

*Pseudomonas aeruginosa*

(1) (1)

*Pseudomonas aeruginosa* 15  
Brain Heart Broth Tributrin Agar Cetermide Agar  
. 2008-2007

*Pseudomonas aeruginosa*  
8 = pH ° 35  
(%63.3)

*Pseudomonas aeruginosa* :

## **Isolation and Identification of *Pseudomonas aeruginosa* From Syrian Oily-soils and Evaluation its Production for Lipase**

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### **ABSTRACT**

Isolation and identification of *Pseudomonas aeruginosa* was screened from 15 samples of Syrian oily-soils to determine the ability to produce Lipase enzyme by Cetermide Agar, Tributrin Agar and Brain Heart Broth during 2007-2008 AD. The results showed that there were grown colonies with color of green or yellow-green surrounded with different diameter of clear zone in three samples and the identification by Mowasat Hospital revealed that it was *Pseudomonas aeruginosa*. In addition, the results showed that the optimum conditions to produce lipase was 35 C° with the pH degree of 8 and the time of production of lipase with highest activity of 63.3% was three days in submerged culture during the optimum conditions. These results illustrated the important of this isolates to produce and control lipase for industrial production.

**Keywords:** Isolation, Identification, Bacteria, *Pseudomonas aeruginosa*, Oily-Soils, Lipase.

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(Pavlova and Zholner, 1988)  
(He *et al.*, 2004)

200  
(Schallmey *et al.*, 2004)

30%  
(Uhlig, 1998)

(Jaeger *et al.*, 1996)

(Snellman and Colwell, 2004)  
(Godefrey and West, 1996)  
(Masse *et al.*, 2001)  
(Vulfson, 1994)

) (Cardenas *et al.*, 2001)  
(2002,

*aeruginosa Pseudomonas*

Bacteria

Pseudomonadals Scotobacteria Gracillicutes  
(Bergy and Holt,1994) *Pseudomonadaceae*

(Fluoarescein) (Pyocyanin)  
(Pyorubin)  
(Cornelis, 2008) ° 42 ° 37

EC.3.1.1.3

(Wang *et al.*, 2009)

:

*P.aeruginosa*

Triacylglycerollipase, Carboxylestrase, Lipoproteinlipase, Acylglycerollipase, Strolsterase, Chlorophyllase, Galactolipase, Glycosylphosphat idylinositol phospholipase D (Arpigni and Jaeger, 1999).

(Hong *et al.*, 2004) 7= pH ° 30

(Masse *et al.*, 2001) ° 50

(Karadzic *et al.*, 2006) 10 PH 70  
*P. alcaligenes* (Lin *et al.*, 1996)  
.10-6

*aeruginosa*

*Pseudomonas*

: - 1

( ) 15  
200 . 2008 2007 500

			:	-2
1.4	20		Cetremide Agar	-
10	10	0.3	10	
15 °	121		500	
			Tributrin Agar	-
12 3		2.5	2.5	
.75 = pH		1	Tributrine	10
		15 °	121	
			35	
			Brain Heart Broth	
200		200		
2.5	5	2	10	
	7			
			( <i>Pseudomonas aeruginosa</i> )	- 3
		0.5		
(	)		Cetremide Agar	° 37
			<i>P. aeruginosa</i>	
250			10	
30			90	
Cetremide Agar		1		
			. API	
			:	-4
(pH)			Brain Heart Broth	

...

3 3 250  
 140  
 ° 4 10000  
 40 30 25 20 .  
 8 45  
 (pH)  
 5.0 4.5 °35 9.0 8.5 7.5 7.0 6.5 6.0 5.5  
 .8 = pH ° 35  
 : -5  
 (Chartrain, et al.,1993)  
 3: 1 %2 5  
 (Tris-HC) 3 15 ° 4  
 1 8 = pH (0.1M) 1 (0.1M)  
 30 ° 35  
 1:1 20  
 0.05 M  
 .  
 ( FFA)  
 ( / 50) 3465 Koch-light  
 :  
 FFA = %  
 FFA  
 : -6

.(Montgomery, 1991)

*Pseudomonas aeruginosa*

15 (1)  
(Cetremide Agar)

*P. aeruginosa*

%20 ° 35

0.8-0.5

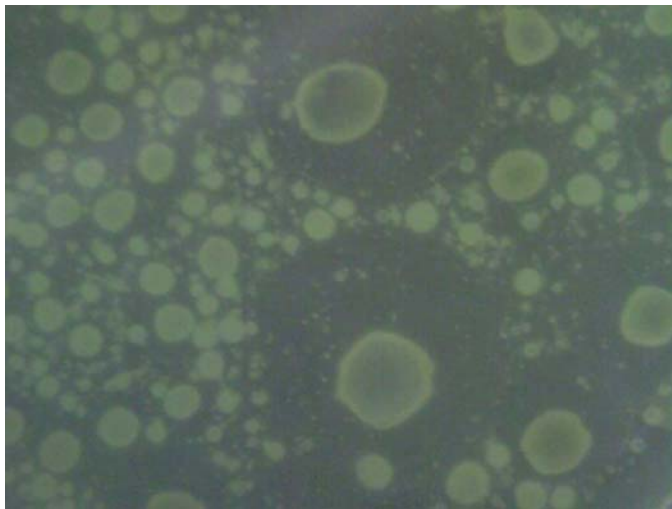
( )

3 -1.5

*P. aeruginosa.*

API

*P. aeruginosa* (1)



**Cetremide** *P. aeruginosa* (1)

:

(1)

*P. aeruginosa*

° 35

F3 2.6±0.22 B2  
 2.1±0.4 2.2±0.32 D1  
 1.8±0.36 B2

(1)

*P. aeruginosa*

Tributrin Agar *	Cetremide Agar		
-	-	A1	
-	-	A2	
-	-	A3	
-	-	B1	
2.6±0.22	+++++	B2	
-	-	B3	
-	-	C1	
-	-	C2	
-	-	C3	
2.2±0.32	+++++	D1	
-	-	D2	
-	-	D3	
-	-	F1	
-	-	F2	
1.8±0.36	+++++	F3	
2.1±0.4	(%20)	15	

\* - +

(Elander and Chang,1979)



(2)

*P. aeruginosa*

%82.7

° 35 20

° 35

° 45 40

%39.9 %73.1

° 35

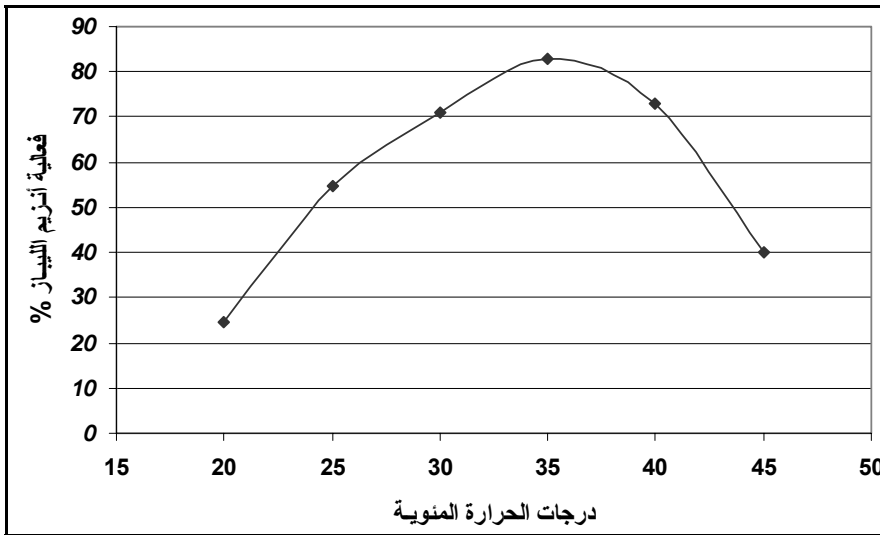
*Pseudomonas spp.*

(Hong *et al.*, 2004) ° 30

(Masse *et al.*, 2001) ° 50

° 70

(Karadzic *et al.*, 2006)



(B2)

*P. aeruginosa*

(2)

(pH)

*P. aeruginosa*

(3)

.9.0 - 4.5  
 %85.2      8 = pH  
                  %27.7    9.0  
                                  8 = pH

(Cornellis, 2008)

.7.5

*P.aeruginosa*

*P. fragy*

(Nishio *et al.*, 1987)

.9 - 9.5      pH  
 (Lin *et al.*, 1996)

*P.alcaligenes*  
 10-6

*P. aeruginosa*

Ca, Mg,

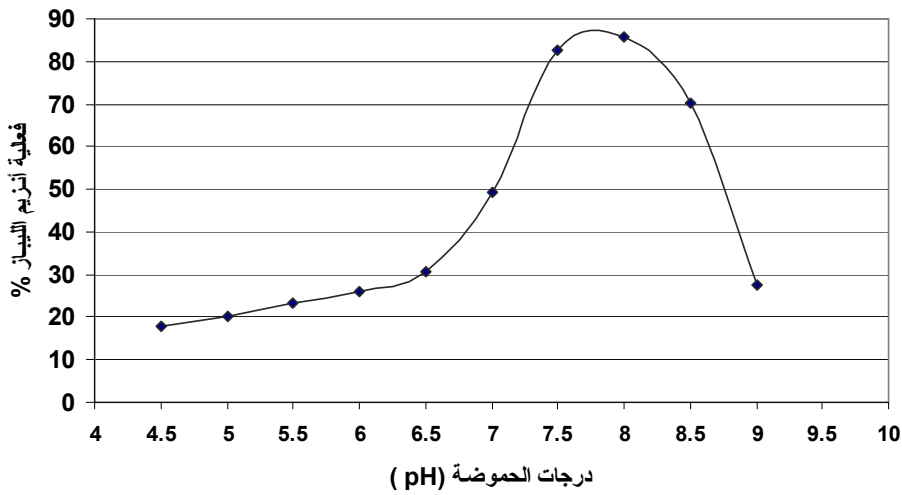
8.5

90%

7.8 = pH  
 (Kok *et al.*, 1995) 8.8 = pH  
 (P-MPP)

Co, Cu

(Chartrain *et al.*, 1993) 9    10.5



(B2)

*P. aeruginosa*

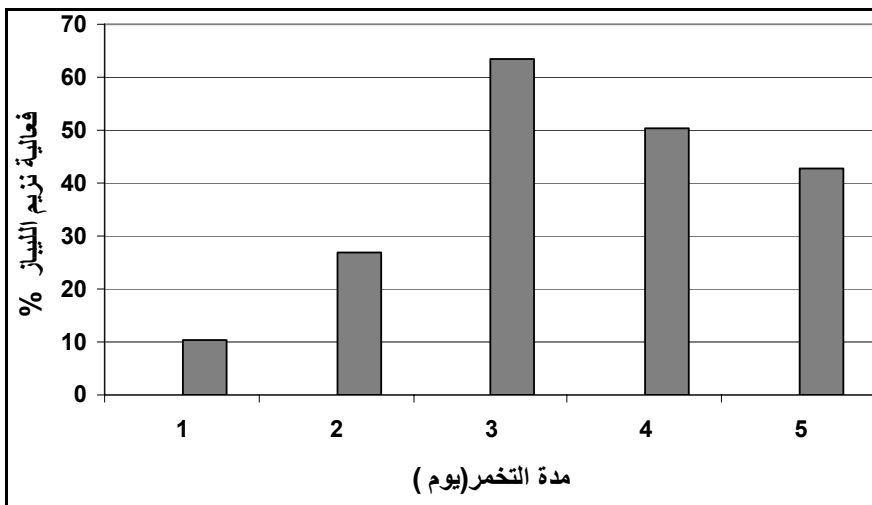
(3)

:  
*P. aeruginosa* (4)

%63.3

%42.8 %50

(2002 )



(B2)

*P. aeruginosa*

8.0

° 35

(4)

<i>P. aeruginosa</i>				.1
B2	%20	.		
				.2
		<i>P. aeruginosa</i>	API	
B2		° 35		.3
			%.82.2	
B2		8		.4
			%.82.2	
B2		3		.5
			%.63.3	

## REFERENCES

.(2002) .

- Arpigni, J. L; Jaeger, K. E. (1999). Bacterial lipolytic enzymes: classification and properties. *J. Biochem*, 343, 177-183 .
- Bergey, N. R. and Holt, J. G. (1994). *Bergey's Manual of Systematic Bacteriology* 9<sup>th</sup> ed. Williams & Wilkins Baltimore.
- Cardenas, J., Alvarez, E, de Castro-Alvarez M-S, Sanchez-Montero J-M, Valmaseda M, Elson SW, Sinisterra J-V. (2001). Screening and catalytic activity in organic synthesis of novel fungal and yeast lipases. *J. Mol .Catal B: Enzym.*;14:111–23.
- Chartrain, M., Katz L., Marcin C., Thien M., Smith S., Fisher F., Goklen K., Salmon P., Brix T., Price K., Greasham R. (1993). Purification and characterization of a novel bioconverting lipase from *Pseudomonas aeruginosa* MB 5001. *Enzyme Microb. Technol*; 15:575–80.
- Cornelis P. (2008). *Pseudomonas: Genomics and Molecular Biology*, 1st ed., Caister Academic Press USA.
- Elander, R. P. and Chang, L. T. (1979). Microbial Culture Selection. In *Microbial Technology*. Vol.2 (eds. Pepler, H.J. and Perlman, D.) Academic press. New York.
- Godfrey, T., and West, S. (1996). *Industrial Enzymology* (2nd. ed) London: Macmillan Press.
- HE YQ, Wang BW, Tan TW. (2004). Fermentation Production Technology of Lipase with *Candida sp.* *Chinese J. Biotechnol.* 20(6): 921-926.
- Hong, J.H, Kim, J., Cho, O.K, Cho, K.S Ryu, H.W. (2004). Characterization of a diesel-degrading bacterium, *Pseudomonas aeruginosa* IU5 Isolated from oil-Contaminated Soil in Korea , Springer link journal.
- Jaeger, K. E., Liebeton, K., Zonta, A., Schimossek, K. & Reetz, M. T. (1996). Biotechnological application of *Pseudomonas aeruginosa* lipase: efficient kinetic resolution of amines and alcohols. *Appl. Microb. Biotechnol.*46, 99-105.
- Karadzic, I, Masui, A, Zivkovic. L. I; Fujiwara, N. (2006). Purification and Characterization of an Alkaline Lipase from *Pseudomonas aeruginosa* Isolated from Putrid Mineral Cutting Oil as Component of Metalworking Fluid *Journal of Bioscience and Bioengineering*102,(2).82-89.
- Lin, S. F.; Chiou, C. M, Yeah, C.M, and Tsai, Y. C. (1996). Purification and partial characterization of an alkaline lipase from *Pseudomonas Pseudomonas alcaligenes* F-111 *Appl. Enviorn.Microbiol.*26.1093-1095.
- Masse L, Kennedy KJ, Chou SP. (2001). The effect of an enzymatic pretreatment on the hydrolysis and size reduction of fat particles in slaughterhouse wastewater. *J Chem .Technol .Biotechnol.*;76:629–35.
- Montgomery, D, C. (1991). *Design and analysis of experiments*. 3rd ed., Wiley , New York .

- Nishio, T; Chikano, T. and Kamimura, M. (1987). Purification and some properties of lipase by *Pseudomonas fragi* 22.39 Agric. Biol. Cheme.51.181-186.
- Pavlova, I. N and Zholner, L. G. (1988). Investigation of a preparation lipolytic enzyme of *Bacillus* Appl. Biochem. Microbiol. 21:520-52.
- Schallmey, M, Singh, A and Ward, O. (2004). Developments in the use of *Bacillus* species for industrial production. Can.J.Microbiol.50:1-17.
- Snellman EA, Colwell RR. (2004). *Acinetobacter* lipase: molecular biology, biochemical properties and biotechnological potential. J. Industrial Microbiol and Biotechnol. 31(9): 391-400.
- Uhlig, H. (1998). Industrial enzymes and their applications,; John Wiley & Sons, New York, p 435.
- Vulfson, E. N. (1994). Industrial applications of lipases, p. 271-288. In P. Woolley, and S. B. Petersen (ed.), Lipases: their structure, biochemistry and application. Cambridge University Press, Cambridge, England.
- Wang, S. L., lin, Y. T., liang, T. W, Chio, S. H, Ming, L. G; Who, P. C. (2009). Purification and characterization of extracellular lipases from *Pseudomonas monteilii* TK009 by the use of soyabeans as the substrate. J. Ind. Microbiol. Biotechnol, 36, 65-73.

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