

hganji@modares.ac.ir:

/ / : // :

( ) ABS :

(PBM)  
R2A

(TSI)

(MacConkey agar)  
SIM (SS agar)

(O-F glucose)  
(EMB)

% % :

% / %  
% %

(Proteobacteria)

(Pseudomonas putida)  
:

ABS

Bigey ) (Watanabe et al. 1987)

(et al. 1999; Kobayashi et al. 1992

(Wang et al.

(Wyatt and Knowles 1995) 2004)

(ABS)

(Deshkar et al. 2003)

.(Chang et al. 2006)

Wyatt and ) (Deshkar et al. 2003)

ABS

( Knowles 1995; Wang et al. 2004

(Roach et al. 2004)

(USEPA)

- : .(Leeuwen and Krzyzanowski 2000)

Li et al. )

/

(2007

- (Anoxic)

Chekhovskaya 1980; Diane and )

(Acidovorax facilis B)

.(Speece 1991

(Wang et al. 2001) (Pseudomonas nautica)

ABS

ABS

.(Chang et al. 2006)

.(Wang et al. 2001) AAS6

ABS

.(Hu et al. 1998)

(PBM)

( / )

( / ) ( / )

( / )

( / )

( / )

( ) ( )

( )  $\text{Na}_2\text{MoO}_4$  ( ) ( )

( )

pH

:

:

ABS

/

pH White )

(et al. 1988; Nawaz et al. 1991

- ( )

/

(OD) pH ( )

pH OD

Microsoft Excel

Reasoner and) (R2A)

( Geldreich 1995

%

R2A

(Merck-1.00416) R2A

yeast )

%

( / )

( / ) ( extract

(Forbes et al. 2007)

( / )

( / )

( / )

( / )

( / )

( )

( / )

SIM (Merck-1.05470)

(O-F

(MacConkey agar-

glucose)

Merck-1.05465)

(TSI- Merck-1.03915)

PBM

(EMB- Merck-1.01347)

( SS agar- Merck-7667)

(Merck-1.04070)

TSI (PBM)

(Proteobacteria)  
(*Pseudomonas putida*)  
(Forbes et al. 2007)

pH OD<sub>600</sub> pH  
(Pharmacia-LKB-Novaspec II)

:

pH FID (Varian CP 3800)  
Capillary Column: CP- WAX )  
( 52 CB 25m×0.32mm×1.2µm  
(Cole Parmer)

*P. putida*

% % :

OD<sub>600</sub>

pH / / / pH

pH

Li .

% /  
% /

%

(Li et al. 2007)

Wang AAS6

/

OD<sub>600</sub>

/

/

(Wang et al. 2001)

/

/

pH

*P. putida*

*P. putida*

-

%

% % %

OD<sub>600</sub>

*P. putida*

( ) Li pH

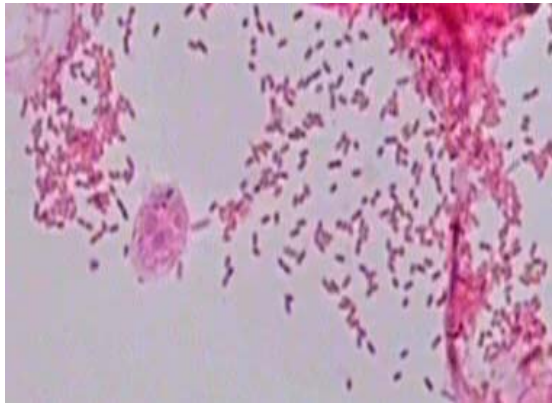
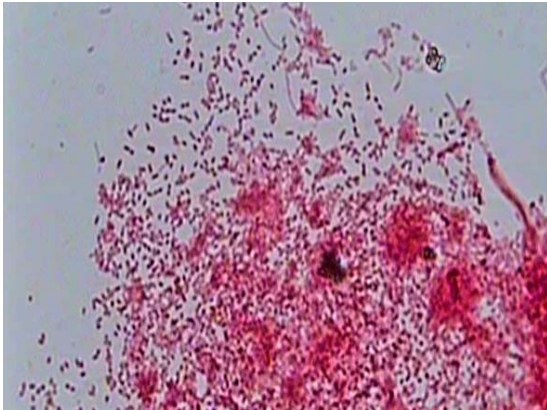
*P.* putida

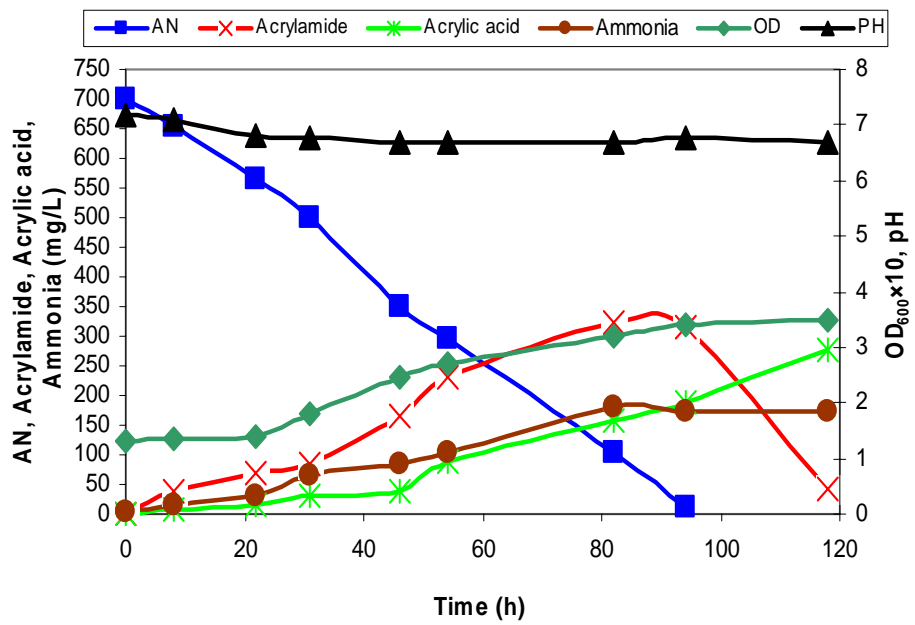
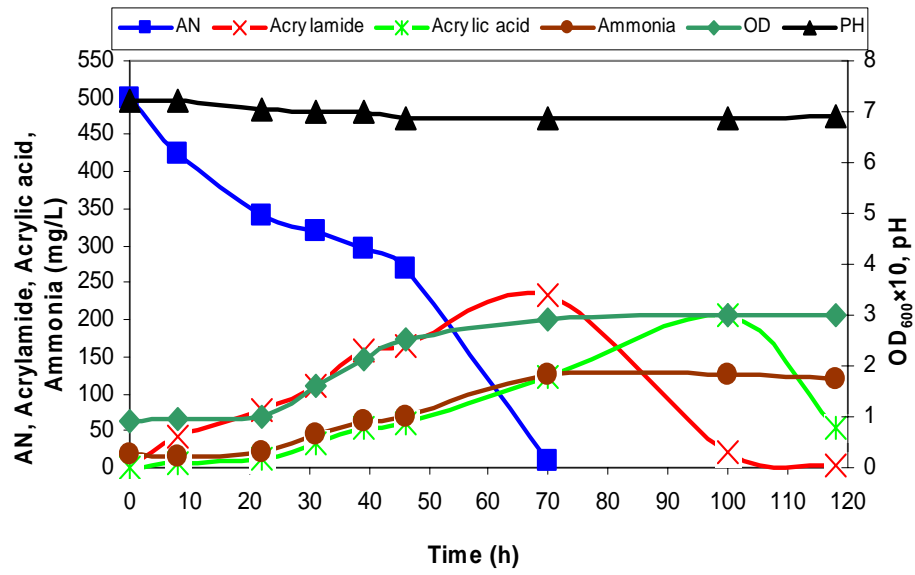
( )

(Li et al. 2007) Li

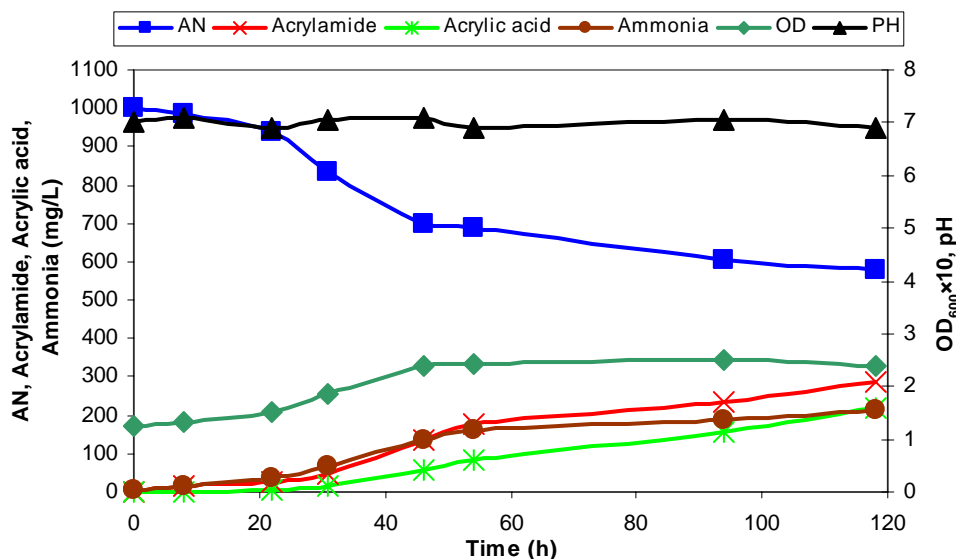
( )

(Wang et al. 2004; Shanker et al. 1990)









- environmental bacteria and its use in interspecies comparisons and correlations, *Research Journal of Water Pollution Control Federation*. **63**, pp. 198-206.
- Forbes, B.A., Sahn, D.F. and Weissfeld, A.S., 2007. Baily and Scott's Diagnostic Microbiology (12th ed.), Elsevier Mosby, Missouri.
- Hu, H.Y., Fujie, K., Nozawa, M., Makabe, T. and Urano, K., 1998. Effects of biodegradable substrates and microbial concentration on the acclimation of microbes to acrylonitrile in aerobic submerged biofilter, *Water Science Technology*. **38**(7), pp. 81-89.
- Kobayashi, M., Nagasawa, T. and Yamada, H., 1992. Enzymatic synthesis of acrylamide: a success story not yet over, *Trends in Biotechnology*. **10**(11), pp. 402-408.
- Leeuwen, F.X.R. and Krzyzanowski, M., 2000. Air Quality Guidelines, WHO Regional publications, European series, (2nd edition), No 91. Copenhagen.
- Li, T., Liu, J., Bai, R., Ohandja, D.G. and Wong, F.S., 2007. Biodegradation of organonitriles by adapted activated sludge consortium with acetonitrile-degrading
- Bigey, F., Chebrou, H., Fournand, D. and Arnaud, A., 1999. Transcriptional analysis of the nitrile-degrading operon from *Rhodococcus* sp. ACV2 and high level production of recombinant amidase with an *Escherichia coli*-T7 expression system, *Journal of Applied Microbiology*. **86**(5), pp. 752-760.
- Chang, C.Y., Chang, J.S., Lin, Y.W., Erdei, L. and Vigneswaran, S., 2006. Quantification of air stripping and biodegradation of organic removal in acrylonitrile-butadiene-styrene (ABS) industry wastewater during submerged membrane bioreactor operation, *Desalination*. **191**, pp. 162-168.
- Chekhovskaya, N., 1980. Ambient waste quality criteria: acrylonitrile, USEPA, Washington DC.
- Deshkar, A., Dhamorikar, N., Godbole, S., Krishnamurthi, K., Saravanadevi, S., Vijay, R., Kaul, S. and Chakrabarti, T., 2003. Bioremediation of soil contaminated with organic compounds with special reference to acrylonitrile, *Annali di Chimica*. **93**(9-10), pp. 729-737.
- Diane, J.W.B. and Speece, R.E., 1991. A database of chemical toxicity to

- bacteria, *Journal of Environmental Science and Health*. **39**(7), pp. 1767-1779.
- Wang, C.C., Lee, C.M. and Cheng, P.W., 2001. Acrylonitrile removal from synthetic wastewater and actual industrial wastewater with high strength nitrogen using a pure bacteria culture, *Water Science Technology*. **43**(2), pp. 349-354.
- Watanabe, I., Satoh, Y. and Enomoto, K., 1987. Screening, isolation and taxonomical properties of microorganisms having acrylonitrile-hydrating activity, *Agricultural and Biological Chemistry*. **51**(12), pp. 3193-3199.
- White, J.M., Jones, D.D., Huang, D. and Gauthier, J.J., 1988. Conversion of cyanide to formate and ammonia by a pseudomonad obtained from industrial wastewater, *Journal of Industrial Microbiology*. **3**, pp. 263-272.
- Wyatt, J.M. and Knowles, C.J., 1995. The development of a novel strategy for the microbial treatment of acrylonitrile effluents, *Biodegradation*. **6**(2), pp. 93-107.
- microorganisms, *Water Research*. **41**, pp. 3465-3473.
- Nawaz, M.S., Franklin, W., Campbell, W.L., Heinze, T.M. and Cerniglia, C.E., 1991. Metabolism of acrylonitrile by *Klebsiella pneumoniae*, *Archives of Microbiology*. **156**(3), pp. 231-238.
- Reasoner, D.J. and Geldreich, E.E., 1995. A new medium for the enumeration and subculture of bacteria from potable water, *Applied and environmental Microbiology*. **49**(1), pp. 1-7.
- Roach, P.C., Ramsden, D.K., Hughes, J. and Williams, P., 2004. Biocatalytic scrubbing of gaseous acrylonitrile using *Rhodococcus ruber* immobilized in synthetic silicone polymer (ImmobaSil) rings, *Biotechnology and Bioengineering*. **85**(4), pp. 450-455.
- Shanker, R., Ramakrishna, C. and Seth, P.K., 1990. Microbial degradation of acrylamide monomer, *Archives of Microbiology*. **154**, pp. 192-198.
- Wang, C.C., Lee, C.M. and Chen, L.J., 2004. Removal of nitriles from synthetic wastewater by acrylonitrile utilizing