*International Research Journal of Environment Sciences*_____ ISSN 2319–1414
Vol. **3(8),** 64-66, August **(2014)** *Int. Res. J. Environment Sci.*

Short Communication

Management of Hazardous Waste - Opium Marc

Sharma Soniya
Department of Chemical Sciences, Christian Eminent Academy, Indore, MP, INDIA

Available online at: www.isca.in, www.isca.me
Received 27th June 2014, revised 30th July 2014, accepted 10th August 2014

Abstract

In order to get valuable drugs from the opium, the process starts with its filtration of aqueous solution. Opium marc is the solid waste left after filtration of opium broth through filter aid and falls under the category of Hazardous Waste. In comparison with other disposal techniques like incineration and landfill, co-processing is more preferred option in the waste management system as it does not leave residues that pose detrimental effects on the environment. Thus, for effective waste management, co-processing is a best solution for ecological sustainability. Co-processing of hazardous waste opium marc can be effective, environmental friendly, energy recovering and safe technology for its management.

Keywords: Opium marc, hazardous waste, co-processing, energy recovery.

Introduction

Hazardous waste is an unwanted material, which poses an inherent danger to personnel or the environment when it is disposed, i.e. it is explosive, oxidizing, radioactive, flammable, corrosive, toxic/ecotoxic and/or poisonous/infectious. The treatment of such waste can be done either biologically (using microorganisms), physically (separation, encapsulation), chemically (i.e. by reduction, oxidation, neutralization, precipitation, hydrolysis), or thermally (incineration/ co-incineration). According to the Hazardous wastes (Management and Handling and Transboundary Movement) Rules 2008, on the basis of the hazard potential and their characteristics guiding their disposal, hazardous waste is categorized into 3 classes- recyclable, land-fillable and incinerable, About 6.2 Million tonnes of hazardous wastes is annually generated in India, out of which around 3.09 Million tonnes is recyclable, 2.73 Million tonnes is land-fillable and 0.41 Million tonnes is incinerable[1]. These wastes on the basis of their characteristics can be utilized for energy recovery, in construction or for manufacture of articles. So rather than treating hazardous waste as a difficult disposable material, it should be taken as a resource material[2].

Material and Methods

Based on empirical observation, the present analysis is theoretical. The methodological principle adopted for the analysis is based on data collected from field survey and literature survey. The data are organized, analysed and are presented below:

Functional Elements of a Waste Management System: Export/import of hazardous wastes generated within the country as well as management of such wastes is regulated by the Hazardous Wastes (Management and Handling) Rules, 1989, mentioned under the Environment (Protection) Act, 1986 and with subsequent amendments in 2000, 2003, 2008 and 2009 as the Hazardous Wastes (Management, Handling and Trans-boundary Movement) Rules. These rules are formulated for effective management of hazardous waste, such as semi-solids, solids and other industrial wastes, which do not come under the purview of Water (Prevention and Control of Pollution) Act and Air (Prevention and Control of Pollution) Act and also it helps authorities to control waste management in an environmentally sound manner.

The interrelationship between the functional elements is shown in figure-1.

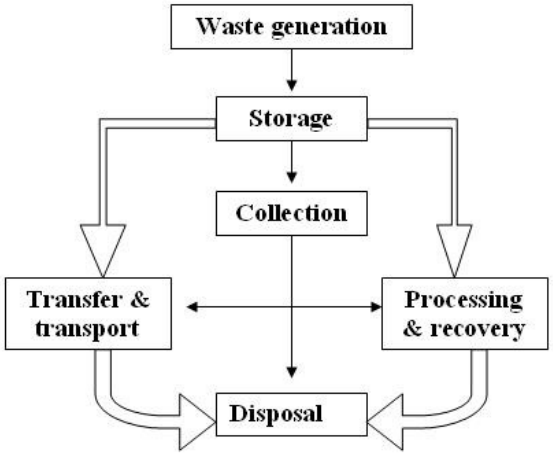

Figure-1
Six functional elements involved in the solid waste management

Waste Disposal Techniques[3,4]: **Landfills:** A landfill is an excavated site or a large area of land that is specially constructed for disposal of wastes. Hazardous waste generated from certain industries or manufacturing processes, can be ignitable, toxic, reactive or corrosive. When the hazardous

waste is to be disposed off in landfills, Environmental Protection Agency (EPA) takes proper steps to safeguard human health and environment. Hazardous waste must be treated differently than solid waste before it reaches a landfill. If the disposal of waste is restricted in a landfill, the whole process is maintained by Land Disposal Restrictions program of EPA. With the help of such program, hazardous waste is treated so that its hazardous components are destroyed or immobilized before it is sent to a landfill.

Incineration: It is a waste treatment technology in which waste is combusted for recovering energy. Incineration is a thermal treatment coupled with high temperature waste treatments. During the process of incineration, the waste material to be treated is converted into gases, particles and heat. Before going into atmosphere, the gases and flue gases are first treated for eradication of pollutants. The mass of the waste is reduced to 95-96% through incineration. This reduction of mass depends upon the composition of materials and recovery degree. Thus incineration does not replace the need for landfilling but it reduce the amount to be thrown in it.

Co-Processing: Co-processing is a secure form of waste management that fully recovers the mineral content and energy from waste for beneficial re-use as product additives for manufacturing and fuel for energy generation[5]. Waste materials that are used for co-processing are called as alternative fuels and raw materials (AFR). Co-processing has proved to be good concept for sustainable development as it diminishes the demands of fossil fuels, lessens pollution and space required for landfill. Thus helps in contributing to decrease the human ecological footprint.

Management of Hazardous Waste - Opium Marc: In order to get valuable drugs from the opium, the process starts with its filtration of aqueous solution. Opium marc is the solid waste left after filtration of opium broth through filter aid and falls under the category of Hazardous Waste. According to the norms, Marc has to be kept for 60-90 days before its disposal. Analysis before disposal of this solid waste generated from the manufacturing process should be done. After analysis, approval from M.P. Pollution Control Board is needed for its disposal.

Earlier Arun Agnihotri et al studied disposal methods namely Landfill and Incineration for disposal of marc. The study showed that in the process of Incineration no solid waste for further disposal was left. Also it regenerates a valuable raw material that can be used for recycling. The ash left after incinerating was almost 90% than the original quantity of solid waste used. This ash was activated and can be reused as a substitute for fresh Filter Aid. The results also showed after activation the filter aid so generated could be reused repeatedly without any change in activity[6]. Another disposal method namely Co-processing/co-incineration for disposal of high calorific hazardous waste opium marc was carried out in Vikram Cement Works under the active guidance of CPCB, Bhopal and Madhya Pradesh Pollution Control Board, Bhopal[5].

Results and Discussion

Co-processing is a more preferred option in comparison to other disposal techniques as it does not give rise to emission of toxic gases like furans and dioxins. It not only uses energy content of the wastes but also uses the material content. No ash or any kind of residue is left in this process. Thus, it completely destroys the waste and eliminates future concerns. Alkaline raw material is used, therefore generation of acidic gases is reduced. Also it is considered as best alternative for disposal of hazardous wastes specifically incinerable waste because of its benefits over resource conservation and reduced carbon emissions. Thus utilization of Hazardous wastes for co-processing is better process than incineration[2,7-8]. Figure 2 depicts comparison between incineration and co-processing.

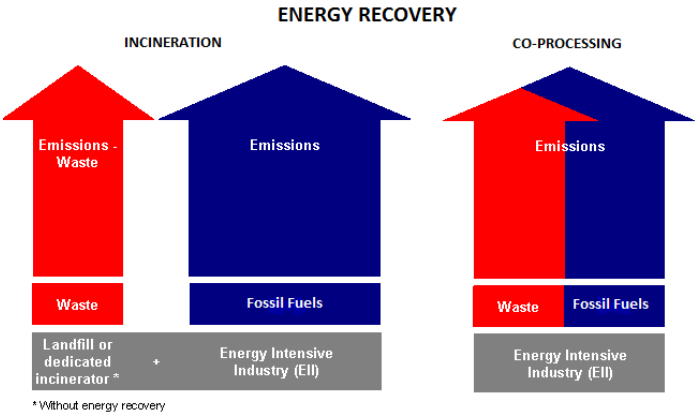

Figure-2
Comparison between incineration and co-processing

Conclusion

Co-processing of opium marc can be effective, environmental friendly, energy recovering and safe technology for its management. 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.

Acknowledgement

I gratefully acknowledge to Government Opium and Alkaloid Factories, New Delhi and Manager, Govt. Opium & Alkaloids Works, Neemuch (M.P.) for giving me permission to carry out my research project. Also I am thankful to Vikram Cement Works (A Unit of UltraTech Cement Ltd) Khor (M.P.) for giving me opportunity to visit their plant. The financial support from UGC is gratefully acknowledged.

References

1. HW (MHTM) Rules 2008. Hazardous Waste (Management and Handling and Transboundary Movement) Rules, Delhi, Ministry of Environment and Forests (MoEF). http://www.legalpundits.com/Content_folder/Haz07112008.pdf **(2008)**

2. Shukla B.P., Dave S, Bala S.S., Gupta P.K., Sharma B K, Basu D. D., Kamyotra J. S. Guidelines on Co-processing in Cement/Power/Steel Industry, CPCB http://www.cpcb.nic.in/divisionsofheadoffice/hwmd/Latest_51_Latest_51_GUIDELINES-ON_CO-Processingin Cement.pdf **(2010)**

3. Zeng X., Sun Q., Huo B., Wan H. and Jing C., Integrated Solid Waste Management under Global Warming, *The Open Waste Management Journal,* **3**, 13-17 **(2010)**

4. Braxton J., Waste Disposal Management - 3 Methods for Waste Disposal, http://ezinearticles.com/?Waste-Disposal-Management---3-Methods-For-Waste-Disposal & id = 4065087 **(2014)**

5. Gautam S.P., Jain R.K., Mohapatra B.N., Joshi S.M. and Gupta R.M., Energy recovery from solid waste in Cement Rotary Kiln & its Environmental impacts, in proceeding of the ICSW 2009 The 24th Internatioanal Conference on Solid Waste Technology and Management, March 15- 18,2009, Philadalphia, PA U.S.A**. (2009)**

6. Agnihotri A., Luharia O.P. and Banerjee S., Solid Waste Management in Govt. Opium & Alkaloid Works, Neemuch (M.P.): Use of Incinerator for environment friendly disposal of Factory Solid Waste or Marc, and Registration of the Filter Aid for Recycling in the Process House, *Res.J.Chem.Environ,* **5(1)**, March **(2001)**

7. Mohapatra B.N., Vyas S. K. and Shekhar C., Indian Experience Of Using AFR In Cement Kiln, in proceeding of the 13th NCB International Seminar and Exhibition on Cement and Building Materials, 19-22 November 2013, Manekshaw Centre, New Delhi, India **(2013)**

8. Bolwerk R., Co-processing of Waste & energy efficiency by Cement Plant, Council Government Munster Domplatz,1-4,D48128Munster. http://www.umweltbundesamt.at/fileadmin/site/umweltthemen/industrie/ippc_konferenz/bolwerk.pdf **(2014)**

9. Bundela P. S., Chakrawarty M. and Gautam S.P., Co-Processing Trial of Spent Carbon at Wadi Cement Works Karnataka, *Am. J. Environ. Sci.*, **6(4)**, 371-378 **(2010)**

10. Gautam S.P., Bundela P. S., Jain R.K. and Padmanabhan V., Co-Incineration Of Textile ETP Sludge In Captive Power House Boiler, *Rec. Res. Sci. Tech.*, **3(4)**, 105-113 **(2011)**