Journal of Environmental & Analytical Toxicology

Alariqi, J Environment Analytic Toxicol 2012, 2:2
DOI: 10.4172/2161-0525.1000e102

Editorial Open Access

Biodegradation of Medical Plastics: The Future Dream Challenge

Sameh A S Alariqi*

Department of Industrial Chemistry, Faculty of Applied Science, Taiz University, Taiz, Yemen

"Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit. …" (Article 26 of the Universal Declaration of Human Rights) [1].

It would be wonderful for science to reach all those brains across the world without any barriers, to be accessible through the internet. It will be vital for science to gain more from them, acquire new ideas and reach further horizons yet with less obligations that may hinder or limit its development. Human's Right emphasizes the importance of education and acquiring knowledge as a human right to be respected. It is so distressing to see people around the world trying to improve and update their scientific knowledge yet, they can't afford to because they lack the financial means.

Open access journals tend to have a wider scale distribution as it provides a priceless knowledge across the world and it tends to be more evolved. It acquires different experiences and different ideas that may contribute to a larger much more beneficial and practical information. Thus, the minimal the merits bases put in the right to gain science the better outcome is expected. The number of people surfing the internet is markedly increasing day by day especially in those less fortunate areas. It would be a great step in science to reach every net surfing individual to be available in universities, schools and institutes to give a chance for people from different countries and different times to talk one language that is science.

The OMICS Publishing Group strongly believes that removing barriers to research published online will greatly aid the progress in OMICS scientific and technical disciplines. OMICS Publishing Group contains 200 Open Access journals in different fields of sciences such as chemistry, clinical, pharmaceutical, medical, environmental, and life sciences. Abstracts and full texts (HTML, XML, and PDF format) of all articles published by OMICS Publishing Group are freely accessible to everyone immediately after publication. Papers published by OMICS Publishing Group are peer reviewed. Archived online transactions of OMICS Publishing Group provide the international scientific community with immediate and permanent access to individual papers. Furthermore, there are special features of OMICS group journals which are not available in other journals such as digital formatting, audio listening, language translation and the ability to share views on articles via social networking.

Journal of Environmental & Analytical Toxicology (JEAT) from OMICS Publishing Group_aims to provide the most rapid and reliable source of information on current developments in the field of Environmental Toxicology & Analytical Toxicology. It allows researchers to maximize the distribution of their work reaching larger readership. Articles published in open access format are more likely to be cited than those not [2]. Thus, the impact of open access journals is rising for the last couple of years [3]. Journal of Environmental & Analytical Toxicology is a multidisciplinary field of science concerned with studying the harmful effects of various chemical, biological and physical agents on individual living organisms. Knowledge and expertise of the editors and editorial board members of JEAT ensures high quality research articles and allow a comprehensive review of scholarly work which act as a reliable source of information on current developments in environmental science.

Synthetic polymers are ubiquitous in our world, finding diverse applications in many fields because of their useful properties and low cost. They contribute to the enhancement of comfort and quality of life in our modern industrial society. The properties of polymers like durability, resistance to weathering and photo-degradation as well as biological attack and hydrophobicity, have contributed to their skyrocketing utility in different applications. In the biomedical field, they have been the materials of choice for medical supplies such as syringes, catheters, vials, blood transfusion bags, dialyzers for blood purification, etc. The annual plastic waste in the USA is about 15 million tons. The question arises on what is the optimal method for waste management.

Some plastic wastes such as thermoplastics can be recycled to produce other products while the medical plastic wastes cannot be recycled due to their pathological and infection considerations. Thus, medical polymer wastes are mostly incinerated. Incineration of polymers which needs higher energy input and emits toxic gases into the atmosphere. Incineration requires more land-space; finding of acceptable sites for land-filling near urban areas is becoming difficult and involves health risks due to infectious wastes and need of proper biomedical waste management. But from an economic and health aspect plastics which disappear in soil would be an environmentally acceptable method [4]. Bio-recycling/biodegradation can be an alternative to overcome the problem of plastic waste disposal. Biodegradation of polyolefins has been of another paramount importance in the field of research for a few decades. Biodegradation of plastics depends on microorganisms which differ in their own optimal growth conditions in soil thus; it proceeds actively under different soil conditions [5]. Biodegradation rate depends on different factors such as the compost (constitution and temperature, moisture), polymer characteristics, type of organism, and the nature of pre-treatment (such as heat, mechanical, photo and high-energy radiation). Medical plastics such as polyolefins have been found to undergo photo-induced biodegradation [6] in natural and accelerated composting conditions [7].

Recently, we have investigated the biodegradation of γ-irradiated polyolefins in composting and microbial culture an environment at different doses and it was concluded that pre-treatment of γ-irradiation

***Corresponding author:** Sameh A S Alariqi, Department of Industrial Chemistry, Faculty of Applied Science, Taiz University, Taiz, Yemen, P.O.Box:4007, Tel: +967777726927; Fax: +9674221623; E-mail: samehalariqi@yahoo.com

Received February 16, 2012; **Accepted** February 18, 2012; **Published** February 20, 2012

Citation: Alariqi SAS (2012) Biodegradation of Medical Plastics: The Future Dream Challenge. J Environment Analytic Toxicol 2:e102. doi:10.4172/2161-0525.1000e102

significantly accelerates biodegradation of polymer matrix in biotic conditions [8]. It was also concluded that the biodegradation process increases with decreasing the dose rate of γ-radiation [9]. This brilliant idea of using gamma radiation for accelerated biodegradability of biomedical plastics waste was introduced for two reasons: Firstly, high-energy radiation such as gamma radiation destroys the polymer chain into smaller parts making it easier to be consumed by microorganisms. Secondly, gamma radiation sterilizes biomedical plastic wastes by deteriorating DNA of microorganisms. The most common validated dose used to sterilize medical devices is 25 kGy [10]. Consequently, such hypothesis will lead to an increase in biodegradability and avoidance of health hazards making waste management easier, safer and of lower cost.

Since the world is suffering from huge wastes amount such as medical plastic, radioactive, municipal wastes and spend a lot of money for treating them separately. It will be a wonderful aspect to use technology to separate radioactive wastes as a source of gamma radiation which is used for irradiating plastic waste and use the municipal waste to prepare compost by optimal growth of microorganisms to consume the medical plastics via biodegradation technique. It will be a brilliant method to get rid of the three hazardous wastes, which the world is suffering from, eradicate themselves miraculously.

References

1. A Global Perspective on Open Access (2011) UNESCO.
2. MacCallum CJ, Parthasarathy H (2006) Open access increases citation rate. PLoS Biol 4: e176.
3. BioMed Central. Open access journals get impressive impact factors; journals published by BioMed Central get new impact factors from ISI.
4. Scott G, Gillead D (1995) Degradable polymers principles and applications. London, Chapman and Hall.
5. Gemini S, Tennakoon, NS, Weerasekara MLMAW, Nandasena KA (2006) Current Sci 90.
6. Pandey JK, Singh RP (2001) UV-Irradiated Biodegradability of Ethylene-Propylene Copolymers, LDPE, and I-PP in Composting and Culture Environments. Biomacromolecules 2: 880-885.
7. Pandey JK, Kumar AP, Singh RP (2003) Biodegradation of packaging materials: composting of polyolefins. Macromol Symp 197: 411-420.
8. Alariqi SAS, Pratheep K, Rao BSM, Singh RP (2006) Biodegradation of γ-sterilised biomedical polyolefins under composting and fungal culture environments. Polym Degrad Stab 91: 1105-1116.
9. Alariqi SAS, Singh RP (2010) Effect of γ-Dose rate on Biodegradation of γ-Sterilized Biomedical Polyolefins. J Polym Environ 18: 600–607.
10. Booth AF (1979) Sterilisation of medical devices. Buffalo Grove, Illinois, Interpharm Press.