

*Phoenix dactylifera*

(1 )

(2011 / 1 / 31 2010 / 11 /28 )

.( 72)

*Phoenix dactylifera*

(a, b, c)

. (2000000>, 45000, 251)

:

# Qualitative and Quantitative Analysis of Amino Acids Isolated from Protein of *Phoenix dactylifera* and Determination of Molecular Weight by Gel Filtration (part I)

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## ABSTRACT

The research was concerned with Amino Acid Analysis of the protein isolated from the crude aqueous extract of ground date seeds *Phoenix dactylifera*.

Two types of analysis acidic and basic hydrolysis were performed for (72 hours). Acidic hydrolysis showed absence of some amino acids and a decrease in the intensity of the peaks. On the other hand, basic hydrolysis showed higher intensity of peaks for the same aqueous extract.

The research also involved separation of the proteinous components from the aqueous extract of ground date seeds *Phoenix dactylifera*. Three major proteins (a, b, c) were isolated and their molecular weight were determined by gel filtration and showed the following values (>2000000, 45000, 251) Dalton Respectively.

**Keywords:** *Phoenix dactylifera*, Amino acid analysis, Gel-filtration technique

. 287-372

*Phoenix*

Phamaeae

*dactylifera*

.( )

.(1972 )

%25

*Phoenix dactylifera*

(Awadalla *et al.*, 2002 1991 )

(2008 1989 )

.....

1989 Awadalla *et al.* )

.(Vyawahare *et al.*, 2009 *al.*, 2002

(Vyawahare *et al.*, 2009 ; Al-Qarawi *et al.*, 2004 ; Kholif *et al.*, 2001)

1996 )

(Vyawahare *et al.*, 2009

(Vyawahare *et al.*, 2009)

%24.2	Caprinic acid 0.5%	Capric acid 0.7%		
Oleic and	Palmitic acid 9.9%	Myristic acid 9.3%	Lauric acid	
8.49%	62.5%	Stearic acid 3.2%	Linoleic acid 25.2%	
Awadalla <i>et al.</i> , 2002	2002	) 16.2%	5.22%	

(Vyawahare *et al.*, 2009

Vyawahare *et al.*, 2009: Al-Farsi, 2005; Sawaya *et al.*, )

.(1984

### Growth Hormones

4-2

.(Al-Qarawi *et al.*, 2004; Awadalla, 2002; Youssef *et al.*, 2001)

:

(*Phoenix dactylifera*)

Amino acid analysis

(250)

10

°(190-140)

(3:1)

(  
-1545 MSC )

) Ultra Sound

( ) /( )

30 (PC

(6000xg)

(Lyophilizer)

.(Whitaker, 1963 ; Elmore, 1968)

( )

( 4)

: (60:40)

(6000xg)

24

(Lyophilizer)

20

( 0.2)

(Church *et al.*,1983)

( 10)

.....

BSA

(Schactele and Pollack, 1973)

. 280 0.67

( 0.2)

(6N)

3

3

(5N)

3

( 72)

( 110)

( ) ,(Model No L-8900-Hitachi)

(Amino acid analyzer)

.(Clark and Switzer, 1977 ; Elmore, 1968)

(105×2.5)

(Gel Filtration)

Fraction collector

(Sephadex G-100)

( )

.(Andrews, 1965) 280

.(Skoog, 2006 ; Andrews, 1965)

(1)

.(Elmore, 1968; Whitaker, 1963)

(Schactele and Pollack, 1973)

:1

(%)	( )	( )	(%)	( )	( )	( / )	
34.1	900	250	1.1	2640	1760	1.5	

(5N)

(6N)

( )

( 110)

(Farmer *et al.*, 2006 ; Clark and Switzer, 1977; Elmore, 1968; Colawic and Kaplan, 1963)

( 72)

(Threonine)

(Serine)

(Valine)

(Isoleucine)

(Miedel *et al.*, 1989 ; Moor and Stain, 1963)

1 )

(R<sub>t</sub>)

(570-440)

.....

( + 3 2) ( + )  
 )  
 ( + 1 ) ( 18  
 .  
 (3 2)  
 (Valine) (Tryptophan)

20

(Tyrosin) (Beavan and Holiday,1952) (Lysine)  
 (Valine) (Tryptophan)

(Serine) (Kaiser *et al.*,1974; Moor and Stain,1948)  
 (Threonine) (Methionine)  
 (Kaiser *et al.*,1974)  
 (Valine)

(Asparagine) (Clark and Switzer,1977; Elmore ,1968)  
 (Glutamin)  
 (Glutamic) (Aspartic)  
 (Arginine)

Farmer *et al.*, 2006; Michael and Hans, 1998; West and Carbb,1992 ; Yano *et al.*, 1990 Soby )  
 (Bassey, 2000; Karen *et al.*, 1998) (\*) (and Johnson,1981

( + 3+2 )  
 ) ( 2 )  
 (Methionne) ( 3

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K = A / (a.a) concentration : (\*)  
 = K / A = K

(Glutamic) (Aspartic) (Cohen *et al.*,1988)  
. (William and George, 2010 ; Todd *et al.*,2006)

(Threonine) (Methionine) (Lysine)

(Glutamic)

(Aspartic)

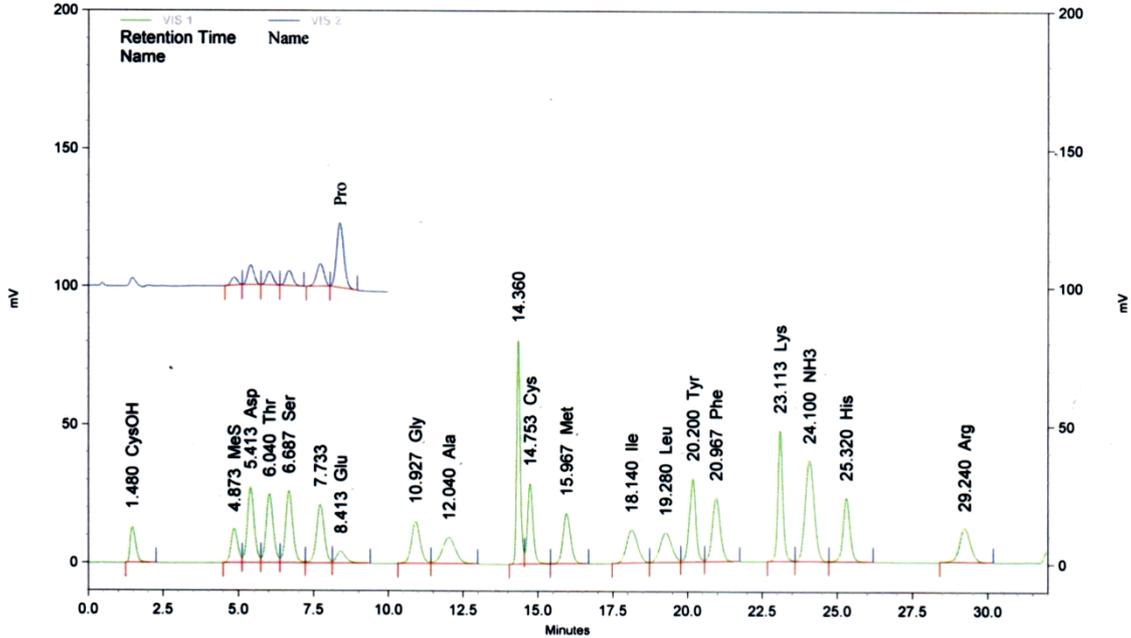
. (Vauquelin and Robiquet, 2005 ; Stegink, 1987)

.(Garattini, 2000)

+ :1

### Hitachi Amino Acid Analyzer Report

Analyzed: 11/5/2009 12:30:56 PM      Reported: 11/5/2009 2:36:57 PM  
 Data File: C:\EZChrom Elite\Enterprise\Projects\Default\Data\st. dahan 2-11-2009-Rep1.dat  
 Method: C:\EZChrom Elite\Enterprise\Projects\Default\Method\Std-PH operating Method.met  
 Sample ID: st.dahan  
 Vial Number: 1      Inj. Volume(uL): 20  
 Data Description: {Data Description}



VIS 1  
Results

PK #	RT	Name	Height	Area	%	ESTD Conc	Units
1	1.48	CysOH	52205	681402	2.77	125.000 CAL	nmol/ml
2	4.87	MeS	49384	772246	=	125.000 CAL	nmol/ml
3	5.41	Asp	109747	1761060	5.5	250.000 CAL	nmol/ml
4	6.04	Thr	99834	1676940	=	250.000 CAL	nmol/ml
5	6.69	Ser	104548	1744982	=	250.000 CAL	nmol/ml
7	8.41	Glu	17566	385180	=	250.000 CAL	nmol/ml
8	10.93	Gly	61356	1254233	=	250.000 CAL	nmol/ml
9	12.04	Ala	38027	1178935	=	250.000 CAL	nmol/ml
11	14.75	Cys	116546	1494019	=	250.000 CAL	nmol/ml
12	15.97	Met	73117	1314808	=	250.000 CAL	nmol/ml
13	18.14	Ile	48084	1268200	=	250.000 CAL	nmol/ml
14	19.28	Leu	43144	1198861	=	250.000 CAL	nmol/ml
15	20.20	Tyr	121544	1854925	=	250.000 CAL	nmol/ml
16	20.97	Phe	92637	1737732	=	250.000 CAL	nmol/ml
17	23.11	Lys	189989	2195118	=	250.000 CAL	nmol/ml
18	24.10	NH3	146274	3131011	=	250.000 CAL	nmol/ml
19	25.32	His	92875	1496500	=	250.000 CAL	nmol/ml
20	29.24	Arg	49412	1274061	=	250.000 CAL	nmol/ml

Totals			1506289	26420213	93.54	4250.000 CAL	
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VIS 2

Results

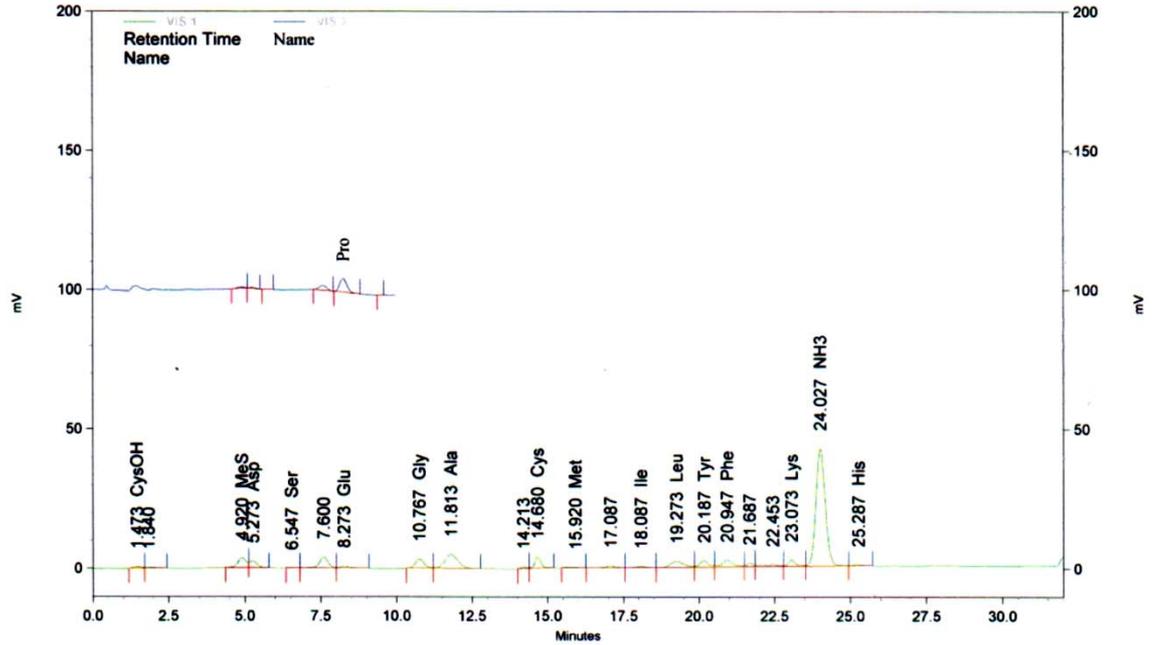
PK #	RT	Name	Height	Area	%	ESTD Conc	Units
6	8.387	Pro	94025	1584909	5.5	250.000 CAL	nmol/ml

Totals			94025	1584909	5.5	250.000 CAL	
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+ :2

### Hitachi Amino Acid Analyzer Report

Analyzed: 11/8/2009 6:05:12 PM      Reported: 11/8/2009 6:58:20 PM  
 Data File: C:\EZChrom Elite\Enterprise\Projects\Default\Data\STnb 8-11-Rep1.dat  
 Method: C:\EZChrom Elite\Enterprise\Projects\Default\Method\Std-PH operating Method.met  
 Sample ID: adib nb 8-11  
 Vial Number: 2      Inj. Volume(uL): 15  
 Data Description: {Data Description}



VIS 1 Results

PK #	RT	Name	Height	Area	%	ESTD Conc	Units
1	1.47	CysOH	2655	50321	1.56	9.2311	nmol/ml
3	4.92	MeS	14585	284691	7.77	46.081	nmol/ml
4	5.27	Asp	10237	176458	4.22	25.049	nmol/ml
5	6.55	Ser	692	10405	0.25	1.490	nmol/ml
7	8.27	Glu	3349	78021	8.53	50.639	nmol/ml
8	10.77	Gly	13535	286107	9.61	57.028	nmol/ml
9	11.81	Ala	20320	635828	22.72	134.83	nmol/ml
11	14.68	Cys	17051	242234	6.83	40.553	nmol/ml
12	15.92	Met	1033	27175	0.90	5.167	nmol/ml
14	18.09	Ile	2287	61698	2.05	12.162	nmol/ml
15	19.27	Leu	9388	306890	10.78	63.996	nmol/ml
16	20.19	Tyr	10102	203498	4.62	27.426	nmol/ml
17	20.95	Phe	10347	290101	7.03	41.73	nmol/ml
20	23.07	Lys	10322	185570	3.56	21.134	nmol/ml
21	24.03	NH3	169198	3647169	32.92	291.213	nmol/ml
22	25.29	His	1819	33452	0.94	5.588	nmol/ml

Totals			296920	6519618	124.29	833.3171	
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VIS 2 Results

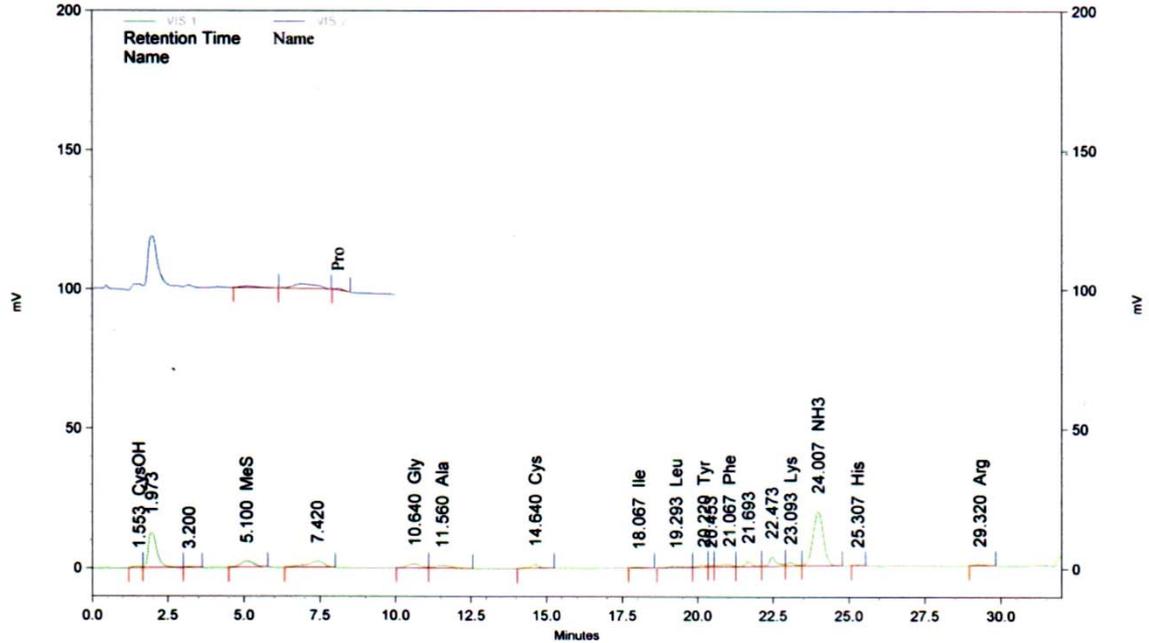
PK #	RT	Name	Height	Area	%	ESTD Conc	Units
5	8.253	Pro	19340	324292	8.622	51.15	nmol/ml

Totals			19340	324292	8.622	51.15	
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+ :3

### Hitachi Amino Acid Analyzer Report

Analyzed: 11/5/2009 4:31:01 PM      Reported: 11/8/2009 7:39:30 AM  
 Data File: C:\EZChrom Elite\Enterprise\Projects\Default\Data\faleh -2- 5-11-Rep1.dat  
 Method: C:\EZChrom Elite\Enterprise\Projects\Default\Method\Std-PH operating Method.met  
 Sample ID: faleh-na- 5-11  
 Vial Number: 3      Inj. Volume(µL): 15  
 Data Description: {Data Description}



VIS 1  
Results

PK #	RT	Name	Height	Area	%	ESTD Conc	Units
1	1.55	CysOH	2532	43614	2.09	8.001	nmol/ml
4	5.10	MeS	9002	281452	11.90	45.557	nmol/ml
6	10.64	Gly	6325	199667	10.40	39.799	nmol/ml
7	11.56	Ala	4207	169128	9.37	35.865	nmol/ml
8	14.64	Cys	6318	127998	5.60	21.418	nmol/ml
9	18.07	Ile	1116	26548	1.36	5.233	nmol/ml
10	19.29	Leu	2222	80229	4.37	16.730	nmol/ml
11	20.22	Tyr	3899	71207	2.50	9.597	nmol/ml
13	21.07	Phe	4252	128484	4.83	18.484	nmol/ml
16	23.09	Lys	6214	113606	3.38	12.938	nmol/ml
17	24.01	NH3	78706	1894044	39.5	151.233	nmol/ml
18	25.31	His	747	10466	0.45	1.748	nmol/ml
19	29.32	Arg	1900	42818	2.19	8.402	nmol/ml

Totals			127440	3189261	97.94	375.006	
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VIS 2  
Results

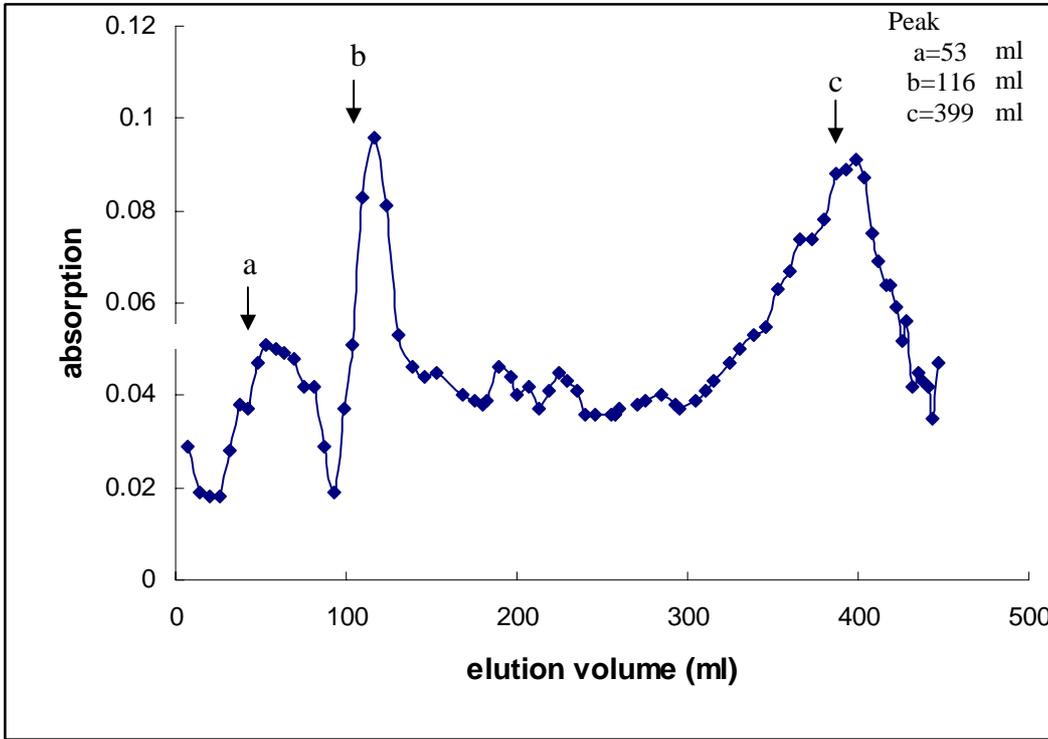
PK #	RT	Name	Height	Area	%	ESTD Conc	Units
3	8.107	Pro	2423	47112	1.94	7.431	nmol/ml

Totals			2423	47112	1.94	7.431	
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(Sephadex G-100)

(1) ( ) (Sephadex G-100) (105 × 2.5)  
 (Elution volume) (a ,b ,c)  
 (a ,b ,c) (53 116 339)

(2)



(*Phoenix dactylifera*)

:1

(105 × 2.5)

(7)

(a ,b ,c) (Sephadex G-100)

/ (42)

.....

:2

.(Sephadex G-100)

(105 × 2.5)

(%)	(%)	( )	( )	( / )	
	100	13.50	3	4.501	
88	31.2	4.21	68	0.062	(a)
	33.3	4.50	85	0.053	(b)
	23.0	3.10	148	0.021	(c)

(4)

(2)

.(Whitaker, 1963)

(105 × 2.5)

(2000000-204)

.(a ,b ,c)

(Sephadex G-100)

:3

(105×2.5)

.(Sephadex G-100)

( ) (Ve)		( )	
59.4	6.30	2000000	Blue dextran
98	4.83	67000	Bovine serum albumin (BSA)
110	4.65	45000	Eggs albumin
250	3.75	5750	Insulin hormone
410	2.30	204	Tryptophan

Void volume (Vo)

Elution volume (Ve)

(3)

(Blue dextran)

. 2000000 >

(a)

(a)

(Ve)

(b , c)

(2)

(b , c)

(Ve)

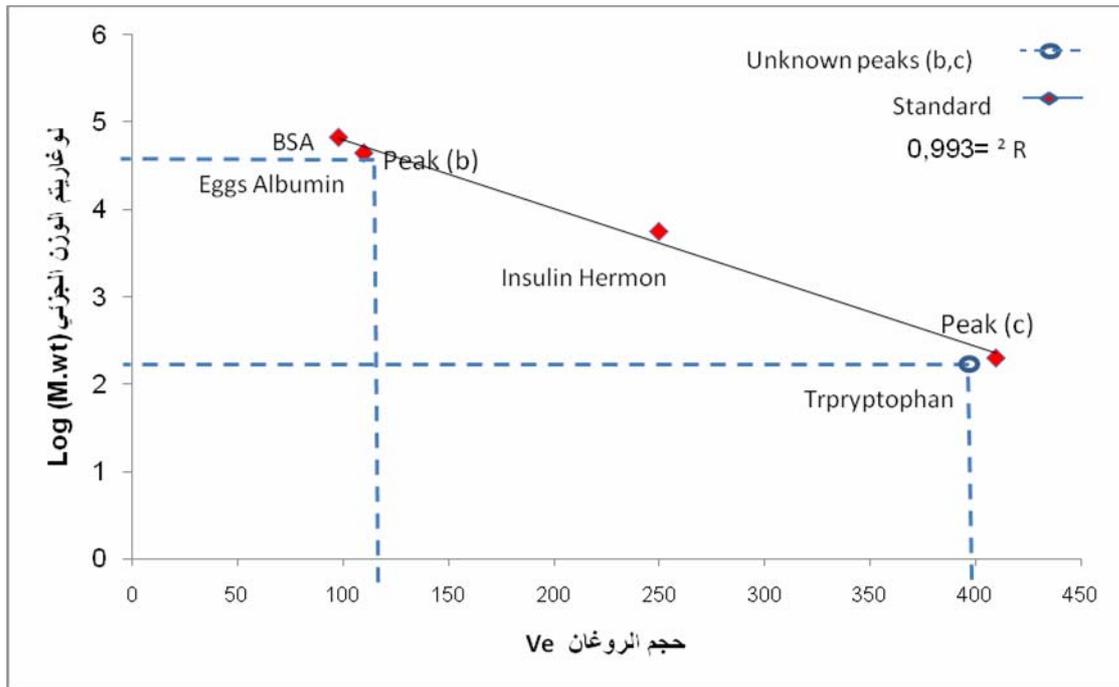
(116,399)

(2)

(45000, 251)

(b , c)

.(4)



.(b , c)

:2

:4

( )	( )	
2000000>	53	(a)
45000	116	(b)
251	399	(c)

-:

$$120 \times$$

=

$$120$$

(Valine) (Trptophan)

18

(16666 372 2 ~) (a ,b ,c)

(c) (a , b)

.(Ezzeddine and Al-Khalidi, 1981; Töple, 1976; Whitaker, 1963)

" (1972)  
.288  
.(2002)  
.1083 2  
8 1 .(1989)  
.30-20  
.1 / "( ) " : (1991)  
1 ( ) .(1996)  
.274-273  
(2008)  
.160-1

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