



Short Communication

Assessment of Physicochemical Properties of Solid Waste - Opium Marc

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Abstract

Assessment of physicochemical properties of opium marc was done in this paper. The results indicate that the brown solid lumps of opium marc sample pass the PFLT and have specific gravity 0.73. The calorific value, flash point, moisture content, LOD @ 105 °C, LOI @ 550 °C, ash content @ 900 °C were 1607.96, >65 °C, 505, 36.3 and 72.0, respectively. pH of the sample was about neutral i.e. 7.3 and rest parameters such as sulphates, chlorides, organic halogens, cobalt, cadmium, iron, chromium, nickel, copper, lead, zinc were below desirable limit. On the basis of analysis of marc (solid waste of process), it is proposed that co-processing for the disposal of opium marc is more suitable, economical and feasible.

Keywords: Opium marc, solid waste, co-processing, physicochemical parameters, composition.

Introduction

Solid waste management programmes are driven by a desire to keep clean environment in the hope of promoting sound environmental quality and public health. For best solid waste management programmes, complete understanding of physicochemical parameters of wastes is required, which in turn will govern their behavior in the environment. Therefore, these parameters serve as proxy indicators of which waste management options would be most suitable for adoption in the implementation of a solid waste programme for an industry¹⁻⁸.

The study was, therefore, undertaken to generate scientific information on both physical and chemical composition of solid waste opium marc from the Govt. Opium and Alkaloids Works, Neemuch. Opium marc is the solid waste of process, falls under stream 28.1 of schedule I of hazardous wastes (management, handling and transboundary movement) rules 2008.

Material and Methods

Field Survey: To evaluate the present situation of Solid Waste Management in Govt. Opium and Alkaloids Works, Neemuch, MP, India and examine the problems, the author visited the factory. The location where opium marc was dumped was examined. Since opium marc is a solid waste of process which according to rules comes under the category of hazardous waste, one could not collect the sample without MPPCB permission. So, Analysis report regarding composition of opium marc was obtained from the factory.

Physicochemical Analysis of Opium Marc: The sample opium marc was analyzed for the following physicochemical parameters which includes physical state, color, odor, texture, Paint Filter Liquid Test (PFLT), specific gravity, calorific value,

flash point, moisture content, LOD @ 105 °C, LOI @ 550 °C, ash content @ 900 °C, pH, sulphates, chlorides, organic halogens, cobalt, cadmium, iron, chromium, nickel, copper, lead, zinc.

Results and Discussion

The sample opium marc was analyzed for physicochemical parameters. Results are shown in table 1.

The results indicate that the brown solid lumps of opium marc sample pass the PFLT and have specific gravity 0.73. The calorific value, flash point, moisture content, LOD @ 105 °C, LOI @ 550 °C, ash content @ 900 °C were 1607.96, >65 °C, 505, 36.3 and 72.0, respectively. pH of the sample was about neutral i.e. 7.3 and rest parameters such as sulphates, chlorides, organic halogens, cobalt, cadmium, iron, chromium, nickel, copper, lead, zinc were below desirable limit.

Conclusion

Co-processing of opium marc (hazardous waste) in a cement kiln can be effective, environmental friendly, energy recovering and safe technology for management of hazardous waste. Due to very high temperature, oxygen rich atmosphere and long residence time, the co-processing of all sorts of high calorific value hazardous waste completely absorbs the energy of waste without any deleterious emission^{9,10}.

Therefore, from the present investigation we can conclude that process of co-processing for the disposal of opium marc is more suitable, economical and feasible.

Table-1
Assessment of the opium marc sample

Parameter	Unit	Method of Analysis	Result	HW (MandH) Rules Schedule II
Physical State	-	-	Solid	Not Specified
Colour	-	-	Brown	Not Specified
Odour	-	-	No odour	Not Specified
Texture	-	-	Lumps	Not Specified
PFLT (Paint Filter Liquid Test)	-	SW 846 9095 A	Pass	Passes
Specific Gravity	g/cm ³	ASTM-D 5057-90	0.73	Not Specified
Calorific Value	cal/g	IS:1350 Part II-1970	1607.96	< 2500 cal/g
Flash Point	°C	SW 846 1020 A	>65.0 °C	>65.0
LOD @ 105 °C	%	APHA 2540	5.5	Not Specified
LOI @ 550 °C	%	APHA 2540	36.3	<20%
Ash content @ 900 °C	%	APHA 2540	72.0	Not Specified
pH (At room temp.)	-	SW 846 9045 C	7.3	>4 to <12
Sulphates as SO ₄ ²⁻	mg/kg	APHA 4500 SO ₄ ²⁻ - E	157.66	Not Specified
Chlorides as Cl ⁻	mg/kg	APHA 4500 Cl ⁻ - B	1649.46	Not Specified
Organic halogens	mg/kg	SW 846 5050 and 9253	1413.5	Not Specified
Cadmium as Cd	mg/L	SW 846 7130	BDL*	<0.2
Total Chromium as Cr	mg/L	SW 846 7190	BDL*	Not Specified
Cobalt as Co	mg/L	SW 846 7200	0.4	Not Specified
Copper as Cu	mg/L	SW 846 7210	BDL*	<10
Iron as Fe	mg/L	SW 846 7380	0.3	Not Specified
Lead as Pb	mg/L	SW 846 7420	1.39	<2.0
Nickel as Ni	mg/L	SW 846 7520	BDL*	<3.0
Zinc as Zn	mg/L	SW 846 7950	0.1	<10

*below desirable limit

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