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Data Article

Application of Cu/Mg/Al-chitosan-O₃ system for landfill leachate treatment: Experimental and economic evaluation data

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ABSTRACT

Landfill leachate contains heavy organic pollutants, which pollute ground and surface waters. This dataset applied a newly-introduced catalyst, Cu/Mg/Al-chitosan, for a landfill leachate treatment during a catalytic oxidation. The data of chemical oxygen demand (COD) and colour removal from the leachate was reported as a function of reaction time (20–460 min). Economic evaluation data of the Cu/Mg/Al-chitosan-O₃ system showed that the current cost of the system for treating each m³ leachate is US\$ 18 and for catalyst synthesis is US\$ 54.5. Data could be useful from environmental and economic perspectives to those concerned about landfill leachate threats.

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Specifications Table

Subject area	<i>Chemical engineering</i>
More specific subject area	<i>Environmental engineering; Wastewater treatment</i>
Type of data	<i>Figure and table</i>
How data was acquired	<i>The landfill leachate pH was determined using a Jenway 3505 pH meter. The COD analysis was conducted using the potassium dichromate oxidation method.</i>
Data format	<i>Analysed</i>
Experimental factors	<ul style="list-style-type: none"> - <i>Cu/Mg/Al-chitosan particles were provided by the precipitation method.</i> - <i>Landfill leachate sample was treated in a given reaction time as a function of COD and colour.</i> - <i>The kinetic of the leachate treatment was determined.</i> - <i>The economic evaluation for Cu/Mg/Al-chitosan-O₃ was presented.</i>
Experimental features	<i>Landfill leachate treatment by Cu/Mg/Al-chitosan-O₃ system</i>
Data source location	<i>Bushehr University of Medical Sciences, Bushehr, Iran, GPS: 28.9667°N, 50.8333°E</i>
Data accessibility	<i>Data presented with article</i>

Value of the data

- A new catalytic process for landfill leachate treatment was introduced to the scientific community.
- From our data, it could be implied that the COD was decreased to discharge allowable limit to wastewater collection system, compared to biological leachate treatment systems.
- Data shows that the Cu/Mg/Al-chitosan-O₃ system is an economic process for landfill leachate treatment.
- Many organizations like waste management organizations, wastewater treatment plants, water resources management, NGOs, etc., which are concerned about the hazards from landfill leachate, can use these data.

1. Data

Table 1 shows the characteristics of the raw leachates. Figs. 1 and 2 depict the COD and colour removal at different leachate pHs respectively as a function of time. Fig. 3 shows the pseudo first-

Table 1
Raw landfill leachates characteristics.

Property	Value ± SD		
	Sample 1	Sample 2	Sample 3
pH	9.5 ± 0.3	7 ± 0.3	5.5 ± 0.2
Colour	Blackish brown	Black	Brown blackish
COD (mg/L)	40,700 ± 44	25,009 ± 39	1938 ± 73
TOC (mg/L)	34,040 ± 46	15,500 ± 69	16,700 ± 86
BOD ₅ (mg/L)	2100 ± 36	1800 ± 41	1830 ± 67
BOD ₅ /COD ratio	0.052	0.072	0.11
Alkalinity (mg/L CaCO ₃)	10,078 ± 26	8955 ± 34	6790 ± 23

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