

:

sahand359@yahoo.com :

// : // :

g/L ( × × × )

COD mg/L COD g/L × mg/L PAC

COD ( mg/L) COD ( mg/L)

Amakrane et al. 1997; Chiang et al. )  
2001; Park et al. 2001; Renou et al. 2008;  
(Irene 1997

(Ahn et al. 2002)

COD

SBR

Bohdziewicz et al. 2001; Diamadopoulos )  
et al. 1997; Ding et al. 2001; Geenens et al.  
(2001

/ mg/L  
COD

Satyawali and Balakrishnan 2009; Foo )  
(and Hameed 2009; Trebouet et al. 2001

/ mg/L

Li and Zhao 2001; Im )  
et al. 2001; Kettunen et al. 1996; Kim et al.  
(1997

( )



×

mg/L

pH (± )

) /

(± /

%

( )

Jorfi )

(et al. 2009

MLSS

COD

:

pH

( )

COD

mg/L

×

COD

American Public Health )

mg/L

(Associatin, 2005

×

/

rpm

COD

mg/L

COD

(.5220B)

/ mg/L

(.4500-NH<sub>3</sub>B)

mg/L

COD

×

/

(.2540D)

(.4500OC)

l...

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mg/L / mg/L

MLSS ×

MLSS MLSS

mg/L

MLSS

mg/L ×

MLSS mg/L mg/L

MLSS × ×

( ) MLSS

× × COD

( )

:

( )

×

COD

( × × × )

g/L

/ mg/L COD

/ mg/L

COD × ×

mg/L

PAC / mg/L /

COD

PAC

COD

COD

COD

mg/L

MLSS

MLSS

× × ×

PAC

	x	x					
	x						PAC
Fikret and Pamukoglu )		/					
			(2003				
	g/L	( )					
	COD				UASB		COD
x		/					
x	x						/
			(Liyan et al. 2009)		COD		(Kennedy et al. 2000)
			PACT				MBR
			COD				(Jolanta et al. 2008)
			(Aghamohammadi et al. 2007)				-
			COD				
							COD
							Shuler and Kargi )
							MBBR
							(2002
							COD
			COD				Loukidoa and Zouboulis )
							(2001
							COD
							Jokela et al. )
							(2002

l...

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/ ± /	(%)
/ ± /	(%)
± /	(%)
/ ± /	(g/cm <sup>3</sup> )
	(mg/g)
±	(mg/g)
	(m <sup>2</sup> /g)
± /	( )
	(%)
	(%)
± /	pH

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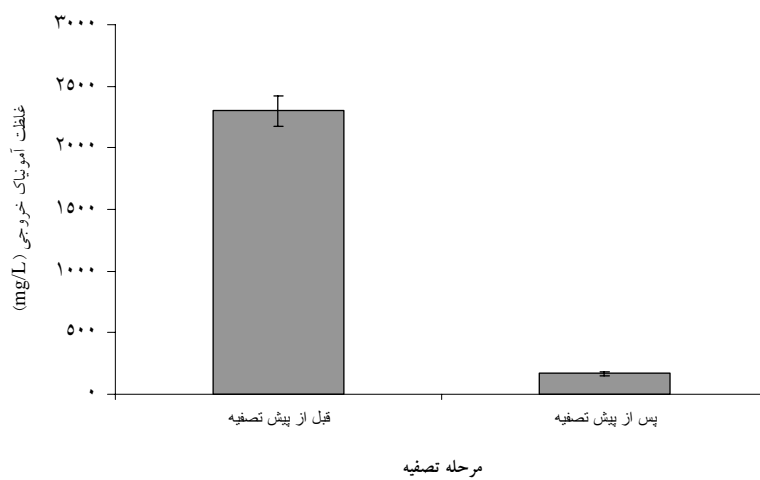
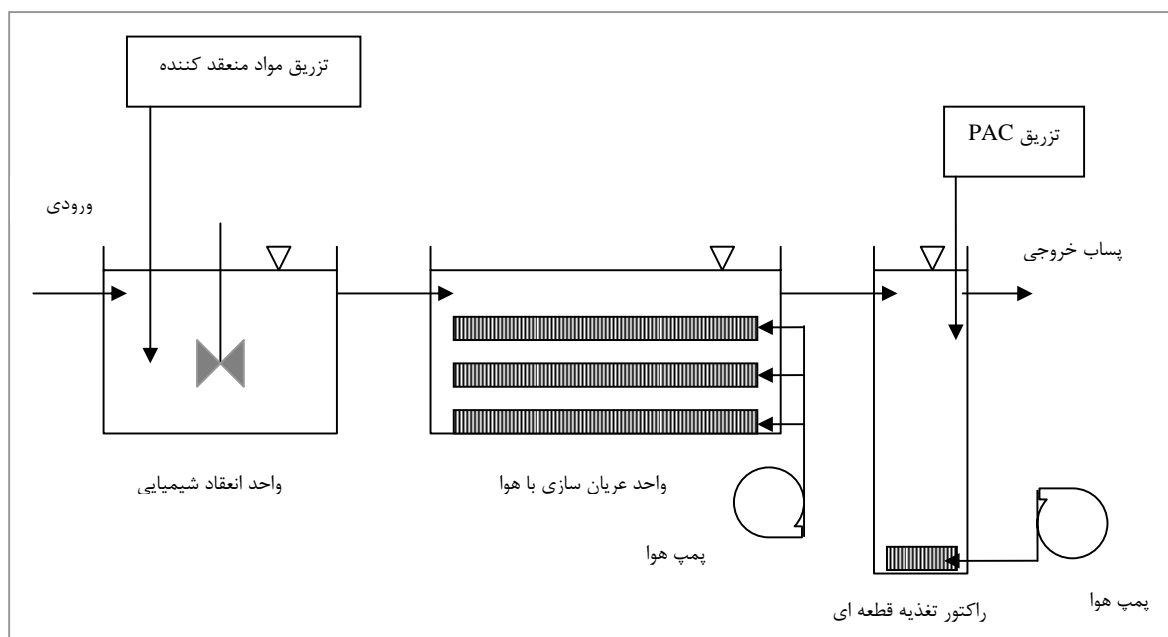
COD			( )
± /	± /		×
± /	± /		×
± /	± /		×

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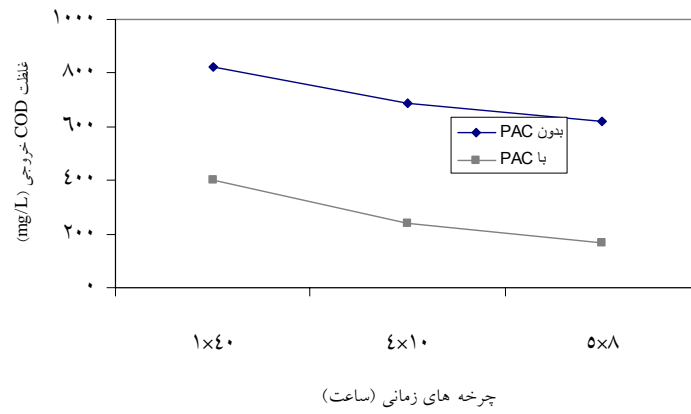
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COD				( )
± /	/	± /	/	×
± /	/	± /	/	×
± /	/	± /	/	×

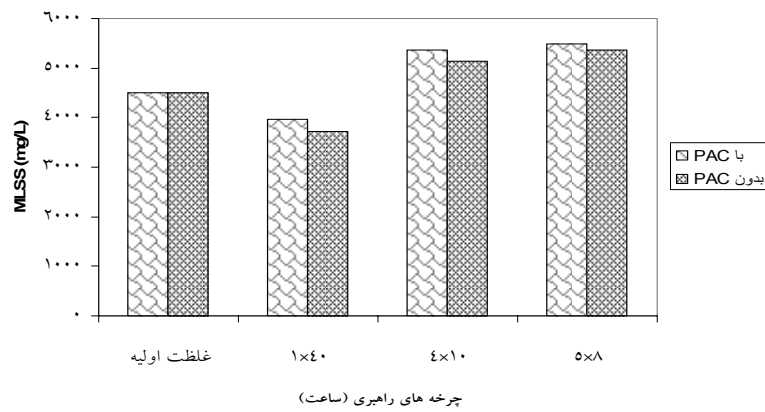
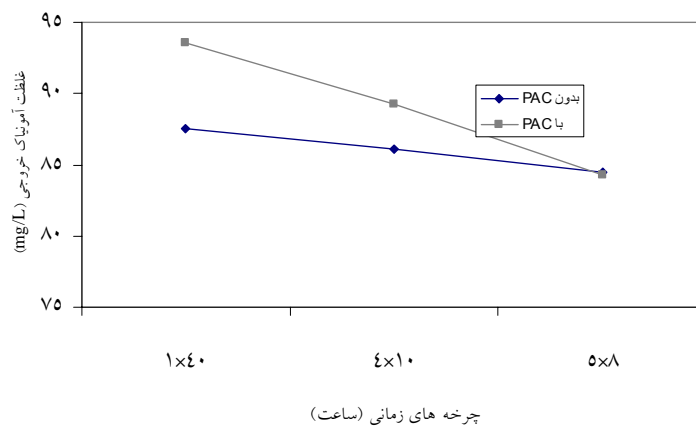
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**COD**



**MLSS**



## References

- Aghamohammadi, N., Hamidi., Mohamed, H. and Zinatizadeh, A., 2007. Powdered activated carbon augmented activated sludge process for treatment of semi-aerobic landfill leachate using response surface methodology. *Bioresource Technology*, **98**, pp. 3570–3578.
- Ahn, D.H., Yun-Chul, C. and Won-Seok, C., 2002. Use Of Coagulant And Zeolite To Enhance The Biological Treatment Efficiency Of High Ammonia Leachate. *Environ Sci Health*, **37**(2), pp. 163–173.
- Amakrane, A., Comel, C. and Veron, J., 1997. Landfill Leachate Pre-treatment By Coagulation flocculation. *Water Res*, **31**(11), pp. 2775–2782.
- American Public Health Association (APHA)., 2005, Standard methods for the examination of water and wastewater, 17th ed., Washington DC.
- Bohdziewicz, J., Bodzek, M. and Górska, J., 2001. Application of Pressure-Driven Membrane Techniques To Biological Treatment Of Landfill Leachate. *Process Biochem*, **36**(7), pp 641– 646.
- Chiang, L., Chang, J. and Chung, C., 2001. Electrochemical Oxidation Combined With Physical-Chemical Pre-treatment Processes For The Treatment Of Refractory Landfill Leachate. *Environ Eng Sci*, **18**, pp.69–78.
- Diamadopoulos, E., Samaras, P., Dabou, X. and Sakellaropoulos, GP., 1997. Combined Treatment of Landfill Leachate and Domestic Sewage In A Sequencing Batch Reactor. *Water Sci Technol*, **36**(2), pp. 61–68.
- Ding, A., Zhang, Z., Fu, J. and Cheng, L., 2001. Biological Control of Leachate from Municipal Landfills. *Chemosphere*, **44**(1), pp. 1–8.
- Fikret, K. and Pamukoglu, Y., 2003., Repeated Fed-Batch Biological Treatment of Pre-treated Landfill Leachate By Powdered Activated Carbon Addition. *Enzyme and Microbial Technology*, **34**, pp. 422 – 428.
- Foo, K. and Hameed, B., 2009. An overview of landfill leachate treatment via activated carbon adsorption process, *Journal of Hazardous Materials*. doi:10.1016/j.jhazmat. 2009.06.038

- Geenens, D., Bixio, B. and Thoeye, C., 2001. Combined Ozone-Activated Sludge Treatment of Landfill Leachate. *Water Sci Technol*, **44**(2-3), pp. 359–365.
- Im, J., Woo, H., Choi, M., Han, K. and Kim, C., 2001. Simultaneous Organic and Nitrogen Removal From Municipal Landfill Leachate Using An Anaerobic–Aerobic System. *Water Res*, **35**(10), pp. 2403–2410.
- Irene, M., 1997. Characteristics and Treatment of Leachates from Domestic Landfills. *Environ Int*, **22**(14), pp. 433–442.
- Jokela, Kettunen, Sormunen., Rintala., 2002. Biological nitrogen removal from municipal landfill leachate: low-cost nitrification in biofilters and laboratory scale in-situ denitrification. *Water Research*, **36**, pp. 4079–4087.
- Jolanta, B., Ewa, N. and Anna, K., 2008. membrane bioreactor Landfill leachate treatment by means of anaerobic. *Desalination*, **221**, pp. 559–565.
- Jorfi, S., Jaafarzadeh, N., Rzaee, R. and Hashempour, Y., 2009. Leachate treatment by batch decant activated sludge process and powdered activated carbon addition. *Journal of health and environment*, **2**(1), pp 16- 27.
- Kennedy, K.J. and Lentz, E.M., 2000. Treatment of Landfill Leachate Using Sequencing Batch And Continuous Flow Upflow Anaerobic Sludge Blanket (UASB) Reactors. *Water Res*, **34**, pp. 40–56.
- Kettunen, R.H., Hoilijoki, T.H. and Rintala, J.A., 1996. Anaerobic And Sequential Anaerobic– Aerobic Treatments Of Municipal Landfill Leachate At Low Temperatures. *Bioresour Technol*, **58**, pp. 31–40.
- Kim, S.K., Matsui, S., Pareek, S., Shimizu, Y., and Matsuda, T., 1997. Biodegradation Of Recalcitrant Organic Matter Under Sulfate Reducing And Methanogenic Conditions In Landfill Column Reactors. *Water Sci Technol*, **36**, pp. 1–8.
- Li, X.Z. and Zhao, Q.L., 2001. Efficiency of Biological Treatment Affected By High Strength Of Ammonium-Nitrogen In Leachate And Chemical Precipitation Of ammonium-Nitrogen As Pretreatment. *Chemosphere*, **44**(1), pp. 37–43.
- Liyan, S., Youcai, Z., Weimin, S. and Ziyang, L., 2009. Hydrophobic organic chemicals (HOCs) removal from biologically treated landfill leachate by powder-activated carbon (PAC), granular-activated carbon (GAC) and biomimetic fat cell (BFC). *Journal of Hazardous Materials*. **163**, pp.1084–1089.
- Loukidou, M.X. and Zouboulis, A.I., 2001. Comparison of Two Biological Treatment Processes Using Attached-Growth Biomass For Sanitary Landfill Leachate Treatment. *Environ Pollut*, **88**, pp.111-273.
- Park, S., Choi, K.S., Joe, K.S., Kim, W.H., and Kim, H.S., 2001. Variations of Landfill Leachate's Properties in Conjunction with the Treatment Process. *Environ Technol*, **22**(6), pp. 639– 645.
- Renou, S., Givaudan, J., Poulain, S., Dirassouyan, F. and Moulin, P., 2008. Landfill leachate treatment: Review and opportunity. *Journal of Hazardous Materials*, **150**, pp. 468–493.
- Satyawali, Y. and Balakrishnan, M., 2009. Performance enhancement with powdered activated carbon (PAC) addition in a membrane bioreactor (MBR) treating distillery effluent. *Journal of Hazardous Materials*. **170**, pp. 457–465.
- Shuler, M.L. and Kargi, F., 2002. Bioprocess Engineering: Basic Concepts. 2nd ed, NJ Prentice Hall.
- Trebouet, D., Schlumpf, J.P., Jaounen, P. and Quemeneur, F., 2001. Stabilized Landfill Leachate Treatment By Combined Physicochemical-Nanofiltration Processes. *Water Res*, **35**(12), pp. 2935-2942.