

# REGULATORY REVIEW AND ANALYSIS OF EUROPEAN UNION AND COLOMBIAN PERSISTENT ORGANIC POLLUTANTS IN COMPOST AND ITS IMPACT

Diana Ortiz-Moncada (1), Esperanza Ayuga-Tellez (1), Rocio Ortiz-Moncada (2).

(1) Polytechnic University of Madrid. Department: Forest Economics and Management, ETSI Montes. Polytechnic University Madrid, Ciudad Universitaria s/n. Postcode 28040. Madrid. Telephone: 913366401. Diana Ortiz Moncada. e-

mail:diamalia@hotmail.com. Esperanza Ayuga Tellez. e-mail: esperanza.ayuga@upm.es

(2) University of Alicante. Department of Community Nursing, Preventive Medicine and Public Health and History of Science. University of Alicante. Ap 99. Postcode 03080 San Vicente del Raspeig (Alicante). Telephone: 965903400 Ext. 2632. Fax: 965903964. e-mail: rocio.ortiz@ua.es

## ABSTRACT

Within the current Spanish and Colombian environmental policies related to urban waste, the use of organic waste through composting for use as fertilizer for agricultural use is promoted. There is a deficient classification of waste and pollution generated by the mixture of organic residues and therefore the presence of toxic elements or compounds such as Persistent Organic Pollutants (POPs).

These compounds have bioaccumulating and biomagnifying characteristics and they move easily on air, water and fat. They have harmful effects on health and the environment, affecting food webs, food chains and can be precursors, as indicated by some studies, of infertility, cancer, obesity or diabetes (Porta, M., 2009).

Therefore, and in order to meet existing regulations on POPs in urban compost in Spain and Colombia, a descriptive study was conducted to review legal texts and codes. This study concluded that there are health and environmental standards defining the maximum permissible quality limits to be met by the compost that is currently earmarked for agricultural use. That leads to an urgent need for political decision makers, researchers, scientific societies, academic and labor from different disciplines work together to regulate POPs content in the compost produced from organic waste.

**Key Words:** Persistent Organic Pollutants - POPs, health impact; composting; organic waste.

## 1. INTRODUCTION.

Currently waste related policies formulated by the different governments are focused on their use. One of the most socialized practices is making compost from the organic fraction of municipal waste generated by the population.

The Spanish and Colombian environmental legislation related to waste policy, promotes the use of compost as fertilizer in agricultural soils. Nevertheless it can appear still unknown elements or persistent toxic compounds in this product (Clarke *et al* Bradley O., 2011). As a consequence of the above, largely due to the fact that inappropriate practices are performed, waste classification is carried out at urban level (CMAM, 2010).

The lack of adequate segregation of urban waste (or mixture) makes usual the presence of

some hazardous waste characteristics. These hazardous materials are mixed with the organic fraction, providing Persistent Organic Pollutants (POPs) in compost and consequently generating a byproduct that can be introduced in many bioaccumulators and biomagnifiers species through food webs, including of course humans.

This large-scale production of urban compost and subsequently its use as agricultural fertilizer can be another source of the presence of POPs in the food chain, generating impact on the health of humans and the environment. These are substances that only living organisms can excrete, and whose presence level increase in biological fluids during growth. Specifically found in blood, body fat, placentas, amniotic fluid and other organs. They are characterized by containing chlorine atoms, they do very well to dissolve in the fat from the middle and along the food chain (Porta, M. 2009).

Therefore, in this study, a comparative analysis related to the content of POPs in the urban compost on the rules of the European Union, Madrid (Spain) and Bogota (Colombia) is presented. The objective is to establish the potential impact on health and the environment of these products. The inclusion of Madrid and Bogota is mainly because local authorities of these two cities have issued some related rules about handling larger volumes of waste, and they are applicable in their area of environmental jurisdiction.

The POPs are highly stable organic compounds and toxic to humans and the environment. They are also bioaccumulative, biomagnificative and easy to travel in air and water. POPs are a group of organic compounds; some are natural but most are produced artificially by man, are highly toxic and have a longer persistence in the environment very long due to their physicochemical characteristics. Being an artificial compound, bacteria and other organisms can not easily decompose and degrade. Many have hormonal effects and cumulative, because they are stored in fatty tissues of the food chain.

They are among the persistent organic compounds, toxic chemicals, which are classified as pesticides, organochlorine insecticides, herbicides, PCBs. These chemicals are toxic substances that generally are not present in nature, but have been synthesized by chemists from simpler substances.

## **2. MATERIAL AND METHODS.**

Descriptive study of literature review of legal texts by:

- a. Google as a search engine, using Boolean operators.  
Key words:  
Persistent Organic Pollutants (POP), organic waste, effect POP in health and environment, composting;
- b. Database: Web Knowledge: Key words: Persistent Organic Pollutants–POP-, health impact;
- c. Websites: European Parliament, Environment Ministry of Spain and Colombia. Variables: Regulatory texts defined as standards and ethical codes.

## **3. RESULTS.**

22 legal texts and 5 ethical codes were found. The first group is related to or regulates the quality to be met by the use of compost from organic waste - ROU-for use as manure or fertilizer in agricultural soils. Codes found are provisions to establish guidelines of best practices in integrated waste management that are aimed at improving health and the environment.

In the European Union, including Spain, there was no specific rule regarding the maximum allowable value of POPs that can contain the urban compost produced. In the case of Colombia, the standard of quality compost produced POPs included in the PCB (Poly Chlorinate Biphenyls), however, this standard does not define agricultural uses which may be allocated to the compost. (RAS, 2000).

Table 1 lists the legal texts and codes of POPs in compost of the European Union and international conventions. Table 2 shows these same texts and codes of Madrid (Spain) and Bogotá DC (Colombia) and Table 3 presents the rules and codes of POPs in Spain and Colombia.

#### **4. CONCLUSIONS.**

The results raise concerns on the absence of specific rules setting maximum limits for POPs content in the compost used as fertilizer in agricultural crops, both in Spain and Colombia.

The above shortcoming and the fact that segregation of the organic fraction of municipal waste is not appropriate in the two countries, reflect that the compost currently earmarked as fertilizer in agricultural crops is not of good quality, and that therefore the possibility of POPs concentrations in this material is important. The consulted rules basically define the sanitary quality of compost using parameters primarily related to heavy metals. Likewise, there is a general lack of evidence in the two countries on reliable scientific studies that reveal the presence of POPs in the urban compost.

Although some studies show the presence of POPs in humans and therefore should be a source of regulation of these substances (Porta M, 2009) (Kharlamov O. et al., 2008) Colombian and Spanish rules do not seem to have in consideration these studies, leaving a large and important void about the maximum permissible limits to be met by the compost that is intended for agricultural use.

This lack of regulation in environmental policy in relation to the regulation of parameters of environmental health surveillance and the use of compost generated from the use of ROU, has an adverse impact on health. Systematically affects the different levels that make up the food chain in the medium and long term, as evidenced in some studies such as the impact on infertility disorders, birth defects, learning disabilities and neurobehavioral development, obesity, diabetes, cancer, Alzheimer, Parkinson and others diseases (M. Porta, 2009).

Therefore, it is required that political decision makers, researchers, scientific societies, academic and union of different disciplines, including environmental and health, work together to regulate POPs content in the compost produced from the ROU. This is because it is a legally permitted practice, unknown and potentially unsafe for the health of people and the environment.

TABLE 1. Normative relationship about POPs European Union / International Agreement.

<b>LEGISLATION FOR PERSISTENT ORGANIC POLLUTANTS – POPs – IN COMPOST</b>			
<b>EUROPEAN UNION / INTERNATIONAL AGREEMENT</b>			
<b>EUROPEAN UNION</b>		<b>INTERNATIONAL AGREEMENT</b>	
<b>Stockholm Convention/2004</b>	The objective of this Convention is to protect human health and the environment from persistent organic pollutants. This treaty requires parties (governments of countries) eliminate and restrict the use of persistent toxic compounds - CTP.	<b>Stockholm Convention/2004</b>	The objective of this Convention is to protect human health and the environment from persistent organic pollutants. This treaty requires parties (governments of countries) eliminate and restrict the use of persistent toxic compounds - CTP.
<b>National Implementation Plan- PNA - Stockholm Convention.</b>	The National Implementation Plan - PNA - is intended to implement the Stockholm Convention on POPs with a comprehensive approach at covering the life cycle of these compounds POPs.	<b>Law 253/1996 Basel Convention</b>	Ratified the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.
<b>Bylaw 850/2004</b>	Aims to "protect human health and the environment from persistent organic pollutants", taking into account into account, in particular the precautionary principle.	-	-
<b>Directive 91/156/CEE</b>	Under Community law relating to waste.	-	-
<b>Directive 1999/31/CE</b>	On the landfill of waste and the establishment of waste acceptance criteria and types of landfills, among which are inert waste.	-	-
<b>Decision 2000/532/CE</b>	Regulates the European Waste Catalogue (EWC) and identifies the categories of wastes considered hazardous.	-	-

TABLE 2. Normative relationship about POPs in Madrid (Spain) and Bogotá D.C. (Colombia).

<b>LEGISLATION FOR PERSISTENT ORGANIC POLLUTANTS – POPs – IN COMPOST</b>			
<b>COMUNITIES OF MADRID (SPAIN) / BOGOTÁ D.C. (COLOMBIA)</b>			
<b>COMUNITY OF MADRID</b>		<b>BOGOTÁ D.C.</b>	
<b>Law 5/2003</b>	<ul style="list-style-type: none"> <li>•Regulates the powers and waste planning, economic and financial measures, legal status of production and possession of waste. Also provides release rates.</li> <li>• Declares owned public service reserved for the Madrid RCD eliminating all municipalities, except those generated in cities exceeding 300,000 inhabitants.</li> <li>• Sets the revision of the plans of the Community of Madrid in waste every 4 years.</li> </ul>	<b>Decree 312/2006.</b>	By Adopting the Master Plan for Solid Waste Management for Bogota Capital District.
<b>Law 6/2003.</b>	Set the waste disposal tax in order to encourage recycling and recovery of waste.	<b>Decree 620/2007.</b>	Through which complements the Solid Waste Master Plan (Decree 312 of 2006),by adopting the urban and architectural standards for the regulation and construction of infrastructure and equipment of the Solid Waste System in Bogota Capital District.

TABLE 3. Normative relationship about POPs in Madrid (Spain) and Bogotá D.C. (Colombia).

<b>LEGISLATION FOR PERSISTENT ORGANIC POLLUTANTS – POPs – IN COMPOST</b>			
<b>SPAIN / COLOMBIA</b>			
<b>SPAIN</b>		<b>COLOMBIA</b>	
<b>Law 22/ 2011</b>	Waste and contaminated soils. Repeals Law 10 of 1998.	<b>Political Constitution of Colombia/1991</b>	Establishes inter alia that "All persons are entitled to a healthy environment" and in this context regulates national environmental regulations.
<b>Bylaw (CE) 850/2004</b>	By which hosts and the European Union regulates the Stockholm Convention of 22 May 2001.	<b>Decree Law 2811/1974. Renewable Natural Resources Code</b>	Which is issued by the National Code of Renewable Natural Resources and Environmental Protection.
<b>Royal Decree 1310/1990</b>	By regulating the use of sewage sludge in agriculture.	<b>Law 1196 of 2008</b>	By approving the "Stockholm Convention on Persistent Organic Pollutants," made in Stockholm on May 22, 2001.
<b>Royal Decree 1481/2001</b>	Regulate disposal of wastes disposal by landfill	<b>Decree 377/2009</b>	By means of promulgating the "Stockholm Convention on Persistent Organic Pollutants" made in Stockholm on May 22, 2001, the "Correction to Article 10 of the original Spanish text" of February 21, 2003 and "Appendix G. the Stockholm Convention "of May 6, 2005.
<b>Orden MAM/304/2002</b>	Are published for recovery and disposal of waste and European Waste List.	<b>Agenda 21/1992. Chapter 21</b>	Sets the environmentally sound management of solid wastes and issues related to sewage.
<b>Royal Decree 824/2005</b>	Aims to establish the basic rules on fertilizer products and standards needed for coordination with the autonomous communities. Includes standard that refers to the quality of the compost (Group 6 of Annex I). Standard defines permissible limits of heavy metals (Annex V).	<b>Law 99/ 1993</b>	Determines the responsibility of the municipalities on solid waste disposal and in the process of carrying out decontamination and sanitation projects, thus recognizing the inadequate disposal of solid waste reduces the life of landfills and prevents harnessing the potential value of raw materials that can return to productive and economic circuit.
-	-	<b>Law 142/1994</b>	Public Utilities Act. Sets the rate of public utility services of water, sewage and toilet and states that the use of waste is a public service activity In the cleaning public system.
-	-	<b>Policy for integrated management of waste/1998</b>	Its main objective is to prevent or minimize, in the most efficient, the risks to humans and the environment that cause solid waste and hazardous, especially to minimize the amount or the danger of coming to disposal sites end, contributing to effective environmental protection and economic growth (prepared by the National Council for the Social Economy - CONPES -).
-	-	<b>Technical Regulations of the drinking water and basic sanitation – RAS/2000.</b>	Title F. Urban sanitation systems. Defines the maximum permissible limits to be met by the quality of compost.
-	-	<b>Decree 1713/2002</b>	Regulates Law 142 of 1994 and Decree Law 2811 of 1974 and Act 99 of 1993 concerning the Integrated Solid Waste Management.

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