

A Review on Solid Waste: Its Impact on Air and Water Quality

Maheep Kumar¹, Vijay Prakash^{2*}

¹Department of Botany, Shri Vishwanath Post Graduate College, Kalan, Sultanpur, India; ²Department of Microbiology, Shri Vishwanath Post Graduate College, Kalan, Sultanpur, India

ABSTRACT

Air and water are two important factors of life. During the course of evolution these two factors play important role. A suitable air and water quality is course point of life. Now a days air and water qualities affected by Solid waste pollution problem. We started our day to night with these problems. Solid waste causes various types of pollution which leads to disturb our daily life. It not only causes the hazard to humans and animal daily life but also causes ecological imbalance. Solid waste is a source of pathogenic microbial development. Their main impact lies on water, soil and air. Thus in these condition human as well as animals life become so difficult that put question on survival. The amount of garbage increasing daily and the dumping area increases so heavily that it can cover our safe zone and also lead to sewage problem. Both factors ultimately resulted into various severe diseases. In presented review the major problems of garbage or solid waste is concern regarding air and water pollution and its impact.

Keywords: Garbage; Solid waste; Air pollution; Water pollution; Chemicals; Diseases

INTRODUCTION

We know that we have a serious solid waste problem, everywhere when we look garbage disposal is irregular and we are compelled to bear it around us. The garbage or household waste included the entire thing which is not related to human nutrition and utilization [1]. In daily life 250 gram to 1 kg waste material disposed every day [2]. As air and water are two importance factor of life and we can say that it is important for all living and of course non-living things. Increasing solid waste dumping problem is lead to air [3] and water [4,5] pollution in India. Urban society produces garbage and other solid waste every day. More recently, however, man's health and welfare are being affected by environmental pollution. These pollutants are substances present naturally in the environment but when released in significant amount by humans, become toxic. Solid waste has become a global problem for local or regional or national level, due to the rapid population growth, urbanization and industrialization [6].

Ill management of solid waste in most places of developing countries leads to problems that impair human and animal health and ultimately result in economic, environmental and biological losses [7]. Waste impact depends on waste composition and illegal disposal practices. Environmental pollution of waste dumping affects health through both short and long-term effects [8,9]. Examples of short-term effects are congenital anomalies, asthma

and respiratory infection [10]. General symptoms such as stress, anxiety, headache, dizziness, nausea, eye and respiratory irritation has been also described [11]. Long-term health effects related to waste exposure include chronic respiratory and cardiovascular diseases, cancer and even brain, nerves, liver, lymphohematopoietic or kidneys diseases [12].

SOLID WASTE PROBLEM IN INDIA

Solid waste is major problem in Indian cities for this various study, characteristics, generation, collection, transportation and disposal for Indian cities has been carried out to evaluate the current status and identify the major problems [7,13]. Solid waste management is a major challenge in cities with high population density in India as the per capita generation of Muncipal solid waste has also increased tremendously with improved life style and social status of the populations in urban centers [14]. As more land is needed for the ultimate disposal of these solid wastes, issues related to disposal have become highly challenging [15]. Despite significant development in social, economic and environmental areas, Solid waste management systems in India have remained relatively unchanged [16]. Current Solid waste management systems are inefficient, with waste having a negative impact on public health, the environment and the economy [17]. The waste Management and Handling Rules in India were introduced by the Ministry of Environment and Forests [18].

*Corresponding author: Vijay Prakash, Department of Microbiology, Shri Vishwanath Post Graduate College, Kalan, Sultanpur, India, E-mail: vijayprakash1982@gmail.com

Received date: July 29, 2020; Accepted date: September 04, 2020; Published date: September 11, 2020

Citation: Kumar M, Prakash V (2020) A Review on Solid Waste: Its Impact on Air and Water Quality. J Pollut Eff Cont 8:252. doi: 10.35248/2375-4397.20.8.252.

Copyright: © 2020 Kumar M, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Effect of solid waste on air quality

Solid waste creates several noxious gases such as suspended Sulphur Dioxide (SO₂), oxides of Nitrogen (NOX), Carbon Monoxide (CO), Respirable Suspended Particulate Matter (RSPM) and Suspended Particulate Matter (SPM). The dust released from various sources can produce a group of diseases ranging from a simple cold to dangerous diseases like cancer as [19]. The higher concentration of particulate matter causes acute and chronic respiratory disorders and lung damage in humans [20]. Population residing in the vicinity of polluted region by high suspended particulate matter was reported to have a higher risk of cardiovascular diseases and in the dry season, the smoke from the incineration of the dump site is an important source of air pollution for people living far away from it. They therefore complained about chest pains, cough, allergy, irritation, tension and respiratory problems [21,22]. In developing countries solid waste is mainly characterized by high density and moisture content, which when undergoes anaerobic decomposition in landfills, leading to production of landfill gas. The landfill gas mainly consists of about CH₄ and CO₂ together with small amount of volatile organic compounds and other trace gases. Being Green House Gases (GHGs) both CH₄ and CO₂ have global warming potential, which is 25 times higher in CH₄ than global warming potential of CO₂ with atmospheric residence time of 12 ± 3 years [23].

Effect of solid waste on water quality

A water pollutant is a chemical or physical substance present in it at the excessive levels capable of causing harm to living organisms. The chemical hazards are the Copper, Manganese, Lead, Cadmium, Phosphate, Nitrate etc. As the public health concern, the ground water should be free from physical and chemical hazards. The people in and around the dumping site are depending upon the ground water for drinking and other domestic purposes. Other high-risk group includes population living close to a waste dump and those, whose water supply has become contaminated either due to waste dumping or leakage from landfill sites increases risk of injury, and infection [4]. In particular, domestic waste creates favourable conditions to the survival and growth of microbial pathogens [24].

Uncollected solid waste can also obstruct storm water runoff, resulting in the forming of stagnant water bodies that become the breeding ground of diseases such as Malaria, chest pains, Diarrhea and Cholera [21]. Direct dumping of untreated waste in rivers, seas, and lakes resulted in the accumulation of toxic substances in the food chain through the plants and animals that feed on it [25]. Certain chemicals if released untreated, e.g. Cyanides, Mercury and Polychlorinated Biphenyls (PCBs) are highly toxic and exposure can lead to disease or death. Different workers detected higher levels of organic and inorganic pollutants and heavy metals in surface and underground water and water in the vicinity of solid waste landfills [26]. It is reported that urban centers of India produce 120,000 tons of solid waste per day and in almost all the cities, unscientific disposal of solid waste has created environmental pollution [27].

CONCLUSION

The household waste included the entire unused and rough thing which is not related to human utilization. These include unused food, peels of vegetable, rotten food, unused papers, plastic bags, plastic material (wrappers, Likho-phekho pens, broken bucket, tub

etc), unused cotton material, electronic waste, smoke, dust etc. In daily life 250 gram to 1 kg waste material disposed every day. Rotting food and other decaying organic waste allows methane and carbon dioxide to seep out of the ground and up into the air. Methane is a potent greenhouse gas and can itself be a danger because it is flammable and potentially explosive. Carbon dioxide is the most widely produced greenhouse gas. It traps heat in the atmosphere, contributing to climate change. Poorly run landfills may become nuisances because of vectors such as rats and flies which can cause infectious diseases. The occurrence of such vectors can be mitigated through the use of daily cover. Gases are produced in landfills due to the anaerobic digestion by microbes.

Solid wastes are potential problem to human health from improper handling. The main problem to health is indirect and arise from the breeding of disease vectors, primarily Flies and Rats. The household waste along with industrial effluents creates specific danger of concentration of heavy metals in the food chain. Due to soil absorption, uptake, ventilation, leaching, biofactors solid waste may be come in contact with living organism and generate various problems such as Cancer, Low birth weight, neurological diseases, nausea, vomiting and long term irritation in daily life.

Population growth is a major contributor to increasing solid waste in India. Growth of mega cities in India Megacities are a relatively recent phenomenon, associated with globalization of the economy, culture and technology (ISWA 2012). Megacities in India include Ahmedabad (6.3 million), Hyderabad (7.7 million), Bangalore (8.4 million), Chennai (8.6 million), Kolkata (14.1 million), Delhi (16.3 million) and Greater Mumbai (18.4 million (Census of India. 2011).

Peoples are compelled to live in such area. This is not the natural process we are responsible for it. We have to concern these problems and should try to control it.

REFERENCES

1. Burnley SJ. A review of municipal solid waste composition in the United Kingdom Waste Manag. 2007;27(10):1274-1285.
2. Bartelings H, Sterner T. Household Waste Management in a Swedish municipality: Determinants of waste disposal, recycling and composting, Environ Reso Econ. 1999;13:473-491.
3. Lingan BA, Poyyamoli G, Boss UJC. Assessment of air pollution and its impacts near municipal solid waste dumping site Kammiyampet, Cuddalore, India, Int J Inno Res Sci Eng Technol. 2014;3(5):12588-12593.
4. Raman N, Narayanan DS. Impact of solid waste effect on ground water and soil quality nearer to pallavaram solid waste landfill site in Chennai, Rasayan J Chem. 2008;4:828-836.
5. Singh CR, Dey M. Surface water quality with respect to municipal solid waste disposal within the imphal municipality area. Int J Sci Res Pub. 2014;4(2).
6. Hoornweg D, Perinaz BT. What a waste: A global review of solid waste management. Urban development series, knowledge papers no. 15. World Bank, Washington, DC. © World Bank, 2012.
7. Sharholy M, Ahmad K, Mahmood G, Trivedi RC. Municipal solid waste management in Indian cities - a review, Wast. Manag. 2008;28(2):459-467.
8. Mattiello A, Chiadini P, Bianco E, Forgione N, Flammia I. et al. Health effects associated with the disposal of solid waste in landfills and incinerators in populations living in surrounding areas: A systematic review. Int J Public Health. 2013;58:725-735.

9. Porta D, Milani S, Lazzarino AI, Perucci CA, Forastiere F. Systematic review of epidemiological studies on health effects associated with management of solid waste. *Environ. Health. Glob Access Sci Source*. 2009;8.
10. Kah M, Levy L, Brown C. Potential for effects of land contamination on human health. 2. The case of waste disposal sites. *J Toxicol Environ Health Part B Crit Rev*. 2012;15:441-467.
11. Carpenter DO, Ma J, Lessner L. Asthma and infectious respiratory disease in relation to residence near hazardous waste sites. *Ann N Y Acad Sci*. 2008;1140:201-208.
12. Vrijheid M. Health effects of residence near hazardous waste landfill sites: A review of epidemiologic literature. *Environ Health Perspect*. 2000;108:101-112.
13. Kumar S, Bhattacharyya JK, Vaidya AN, Chakrabarti T, Devotta S. et al. Assessment of the status of municipal solid waste management in metro cities, state capitals, class I cities, and class II towns in India: An insight. *Waste Manag*. 2009;29(2):883-895.
14. Sharholly M, Ahmad K, Vaishya R, Gupta R. Municipal solid waste characteristics and management in Allahabad, India. *Waste Manag*. 2007;27(4):490-496.
15. Idris A, Inane B, Hassan MN. Overview of waste disposal and landfills/dumps in Asian countries. *Material Cycles and Waste Manag*. 2004;16:104-110.
16. Narayan T. Municipal solid waste management in India: From waste disposal to recovery of resources? *Waste Manage*. 2008;29:1163-1166.
17. Biswas AK, Kumar S, Babu SS, Bhattacharyya JK, Chakrabarti T. (2010) Studies on environmental quality in and around municipal solid waste dumpsite. *Resour Conserv Recycling* 2010;55:129-134.
18. Ministry of Environment and Forests (MoEF). The gazette of India. Municipal solid waste (Management and Handling) rules, New Delhi, India. 2015.
19. Bency KT, Suresh VM, Kumaran V, Jansy J, Thakappan B, et al. A study on the air pollution related human diseases in Thiruvananthapuram city, Kerala, 2003;15-17.
20. Pulikesia M, Baskaralingama P, Elangob D, Rayuduc VN, Ramamurthia V, et al. Air quality monitoring in Chennai, India, in the summer of 2005. 2006.
21. Sankoh FP, Yan X, Tran Q. Environmental and health impact of solid waste disposal in developing cities: A case study of Granville Brook dumpsite, Freetown, Sierra Leone. *J Environ Prot*. 2013;4:665-670.
22. Triassi M, Alfano R, Illario M, Nardone A, Caporale O. et al. Environmental pollution from illegal waste disposal and health effects: A review on the "Triangle of Death". *Int J Environ Res Public Health* 2005;12:1216-1236.
23. IPCC. Climate change 2007: the physical science basis. In: Contribution of working group I to the fourth assessment report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK and New York, NY, USA. 2007.
24. Gautam SP, Bundela PS, Pandey AK, Jamaluddin Awasthi MK, Sarsaiya S. Diversity of cellulolytic microbes and the biodegradation of municipal solid waste by a potential strain. *Hind Pub Corp Int J Microbiol*. 2012;325907:1-12.
25. BDerraik JG. The pollution of the marine environment by plastic debris: A review. *Mar Poll Bull*. 2002;44(9):842-852.
26. Namasivayam C, Sangeetha D. Recycling of agricultural solid waste, coir pith: Removal of anions, heavy metals, organics and dyes from water by adsorption onto ZnCl₂ activated coir pith carbon. *J Haz Mat*. 2006;135:449-452.
27. Dhere AM, Chandrasekhar BP, Pratapsingh BP, Dhanraj AP. Municipal solid waste disposal in Pune city: An analysis of air and groundwater pollution. *Current Science*. 2008;95:773-777.