International Journal of Life Sciences
Available online at http://sciencescholar.us/journal/index.php/ijls
Vol. 1 No. 1, April 2017, pages: 58~64
e-ISSN : 2550-6986, p-ISSN : 2550-6994
http://dx.doi.org/10.21744/ijls.v1i1.24

Effect of Biodegradation and Non-Degradable Substances in Environment

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Article history: Received 5 January 2017; Accepted in revised form 23 February 2017; Approved 28 February 2017; Available online 2 March 2017

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Keywords

Environment;
Non-Degradable;
Oxo Biodegradable;
Phyto capping;
Pollution;

Abstract

Non-Biodegradable substances produce the greenhouse gasses, methane and carbon dioxide. Growing plants and trees on top of a landfill, a process known as 'Phyto capping', could reduce the production and release of these gasses. In certain parts of the world, it remains the most economical and simplest method of waste disposal. Biodegradation of organic matter in a landfill site occurs most rapidly when water comes into contact with the buried waste. An important step in the drive is to remove environmentally harmful materials from waste streams and drinking water. A synthetic clay known as swelling mica has the ability to separate ions of radium, a radioactive metal, from the water. The finding could have implications for radioactive and hazardous waste disposal, particularly in the cleanup of mill tailings left over from the processing of uranium for the nation's nuclear industry. The tailings contain radium and heavy metals.

Contents

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Introduction

A pollutant that is not broken down by natural processes is a non-degradable pollutant. As we become more technologically advanced, we produce materials that can withstand extreme temperatures, are durable and easy to use. Plastic bags, synthetics, plastic bottles, tin cans, and computer hardware are some of the things that make life easy. DDT, plastics, polythene, insecticides, pesticides, synthetic fibers, glass objects, mercury, lead, arsenic, metal articles like aluminium cans, iron products and silver foils are products do not break down into simpler, harmless substances naturally. They are not biodegradable. These things stay on earth for thousands and thousands of years. When we dispose of them in a garbage pile, the air, moisture, climate, or soil cannot break them down naturally to be dissolved with the surrounding land. However natural waste and products made from nature break down easily when they are disposed of as waste. But as more and more non-degradable materials pile up, there is increased the threat to the environment. The contribution of Thermoplastics is about 80% and Thermoset constitutes approximately 20% of the total plastics waste generated.

There are so many polymeric products which are not utilized or digested by any living system as they don't have digestive enzymes for such polymers. It is roughly estimated that it will take some 3 lac years for the degradation of plastic, therefore, it is called Non-biodegradable but we can re-utilize these things. Degradation related research shows that a banana peel degrades in two months, while notebook paper will break down in three months. Harder substances take longer time. Soda cans can take up to 350 years, while the plastic rings that hold together a six-pack of those cans can take up to 450 years. Glass bottles and Styrofoam products might never biodegrade. The danger is that products that do not biodegrade will continue to pile up over time, requiring more and more land devoted to holding waste. A study shows that low doses of Bisphenol a chemical used in water bottles, food containers, and hard plastics leach into foods and water over time and are carcinogenic, cause insulin resistance and interfere with conception. Constant exposure to heat melts plastic, emitting gasses into the atmosphere in a process known as outgassing. According to the conservation reports, incinerating plastic causes toxic fumes to be released into the atmosphere. The same problem happens with plastics exposed to constant sunlight. One of the most common household wastes is polyethene- mostly used as polythene bags for shopping and carrying light things. Since they are cheap, they are used by almost everyone. The hazard that polythene causes to the environment is very serious.

Non-degradable pollutants create problems because they are toxic and persistent in the environment. We need to deal non-degradable pollutants to reduce the quantity released into the environment either by recycling them for reuse before they are disposed of or by curtailing their production. Biodegradable plastic is Bioplastic, whose components are derived from renewable raw materials and plastics made from petrochemicals containing biodegradable additives which enhance biodegradation. Scientists have been able to develop new types of bacteria, that do not exist in nature, but that will degrade plastics. Biodegradable plastics are plastics that decompose by the action living organisms, usually bacteria.

Biodegradable plastics are Aromatic polyesters are almost totally resistant to microbial attack, while most aliphatic polyesters are biodegradable due to their potentially hydrolysable ester bonds. Naturally Produced, Poly hydroxyl alkanoates (PHAs) like the poly-3-hydroxybutyrate (PHB), poly hydroxyl valerate (PHV) and poly hydroxyl hexanoate (PHH), Renewable Resource: Polylactic acid (PLA); Synthetic: Polybutylene succinate (PBS), poly caprolactone (PCL), Poly

anhydrides, Polyvinyl alcohol, most of the starch derivatives, cellulose esters like cellulose acetate and nitrocellulose and their derivatives celluloid.

Under proper conditions, some biodegradable plastics can degrade to the point where microorganisms can completely metabolize them to carbon dioxide and water. Starch-based bioplastics produced from sustainable farming methods could be almost carbon neutral. Research shows that "Oxo Biodegradable (OBD)" plastic bags release metals, and requires a great deal of time to degrade in certain circumstances and that OBD plastics may produce tiny fragments of plastic that do not continue to degrade at any appreciable rate regardless of the environment. It is found that OBD plastics do not contain metals. They contain salts of metals which are trace elements in the human diet. Conventional plastics are often commingled with organic wastes food scraps, wet paper, and liquids, making it difficult and impractical to recycle the polymer without expensive cleaning and sanitizing procedures. Composting of these mixed organics food scraps, yard trimmings, and wet, the non-recyclable paper is a potential strategy for recovering large quantities of waste. Biodegradable plastics can replace.

There are now biodegradable forms of Styrofoam and plastic also. Recent studies in Biotechnology revealed that some genetically modified bacteria can degrade these plastics into carbon compounds and utilize it. This may be a cure for this plastic pollution. One of the biggest food industry waste products could be used to extract environmentally damaging copper ions from waste water. This readily available waste material can be used to extract toxic copper ions from waste water.

Research Method

The presented research is based on lab work, survey, research papers, and websites. Collected data is tabulated and analyzed. 5 data tables are prepared. Table-1 contains data regarding typical thermoplastic and thermosetting resins. Table-2 shows data about the content percentage of pollutants. In the table-3 data regarding pollution status of India is depicted. Data related to plastic consumption is presented in table-4. Table-5 contains data about plastic waste consumption.

Results and Analysis

Table 1. Typical Thermoplastic and Thermosetting Resins

S.N.	Thermo Plastic	S.N.	Thermoset Plastic
1	Polyethylene Terephthalate (PET)	1	Bakelite
2	Polypropylene (PP)	2	Epoxy
3	Poly Vinyl Acetate (PVA)	3	Melamine
4	Poly Vinyl Chloride (PVC)	4	Polyester
5	Polystyrene (PS)	5	Polyurethane
6	Low-Density Polyethylene (LDPE)	6	Urea – Formaldehyde
7	High-Density Polyethylene (HDPE)		

Source: Central Pollution Control Board

Table 2. Non-Degradable Pollutant % in waste

S.N.	Non-degradable Pollutants	Content %
1	Polythene	33
2	Glass	9
3	Rubber	11
4	Plastic	17
5	Paper	21
6	Chemicals	4
7	Metal Pieces	2
8	Other	3

Source: Central Pollution Control Board

Table 3. Pollution in India

Category	Percentage	Status
Air Pollution	70.3	High
Drinking Water Pollution and Inaccessibility	54.21	Moderate
Dissatisfaction with Garbage Disposal	70.25	High
Dirty and Untidy	64.81	High
Noise and Light Pollution	57.9	Moderate
Water Pollution	68.08	High
Dissatisfaction to Spend Time in the City	63.79	High
Dissatisfaction with Green and Parks in the City	53.12	Moderate

http://www.wealthywaste.com

Table 4. Plastic Consumption in India

S. N.	Year	Consumption (Tones)
1	1996	61,000
2	2000	3,00,000
3	2001	4,00,000
4	2007	8,500,000

Source: Central Pollution Control Board

Table 5. Plastic Waste Consumption

S.N.	Description	World	India
1	Per capita per year consumption of plastic (kg)	24	7
2	Recycling (%)	20	60
3	Plastic in Solid Waste (%)	14	17

Source: Central Pollution Control Board

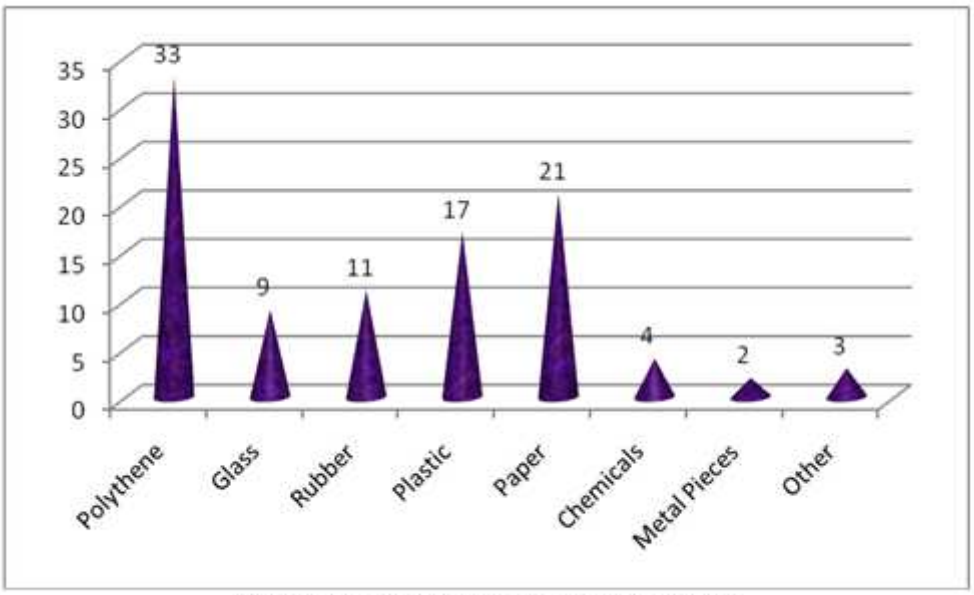

Chart 1. Non Degradable Pollutant % in waste

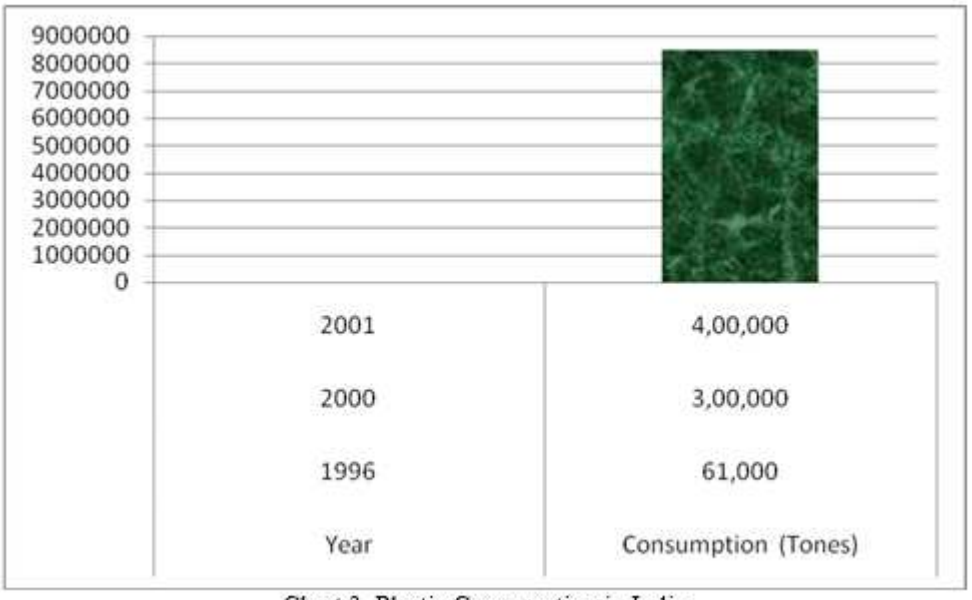

Chart 3. Plastic Consumption in India

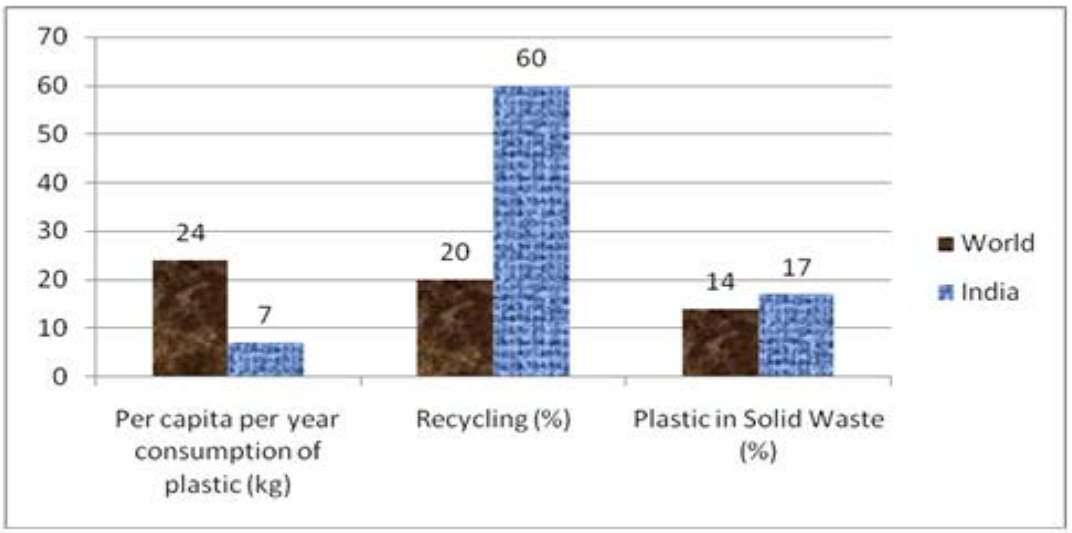

Chart 4. Plastic Waste Consumption

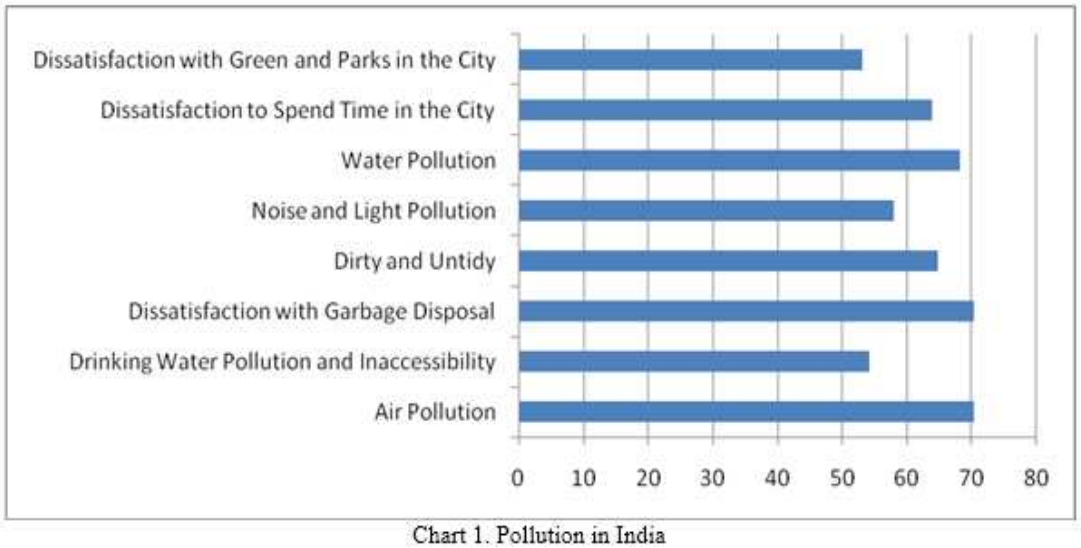

Chart 1. Pollution in India

Table-2 shows contents found in waste. Polythene found in high extent rather than other materials. Paper found 21% while plastic 17% and rubber 11%. Waste contain 9% glass, 4% chemicals, 2% metal and 3% other substances. Table-3 exhibits pollution status in India. Our environment contains 70.3 % air pollution. Dissatisfaction with garbage disposal has 70.25%. Drinking water has contamination 54.21%. Dirty and untidy has 64.81% value. Noise and light pollution also has high value i.e., 57.9%. Water pollution value is 68.08%. Dissatisfactions are also valued. Dissatisfaction to spend time in the city is high i.e., 63.79% while dissatisfaction with green and parks in the city is 53.12% which is moderate.

Plastic consumption is increasing day by day. Its value was just 61000 tons in 1996 it reached 3 lakh within 4 years. This value increased and reached 850000 by 2007. Plastic waste consumption is very low i.e., 24 in the world and only 7kg per capita per year in India. Recycling % in the world is just 20% while it is 60% found in India. Plastic found in solid waste is 14 % in the world and 17% in India.

Conclusion

The whole World is worried about nonbiodegradable substances and their impact on our environment. The hazards by bio nondegradable substances have enormously enlarged. There are ways to decompose of these substances. One way to prevent the accumulation of non-biodegradable trash is to recycle. Another solution is to replace non-biodegradable materials with ones specifically designed to biodegrade. Public awareness is also enhancing and so the magnitude of people who are giving up the use of bio undegradable substances. Nowadays the products, packaging, and articles are manufactured which are biodegradable and thereby enriching the pollution free green healthy environment.

Acknowledgement

The author thank those who supports for completing this article to be published in ScienceScholar Publishing.

References

Arcentales, G. A. T., Lucas, M. A. P., Guerrero, J. A. C., & Gordín, R. G. (2017). Evaluation for the Reduction of NH3 Contamination Risks. International Journal of Life Sciences (IJLS), 1(2), 10-17.

Arnawa, I. K., Sukerta, I. M., Martiningsih, N. G. A. E., & Astuti, P. S. (2017). Minapolitan Area Development Strategy: An Effort to Increase Fisherman Income, Gianyar Regency, Bali Indonesia. International Journal of Life Sciences (IJLS), 1(2), 39-47.

Atulesh, Plastic Consumption in India, http://www.wealthywaste.com/plastic-consumption-in-india

Jain, P., Jain, A., Singhai, R., & Jain, S. (2017). Effect of Biodegradation and Non Degradable Substances in Environment. International Journal of Life Sciences (IJLS), 1(1), 58-64.

Jurado, W. C. C., Pérez, A. V. P., Quiroz, A. M. V., & Gámez, M. R. (2017). Environmental Impact On Electrical Networks Near The Manabita Litoral. International Journal of Life Sciences (IJLS), 1(2), 18-27.

Mufeed Sharholy, Kafeel Ahmad, Gauhar Mahmood, R.C. Trivedi, Elsevier, Municipal solid waste management in Indian cities – A review 2015

Ogu, G. I., & Orjiakor, P. I. (2017). Microbiological and Nutritional Qualities of Fermented Melon Seed Shells. International Journal of Life Sciences (IJLS), 1(2), 1-9.

Ogunsiji, A. S., & Ladanu, W. K. (2017). A Theoretical Study of Performance Measures in the Strategic and Corporate Entrepreneurship of Firms. International Journal of Life Sciences (IJLS), 1(1), 49-57.

Omer, A. M. (2017). Identifying, Developing, and Moving Sustainable Communities through Application of Bioenergy for Energy or Materials: Future Perspective through Energy Efficiency. International Journal of Life Sciences (IJLS), 1(1), 9-39.

Report of Central Pollution Control Board

S.P. Gautam.Bio-degradable Plastics-Impact on Environment, Central Pollution Control Board, 2009.

Saxena, A. (2017). The Impact of Nutrition on the Overall Quality of Life Adolescent Girls are Living Across the City of Kota. International Journal of Life Sciences (IJLS), 1(1), 40-48.

Singh, D. (2017). Leaf Phenology of Cassia Sieberiana L. in KSUSTA Campus of Kebbi State, Nigeria. International Journal of Life Sciences (IJLS), 1(1), 1-8.

Sulistiawati, N. P. A., Kartini, L., & Yuliartini, M. S. (2017). Identification of Development Phases and Changes Shoots Flowering Orange Siam Plants. International Journal of Life Sciences (IJLS), 1(2), 28-38.

Sutapa, I. K., Sutapa, I. N., & Susila, I. N. D. (2017). Implementation of Active Rest in Participatory Ergonomics Decrease Workload and Women Musculoskeletal Complaints of Parking in Mall Ramayana Denpasar. International Journal of Life Sciences (IJLS), 1(2), 48-54.