

1	1	1
7,92	9,10	20 × 20
1,94	2,85	9,18 50,86
		54,21
		25,27
1684,20	100 / 332,01	Camphene salicylate
	Limonene Methylbenzoate	5 / 1701,05 2886,85 1162,80

(2005)

(*Dianthus caryophyllus*)

Caryophyllaceae

Caryophyllene Eugenol
 Eliat benzoic
 Zuker) (2002

° 25

% 84	Eugenol	.2012/9/24	2012/2/13
Clery) % 1,4	0,1 Methylsalicylate		
	.(1999		

(/	5,4	3,6	1,8)	51	-	18
							3 - 1
			(2001)		Cymene		terpenoids
/	200		Chaboud			Pinene	Camphene Limonene
					benzenoids		Caryophyllene
					Ethylsalicylate		Methylbenzoate
(2006)					phenyl		Dimethylsalicylate
Mg-Nitro			/	(2)	Methyleugenol	Eugenol	propanoids
					(2003	Ju rrgens)	Methylisoeugenol
							terpenoids
El-		/	28,41	25,44			
			(2009)	Naggar			
50 0)	P ₂ O ₅			Red sim	() benzenoids
				(200 100	Eugenol		
					Eugenol		
Kocabas			100				
			(2009)	Kaplan			
				Darling			
			100 /	51,90			
					(1987)
			(2007)				
			15 - 13				
(2005)				20 - 8			
					(1982)		(1999)
					NPK		
			15		(1986)		

.()

Disbudding

SAS

Duncan

.(1990) %5

: 2010/3/26

Chabaud Jeanne Dionis

8

2009/9/1

20

.2009/10/15

2010/6/5

.° 46

:

× 10

25

D₂ D₁)

30 × 30 20 × 20 10

(D₃

5

1

%20

(N % 46)

.(2005 Hassan)

/ N 1170 780 0

25 2010/4/15

(N₂ N₁ N₀)

Hexane

0

(P₂O₅ % 18)

48

(P₂ P₁ P₀)

/ P₂O₅ 780 390

K₂O 200

Rotary evaporation

(K₂O % 50)

/

(1992) ° 45

27

5

9

)

13

ethyl acetate

100

(

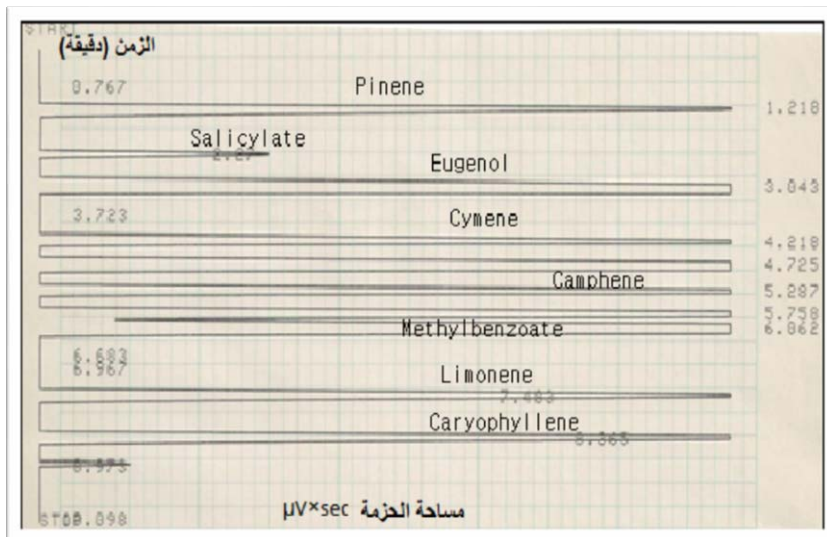
50 °

R-C-6 30 Ultra sonic path
 integrator (1)
 30 Sep-pak
 Pinene Eugenol 50
 Limonene Camphene Cymene Salicylate
 5 Methylbenzoate Caryophyllene 5 150
 20) 20
 (2) Shimadzu 10AV HPLC (1
 LC-10AV (Japan Koyoto)
 Royodyne 7125

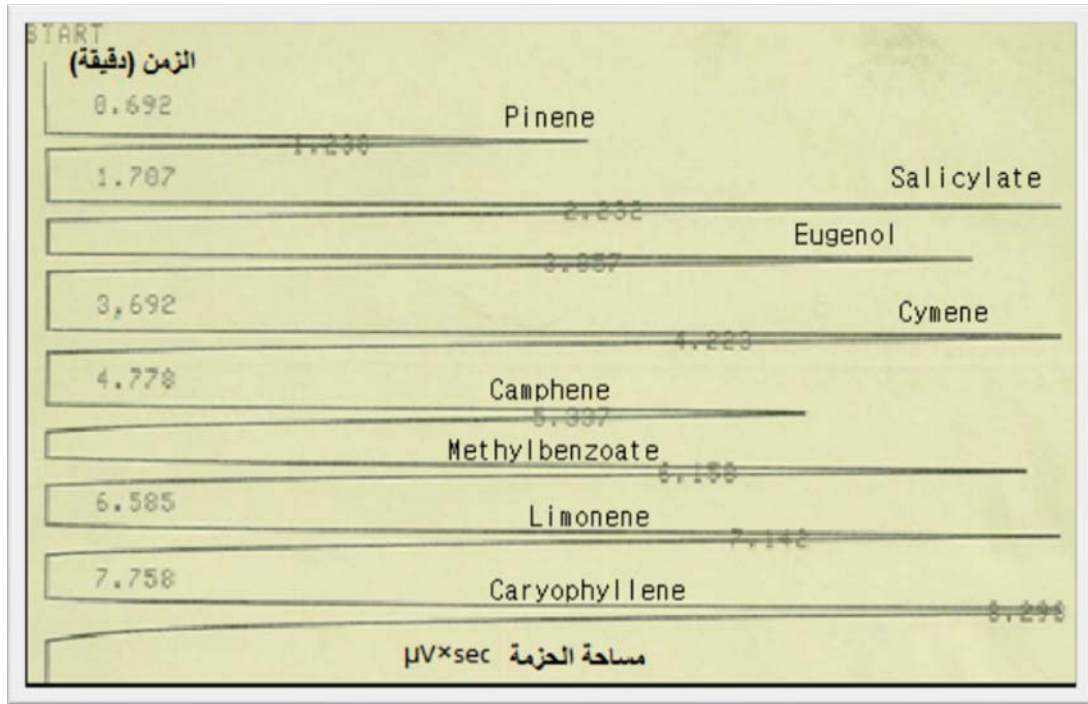
(F/C 50*4.6 mm ID) :
 :
 تركيز العينة (ميكروغرام/مل) = $\frac{\text{مساحة قمة العينة في النموذج}}{\text{مساحة قمة العينة في النموذج}} \times \text{تركيز العينة}$
 :
 1 (/ 70 : 30 : 1)

5 5 20 Uv-visible : /
 SPD-10AV UV

254



(1):



(2):

(1):

(%)	($\mu V \times sec$)	(%)	($\mu V \times sec$)	()		
8.437	76239	8.0763	13761	1.238	Pinene	1
3.9087	35320	11.7473	20016	2.232	Salicylate	2
25.8592	233673	9.5775	16319	3.057	Eugenol	3
6.2862	56884	11.6148	19790	4.220	Cymene	4
5.9476	53745	10.6886	18212	5.337	Camphene	5
14.5594	131564	11.2261	19128	6.158	Methylbenzoate	6
6.378	57634	12.8713	21931	7.142	Limonene	7

(2)

D₂N₂P₂

				9,18	9,70	50,86	
				20			
P ₁		20	10,71	D ₂ N ₂ P ₁			
						3,17	15,76
				D ₃		206,5	
				.P ₂	P ₁		N ₀
						D ₂	
							20
(ATP GTP CTP)				N ₂		D ₂	
.(1999							
) (NADPH NADP FAD)							
D ₃							
	N ₀						
		P ₁	P ₂)		DNA	RNA
							.(1989
		(2008	Pal Sarkar)	.(1991)	
D ₁	D ₃		N ₀				
				1985)	
							.(1987
)			
						.(1999	1990
					20		
					P ₂		
					N ₂		D ₂

:(2)

()	()	()	()	()	20 ()	()			
2.70 a	11.47 b	7.91 b	7.41 b	44.74 b	8.11 b	213.2 b	N0		
2.63 a	12.48 b	8.21 ab	7.81 ab	45.97 a	8.72 ab	220.9 a	N1		
2.61 a	13.57 a	8.53 a	8.18 a	46.85 a	9.21 a	223.1 a	N2		
2.66 ab	11.29 c	7.79 c	7.48 a	44.34 b	8.40 a	222.4 a	P0		
2.73 a	13.84 a	8.28 b	7.82 a	46.30 a	9.09 a	219.9 a	P1		
2.55 b	12.39 b	8.63 a	8.11 a	46.92 a	8.56 a	214.8 b	P2		
2.55 a	11.92 b	8.59 a	7.75 ab	44.25 b	8.37 b	219.6 a	D1		
2.73 a	13.23 a	8.44 a	8.15 a	48.24 a	9.46 a	218.5 a	D2		
2.66 a	12.36 ab	7.63 b	7.50 b	45.07 b	8.21 b	219.1 a	D3		
2.69 ab	10.23 e	7.62 d	7.04 b	43.78 e	7.60 b	217.0 cd	P0		
2.88 a	12.68 bcd	7.90 cd	7.50 ab	44.65 de	8.79 ab	210.8 ef	P1	N0	
2.53 b	11.50 cde	8.22 bcd	7.70 ab	45.81 bcd	7.95 ab	208.5 f	P2		N × P
2.62 ab	11.31 de	7.70 d	7.57 ab	44.15 de	8.47 ab	226.0 a	P0		
2.71 ab	13.96 ab	8.28 bcd	7.73 ab	46.77 abc	9.00 ab	222.0 abc	P1	N1	
2.58 ab	12.16 bcde	8.65 ab	8.15 ab	47.00 ab	8.69 ab	214.8 de	P2		
2.67 ab	12.32 bcd	8.07 bcd	7.82 ab	45.11 cde	9.12 ab	224.3 ab	P0		
2.61 ab	14.87 a	8.50 abc	8.24 ab	47.48 ab	9.47 a	225.3 a	P1	N2	
2.54 ab	13.51 abc	9.03 a	8.48 a	47.95 a	9.03 ab	219.5 bcd	P2		
2.77 a	11.04 c	8.32 abc	7.62 b	43.49 f	8.05 b	216.0 bc	N0		
2.51 ab	12.06 bc	8.45 ab	7.81 ab	44.27 ef	8.43 b	218.8 abc	N1	D1	
2.37 b	12.65 bc	9.00 a	7.84 ab	44.98 def	8.64 b	224.0 a	N2		
2.59 ab	11.99 bc	7.93 bcd	7.44 b	46.85 bc	8.54 b	214.2 cd	N0	D2	
2.79 a	12.94 abc	8.53 ab	8.12 ab	48.34 ab	9.36 ab	220.7 ab	N1		D × N
2.81 a	14.77 a	8.85 a	8.89 a	49.53 a	10.48 a	220.7 ab	N2		
2.74 a	11.38 bc	7.48 d	7.18 b	43.89 ef	7.76 b	209.5 d	N0		
2.60 ab	12.42 bc	7.65 cd	7.52 b	45.31 cde	8.38 b	223.3 a	N1	D3	
2.65 ab	13.28 ab	7.75 cd	7.81 ab	46.02 cd	8.50 b	224.5 a	N2		
2.66 ab	11.20 cd	8.45 bc	7.66 ab	43.77 ef	8.20 ab	225.8 a	P0		
2.58 ab	12.70 bcd	8.63 ab	7.71 ab	44.42 de	8.60 ab	220.8 ab	P1	D1	
2.41 b	11.86 cd	8.68 ab	7.90 ab	44.56 de	8.32 ab	212.2 c	P2		
2.75 ab	11.89 cd	7.78 cde	7.84 ab	46.99 bc	9.39 a	221.2 ab	P0		D × P
2.75 ab	14.82 a	8.35 bcd	8.13 ab	48.59 ab	9.84 a	219.0 b	P1	D2	
2.69 ab	12.98 abc	9.18 a	8.49 a	49.15 a	9.15 ab	215.3 bc	P2		
2.58 ab	10.77 d	7.15 e	6.93 b	42.27 f	7.60 b	220.3 ab	P0	D3	
2.87 a	13.99 ab	7.70 de	7.31 ab	45.90 cd	8.83 ab	220.0 b	P1		
2.54 ab	12.32 bcd	8.03 bcd	7.94 ab	47.06 bc	8.21 ab	217.0 bc	P2		
2.89 ab	10.03 d	8.15 bcdef	7.51 ab	43.35 ijkl	7.72 ab	219.5 bcdefgh	P0		
2.84 ab	11.78bcd	8.35 bcdef	7.53 ab	43.20 jkl	8.49 ab	216.5 defghi	P1	N0	D × N × P
2.58 ab	11.32 bcd	8.45 abcdef	7.81 ab	43.93 ghijkl	7.94 ab	212.0 hi	P2		
2.65 ab	11.49 bcd	8.35 bcdef	7.73 ab	43.90 hijkl	8.36 ab	226.5 abcde	P0		
2.49 b	13.07 abcd	8.50 abcde	7.72 ab	44.79 efghijk	8.50 ab	218.5 bcdefgh	P1	N1	D1
2.40 b	11.64 bcd	8.50 abcde	7.97 ab	44.13 ghijkl	8.43 ab	211.5 hi	P2		
2.45 b	12.09 abcd	8.85 abcde	7.73 ab	44.07 ghijkl	8.52 ab	231.5 a	P0	N2	
2.40 b	13.27 abcd	9.05 abcd	7.89 ab	45.26 efghij	8.83 ab	227.5 abc	P1		
2.26 b	12.61 abcd	9.10 abc	7.91 ab	45.62 efghij	8.59 ab	213.0 ghi	P2		
2.72 ab	10.54 cd	7.55 ef	7.18 ab	46.83 cdefgh	8.34 ab	216.0 efghi	P0		
2.65 ab	13.92 abc	7.80 cdef	7.43 ab	46.26 cdefghij	9.24 ab	214.5 fghi	P1	N0	
2.40 b	11.51 bcd	8.45 abcdef	7.73 ab	47.45 bcdef	8.04 ab	212.0 hi	P2		
2.74 ab	11.37 bcd	7.60 ef	7.94 ab	46.49 cdefghi	9.12 ab	224.0 abcdef	P0		
2.83 ab	14.79 ab	8.60 abcde	7.86 ab	49.41 abc	9.60 ab	220.5 bcdefgh	P1	N1	D2
2.80 ab	12.66 abcd	9.40 ab	8.57 ab	49.14 abcd	9.35 ab	217.5 cdefgh	P2		
2.79 ab	13.77 abcd	8.20 bcdef	8.40 ab	47.65 bcdef	10.68 a	223.5 abcdefg	P0		
3.17 a	15.76 a	8.65 abcde	9.08 ab	50.10 ab	10.71 a	222.0 abcdefgh	P1	N2	
2.86 ab	14.78 ab	9.70 a	9.18 a	50.86 a	10.06 a	216.5 defghi	P2		
2.46 b	10.14 d	7.15 f	6.44 b	41.16 l	6.74 b	215.5 fghi	P0	N0	D3

()	()	()	()	()	20 ()	()			
2.78 ab	12.36 abcd	7.55 ef	7.55 ab	44.48 fghijk	8.66 ab	206.5 i	P1	N1	
2.59 ab	11.66 bcd	7.75 cde	7.56 ab	46.04 defghij	7.88 ab	206.5 i	P2		
2.48 b	11.06 bcd	7.15 f	7.03 ab	42.05 kl	7.93 ab	227.5 abc	P0		
2.80 ab	14.03 abc	7.75 cde	7.61 ab	46.13 defghij	8.91 ab	227.0 abcd	P1		
2.53 b	12.18 abcd	8.05 cdef	7.91 ab	47.75 bcde	8.29 ab	215.5 fghi	P2	N2	
2.80 ab	11.11 bcd	7.15 f	7.33 ab	43.60 ijkl	8.14 ab	218.0 cdefgh	P0		
2.65 ab	15.58 a	7.80 cdef	7.74 ab	47.09 bcdefg	8.91 ab	226.5 abcde	P1		
2.51 b	13.14 abcd	8.30 bcdef	8.35 ab	47.39 bcdef	8.46 ab	229.0 ab	P2		

%5

(3)

(2)

54,21 1,94 2,85

.D₁N₁P₂

7,92

D₂N₂P₂

25,27

D₃N₁P₂

D₃N₂P₂

100 / 332,01

D₁

N₁

² / 460 D₁ ² / 1281

.D₃

² / 245 D₂

(2)

(3)

:(3)

()	()	()	()	()	()			
133.8 c	15.94 c	6.23 c	49.12 b	1.14 b	1.86 a	N0		
181.78 b	18.41 b	6.50 b	50.51 ab	1.33 a	2.04 a	N1		
197.30 a	22.29 a	6.78 a	51.83 a	1.34 a	2.01 a	N2		
157.72 c	16.77 c	6.13 c	49.68 a	1.04 c	1.69 b	P0		
170.80 b	17.81 b	6.51 b	50.35 a	1.28 b	1.92 b	P1		
184.35 a	18.94 a	6.86 a	51.42 a	1.51 a	2.30 a	P2		
94.18 c	12.81 c	6.40 b	52.79 a	1.47 a	2.37 a	D1		
131.82 b	18.41 b	6.70 a	49.73 b	1.25 b	1.91 b	D2		
286.88 a	22.29 a	6.41 b	48.93 b	1.01 b	1.63 c	D3		
106.20 d	14.92 d	5.98 d	48.13 c	0.90 c	1.61 d	P0	N × P	
143.29 c	15.31 d	6.17 cd	48.81bc	1.16 bc	1.84 bcd	P1		
151.92 c	17.58 c	6.54 bc	50.41abc	1.37 ab	2.13 abc	P2		
178.33 b	16.95 c	6.20 cd	49.76 abc	1.07 bc	1.82 cd	P0	N1	

()	()	()	()	()	()	()	()	()
180.76 b	18.97 b	6.50 bc	50.48 abc	1.35 ab	1.99 abcd	P1		
186.25 b	19.32 ab	6.80 b	51.29 abc	1.59 a	2.31 ab	P2		
188.64 b	18.45 b	6.21 cd	51.16 abc	1.14 bc	1.64 cd	P0		
188.35 b	19.14 ab	6.87 ab	51.76 ab	1.32 ab	1.95 bcd	P1	N2	
214.89 a	19.92 a	7.24 a	52.57 a	1.57 a	2.45 a	P2		
57.20 f	12.12 g	6.12 d	51.69 abc	1.26 bc	2.14 bc	N0		
112.02 e	13.34 f	6.42 bcd	52.72 ab	1.63 a	2.63 a	N1	D1	
113.31 e	12.98 f	6.65 abc	53.97 a	1.52 ab	2.34 ab	N2		
115.10 e	15.30 e	6.34 bcd	48.33 cd	1.14 c	1.85 cd	N0		
129.41 e	18.48 d	6.71 ab	49.84 bcd	1.28 bc	1.87 cd	N1	D2	D × N
150.97 d	21.46 b	7.03 a	51.02 abc	1.32 bc	2.03 bcd	N2		
229.12 c	20.39 c	6.23 cd	47.34 d	1.02 c	1.59 d	N0		
303.91 b	23.41 a	6.37 bcd	48.96 cd	1.09 c	1.62 d	N1	D3	
327.61 a	23.08 a	6.62 abc	50.50 bcd	1.19 c	1.67 cd	N2		
91.33 e	12.31 g	6.06 e	51.88 abc	1.20 bc	2.15 ab	P0		
95.56 e	12.73 fg	6.44 bcde	52.74 ab	1.54 a	2.39 a	P1	D1	
95.64 e	13.39 f	6.70 b	53.76 a	1.67 a	2.57 a	P2		
120.10 d	17.59 e	6.23 cde	49.10 cd	0.96 c	1.48 c	P0		
124.68 d	18.27 e	6.58 bc	49.73 bcd	1.20 bc	1.73 bc	P1	D2	D × P
150.69 c	19.38 d	7.28 a	50.35 bcd	1.59 a	2.54 a	P2		
261.75 b	20.42 c	6.10 de	48.06 d	0.94 c	1.43 c	P0		
292.16 a	22.41 b	6.52 bcd	48.59 cd	1.10 bc	1.66 c	P1	D3	
306.73 a	24.05 a	6.61 bc	50.16 bcd	1.26 b	1.79 bc	P2		
52.87 g	11.67 k	6.00 gh	50.41 abcd	1.11 defg	1.98 abcdef	P0		
59.56 g	11.73 k	6.07 fgh	51.68 abcd	1.31 bcdefg	2.14 abcdef	P1	N0	
59.17 g	12.95 jk	6.29 bcdefgh	52.97 abc	1.35 bcdefg	2.30 abcde	P2		
109.57 f	12.63 jk	6.07 fgh	51.50 abcd	1.19 cdefg	2.38 abcde	P0		
115.16 f	13.62 hij	6.30 bcdefgh	52.46 abcd	1.77 ab	2.68 ab	P1	N1	D1
111.34 f	13.78 hij	6.89 bcde	54.21 a	1.94 a	2.85 a	P2		
111.55 f	12.63 jk	6.10 efgh	53.74 ab	1.32 bcdefg	2.10 abcdef	P0		
111.96 f	12.85 jk	6.95 bc	54.08 ab	1.52 abcdef	2.35 abcde	P1	N2	
116.42 f	13.45 hij	6.92 bcd	54.10 ab	1.72 abc	2.58 abc	P2		
113.37 f	14.45 hi	6.00 gh	47.66 bcd	0.81 g	1.33 f	P0		
113.76 f	14.65 h	6.13 defgh	48.15 abcd	1.09 defg	1.80 bcdef	P1	N0	
118.17 ef	16.81 g	6.90 bcde	49.17 abcd	1.52 abcdef	2.41 abcd	P2		
122.08 ef	18.03 fg	6.37 bcdefgh	49.54 abcd	1.05 efg	1.60 def	P0	N1	D2
128.48 ef	18.50 f	6.75 bcdefg	49.92 abcd	1.21 cdefg	1.65 def	P1		
137.66 ef	18.90 ef	7.02 b	50.07 abcd	1.59 abcde	2.35 abcde	P2		
124.84 ef	20.28 de	6.34 bcdefgh	50.12 abcd	1.03 fg	1.50 def	P0		
131.81 ef	21.67 cd	6.85 bcdef	51.13 abcd	1.29 bcdefg	1.74 cdef	P1	N2	
196.25 d	22.42 bc	7.92 a	51.81 abcd	1.65 abc	2.85 a	P2		
152.37 e	18.63 f	5.94 h	46.32 d	0.79 g	1.51 def	P0		
256.56 c	19.56 ef	6.32 bcdefgh	46.61 cd	1.07 efg	1.57 def	P1	N0	
278.42 bc	22.99 bc	6.44 bcdefgh	49.09 abcd	1.21 cdefg	1.69 cdef	P2		
303.34 ab	20.18 e	6.17 cdefgh	48.24 abcd	0.97 fg	1.47 ef	P0		
298.63 ab	24.78 a	6.44 bcdefgh	49.06 abcd	1.06 efg	1.64 def	P1	N1	D3
309.75 ab	25.27 a	6.50 bcdefgh	49.58 abcd	1.24 bcdefg	1.75 cdef	P2		
329.53 a	22.42 bc	6.19 cdefgh	49.61 abcd	1.07 efg	1.32 f	P0		
321.29 a	22.90 bc	6.80 bcdefg	50.09 abcd	1.17 cdefg	1.76 cdef	P1	N2	
332.01 a	23.90 ab	6.88 bcde	51.80 abcd	1.35 bcdefg	1.94 bcdef	P2		

.%5

(3)

D₃

Methylbenzoate Camphene Salicylate
 1162,80 1684,20 Limonene
 5 / 1701,05 2886,85
 D₃N₀P₂

Cymene Caryophyllene
 5 / 2459,00 1420,60
 D₃N₂P₀ D₃N₁P₀
 Eugenol
 5 / 4661,20 4418,45

1821,15 D₁N₁P₁ (1996) Hamman
 Pinene
 5 /
 (3)
 (4)
 .D₃
 (2)

D₃
 Methylbenzoate Salicylate
 Limonene Camphene
 ATP,NADPH₂,NADH₂
 Acetyl-coA
 Benzenoids Pyruvic acid
 Eugenol Isoprenoids Mevalonic acid
 (Methylbenzoate Salicylate) Cinnamic Terpenes
 Benzenoids Benzenoids acid
 Phenylpropanoids Phenylpropanoids
 Benzenoids Cinnamic acid (2004 Xiao-Jun 2007 Minmin)
 Phenylalanine Trans-cinnamic acid
 Phenylpropanoids Benzenoids
 .Benzenoids (4)
 Isoprenoids
 D₃N₂P₂

Mevalonate
(2007 Minmin)

(5 /) : (4)

Limone	Methylbenzoate	Camphene	Cymene	Eugenol	Salicylate	Pinene	Caryophyllene		
393.01 b	315.80 c	380.08 c	819.17 a	1988.22 c	345.07 b	644.46 c	309.91 a	N0	
452.69 b	430.61 b	507.99 b	627.76 b	3105.37 a	492.31 a	1232.00 a	216.09 b	N1	
688.86 a	756.89 a	622.36 a	467.31 c	2544.18 b	522.73 a	997.36 b	181.05 c	N2	
380.45 b	259.53 c	458.47 a	385.09 c	2923.82 a	292.78 c	785.51 c	107.55 c	P0	
470.11 b	457.44 b	535.54 a	659.99 b	2482.32 b	475.85 b	1115.59 a	164.74 b	P1	
683.99 a	786.33 a	516.42 a	869.16 a	2231.63 c	591.48 a	972.71 b	434.77 a	P2	
323.38 b	314.24 b	374.58 b	275.77 b	1356.59 c	255.32 b	1113.49 b	110.73 c	D1	
416.17 b	279.51 b	374.07 b	194.62 b	2809.34 b	203.80 b	510.51 c	148.81 b	D2	
795.01 a	909.55 a	761.78 a	1443.84 a	3471.84 a	900.99 a	1249.81 a	447.51 a	D3	
274.30 d	207.34 e	336.68 e	524.22 de	2101.47 e	153.14 e	504.25 d	120.43 f	P0	
372.52 cd	303.73 d	421.93 cde	869.50 b	1981.03 e	361.90 cd	768.67 c	205.80 d	P1	N0
532.20 bc	436.33 c	381.63 de	1063.78 a	1882.15 e	520.18 ab	660.45 cd	603.50 a	P2	
363.22 cd	256.65 de	486.57 bcd	404.50 e	3601.82 a	383.17 cd	1136.32 ab	107.83 f	P0	
429.67 bcd	443.22 c	493.46 bcd	659.33 cd	2994.58 b	475.68 bc	1367.90 a	165.20 e	P1	N1
565.20 bc	591.95 b	543.93 bc	819.43 b	2719.72 c	618.08 a	1191.78 ab	375.25 b	P2	
503.83 bc	314.60 d	552.15 bc	226.54 f	3068.17 b	342.03 d	715.97 cd	94.38 f	P0	
608.15 b	625.38 b	691.23 a	451.15 e	2471.35 d	589.97 ab	1210.20 ab	123.22 f	P1	N2
954.58 a	1330.70 a	623.70 ab	724.50 bc	2093.02 e	636.18 a	1065.90 b	325.55 c	P2	
227.97 e	164.88 e	178.97 e	317.47 d	557.97 h	154.81 de	503.10 e	156.37 de	N0	
246.62 e	241.45 de	393.32 d	275.17 d	1991.20 f	492.80 c	1528.30 ab	97.65 f	N1	D1
495.55 bcd	536.38 c	551.47 c	234.69 d	1520.60 g	118.35 e	1309.10 bc	78.18 f	N2	
351.95 de	255.12 de	375.95 d	235.37 d	2693.72 d	152.38 de	455.80 e	172.18 d	N0	
433.80 cde	272.52 d	354.01 d	186.10 d	3279.05 c	178.55 de	566.80 e	144.35 de	N1	D2
462.77 cd	310.90 d	392.25 d	162.40 d	2455.25 e	280.47 d	509.00 e	129.90 e	N2	
599.10 bc	527.41 c	585.33 c	1904.67 a	2712.97 d	728.03 b	974.50 d	601.18 a	N0	
677.67 b	777.85 b	776.63 b	1422.00 b	4045.87 a	805.58 b	1601.00 a	406.28 b	N1	D3
1108.25 a	1423.40 a	923.37 a	1004.85 c	3656.68 b	1169.37 a	1174.00 cd	335.07 c	N2	
226.03 e	219.45 d	323.95 ef	148.62 ef	1936.60 e	225.84 de	980.70 c	57.73 d	P0	
311.08 de	315.08 d	530.08 cd	316.48 d	1295.95 f	257.10 de	1258.20 b	138.52 c	P1	D1
433.02 cde	408.18 c	269.72 f	362.22 d	837.22 g	283.02 de	1101.57 bc	135.95 c	P2	
305.33 de	246.92 d	450.91 de	82.08 f	2936.70 cd	197.83 ef	446.62 d	134.00 c	P0	
424.47 cde	277.15 d	383.91 ef	230.42 def	2791.33 d	331.33 d	540.38 d	152.52 c	P1	D2
518.72 bcd	314.47 d	287.38 f	271.37 de	2699.98 d	82.23 f	544.53 d	159.92 c	P2	
609.98 bc	312.23 d	600.53 bc	924.55 c	3898.15 a	454.67 c	929.22 c	130.92 c	P0	
674.78 b	780.10 b	692.63 b	1433.08 b	3359.68 b	839.12 b	1548.18 a	203.18 b	P1	D3
1100.25 a	1636.33 a	992.17 a	1973.88 a	3157.68 bc	1409.20 a	1272.03 b	1008.43 a	P2	
179.65 e	93.55 h	122.15 k	227.65 hijk	984.55 k	110.98 i	517.40 f	78.25 kl	P0	
183.00 e	192.75 gh	203.45 jk	328.15 ghij	333.15 l	142.45 hi	534.95 f	196.90 def	P1	N0
321.25 cde	208.35 fgh	211.30 jk	396.60 gh	356.20 l	211.00 ghi	457.00 f	193.95 defg	P2	
182.80 e	229.15 fgh	432.00 d-h	117.00 ijk	2908.75 defg	454.10 cdef	1330.95 b-e	49.10 l	P0	
191.85 e	238.95 fg	524.75 cdefg	334.65 ghij	1941.20 ij	508.30 cde	1821.15 a	125.20 kij	P1	N1
365.20 cde	256.25 fg	223.20 ijk	373.85 ghi	1123.65 k	516.00 cde	1432.75 a-d	118.65 kij	P2	
315.65 cde	335.65 fg	417.70 efghij	101.22 jk	1916.50 ij	112.45 i	1093.75 de	45.85 l	P0	
558.40 bcde	513.55 e	862.05 b	286.65 ghijk	1613.50 j	120.55 hi	1418.50 a-e	93.45 kjl	P1	N2
612.60 bcd	759.95 d	374.94 efghijk	316.20 ghijk	1031.80 k	122.05 hi	1414.95 a-e	95.25 kjl	P2	
209.30 de	224.25 fgh	392.94 efghij	100.00 jk	2705.05 efgh	102.85 i	388.40 f	140.35 hij	P0	
354.20 cde	245.70 fg	486.45 cdefgh	270.00 ghijk	2676.50 fgh	303.55 fgh	460.95 f	180.25 efgh	P1	N0
492.35 bcde	295.40 fg	248.45 ijk	335.75 ghij	2699.60 efgh	50.73 i	517.90 f	195.95 def	P2	
346.15 cde	228.40 fgh	443.05 defghij	91.90 jk	3478.25 bc	136.20 hi	516.50 f	136.60 hij	P0	
441.55 bcde	286.45 fg	338.94 fghijk	215.55 hijk	3192.55 cd	305.80 fgh	610.10 f	146.40fghij	P1	N1
513.70 bcde	302.70 fg	280.05 ghijk	250.85 hijk	3166.35 cde	93.65 i	573.65 f	150.05 fghi	P2	
360.55 cde	288.10 fg	516.75 cdefg	54.00 k	2626.80 fgh	354.45 efg	434.95 f	125.05 ijk	P0	N2

Limonene	Methylbenzoate	Camphene	Cymene	Eugenol	Salicylate	Pinene	Caryophyllene				
477.65 bcde	299.30 fg	326.35 fghijk	205.70 hijk	2504.95 gh	384.65 defg	550.10 f	130.90 hijk	P1			
550.10 bcde	345.30 f	333.65 fghijk	227.50 hijk	2234.00 hi	102.30 i	542.05 f	133.75 hij	P2			
434.00 bcde	304.23 fg	494.95 cdefgh	1244.65 e	2614.80 fgh	245.60 ghi	606.95 f	142.70 ghij	P0			
580.35 bcde	472.75 e	575.90 cdef	2010.35 b	2933.45 defg	639.70 c	1310.10 b-e	240.25 d	P1	N0		
783.00 b	805.25 d	685.15 bcd	2459.00 a	2590.65 fgh	1298.80 b	1006.65 e	1420.60 a	P2			
560.70 bcde	312.40 fg	584.85 cdef	1004.60 f	4418.45 a	559.20 cd	1561.50 abc	137.80 hij	P0			
655.60 bc	804.25 d	616.70 cde	1427.80 de	3850.00 b	612.95 c	1672.45 ab	224.00 de	P1	N1	D3	
816.70 b	1216.90 b	1128.55 a	1833.60 bc	3869.15 b	1244.60 b	1568.95 abc	857.05 b	P2			
835.30 b	320.05 fg	722.00 bc	524.40 g	4661.20 a	559.20 cd	619.20 f	112.25 kij	P0			
788.40 b	1063.30 c	885.30 b	861.10 f	3295.60 cd	1264.70 b	1662.00 ab	145.30fghij	P1	N2		
1701.05 a	2886.85 a	1162.80 a	1629.05 cd	3013.25 def	1684.20 a	1240.78 cde	747.65 c	P2			

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Cymene Caryophyllene

Eugenol

Camphene Pinene

Cymene Caryophyllene

Eugenol

Minmin)

Pinene

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Dianthus caryophyllus L. .

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The Effect of Nitrogen and Phosphorus Fertilization and Planting Space on Vegetative Growth, Flowering and the Essential Oil Content of *Dianthus caryophyllus*.

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ABSTRACT

This experiment included three factors: First, three plant spacing. Second, three levels of Nitrogen fertilizer. Third, three levels of Phosphorus fertilizer. The results showed that high levels of nitrogen and phosphors added to plant spacing 20*20 cm had caused increased in length stem flower , number of leaves, diameter of stem flower and vase life (50.86 cm, 9.18 leaves , 9.10mm , 7,92 day) respectively. While the middle level of nitrogen and high level of phosphors added to plant spacing 10*10cm caused a increase in weight of flower, weight of petals and diameter of flower (2.85 gm, 1.94 gm , 54.21 cm) respectively. While the middle level of nitrogen and high level of phosphors added to plant spacing 30*30cm caused a high number of flower (25.27) that significant increase for most treatment. The results showed that high levels of nitrogen and phosphors added to plant spacing 30*30 cm had caused high essential oil content (332.01) mg/100 gm because of a significant increase in contents salicylate, camphene , methyl benzoate and limonene (1684.20 , 1162.80 , 2886.85 , 1701.05) $\mu\text{g}/5$ gm respectively.

Keywords: Ornamental Plants; Carnation ; Nutrition; Fertilizer; Planting Space; Nitrogen; Phosphorus.

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