of 50 ppm benzene concentration in the 6x4x3 m^3 room within 24 h.

