# STUDY REGARDING THE WASTES RECYCLING ESPECIALLY OF THE PLASTIC WASTES

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***Abstract***

*This paper represents a documentation regarding the multiple categories in which waste can be divided based on different factors such as: the generating source, the composition, the main waste treatments, on the reuse possibilities, based on the aggression towards environment, special waste that is not in previous categories, waste from construction, and also about the general guidelines regarding approaches in waste management applied to satisfy an objective, an organization and a global coordination. There must exist high range applicability measures and also specific measures able to solve local problems and also a method to involve the community members in order to separate waste and collecting it.*

*The last part of the paper is about plastic recycling, advantages and disadvantages of collecting and recycling this particular material and also general information about PET.*

## INTRODUCTION

When talking about waste management, in order to estimate the effects on the environment, the discussions are not just about the technique of removing waste, but also the priority strategies and activities to avoid the formation of waste and recovery methods. It is also recommended estimating the quantity and quality of the remaining remnants, ways to treat them, and also the long-term emissions.

The major routes of spread of harmful substances in unprotected waste deposits is air, soil and water. The risk of emissions and the need to achieve technical barriers that prevent dispersal in the environment is a prerequisite in adopting measures for protection and prevention of pollution, widely used today in developed countries.

Depending on the material from which is made the product can be influenced on the period during which becomes biodegradable. Here are some products that we use and varies as a period of decay:

*Table 1*

The deterioration period for different materials

| | |
|---|---|
| Aluminum cans | 10-100 years |
| Paper scraps | 3 months |
| Glass containers | 4000 years |
| Plastic bottles | 100-1000 years |
| Matches | 6 months |
| Chewing gum | 5 years |
| Credit cards | 1000 years |
| Plastic bags | 100-1000 years |

**INFORMATION REGRADING GENERAL CATEGORIZATION OF WASTE**

**Waste can be divided in more categories depending on the source that generates them**:

- household waste and related with household waste, derived from domestic activities or related with this that can be taken with precollection current systems from localities or the ones produces in industry, commerce, public or administrative domain, that presents a composition and properties similar with household waste and are collected, transported, processed and storage along with them
- construction waste derived from construction or demolition of public or civil buildings
- municipal solid waste that includes food wastes, market wastes, yard wastes, plastic containers and product packaging materials, and other miscellaneous solid wastes from residential, commercial, institutional, and industrial sources
- green waste is biodegradable waste that can be composed of garden or park waste,suchas grass or flower cuttingsand hedge trimming; the differentiation *green* identifies it as high in nitrogen, as opposed to *brown* waste, which is primarily carbonaceous.
- industrial waste derived from technological processes
- agricultural waste derived from agricultural and livestock units
- animal waste derived from slaughterhouses, livestock units, rendering territory

**Based on composition waste are divided in :** inorganic waste : metals and nonmetals, from constructions (concrete, plaster, paving, etc), glass, pottery, ash, clay, various aggregates, inorganic sludge; organic waste : plant debris, animal remains, paper, cardboard, textiles, plastics, wood, cork, scrap leather and fur processing, organic sludge; food waste represents remains obtained during processing, storage, preparing or consuming food products; leaves and grass are phyto residue derived from public and private sector, except wood or any other waste derived from agricultural sector; twigs and branches are also phyto residues derived after pruning, in public and private sector; residues from agriculture are phyto waste obtain during the growth

of crops; this sections does not include existent waste after harvesting or the waste obtained after pruning works in orchards; textiles are articles made from textile fibers woven or spun, clothes; also includes clothes made from synthetic fibers, fabrics and curtains, but excludes couch fabric, leather clothing or shoes; other organic waste that are not included above, usually a mix of organic waste

**Based on main waste treatments :** combustible waste (paper residues, cardboard, textiles, plastics, wood, cork); fermentable waste (food scraps, vegetables, fruits, manure); inert waste (metallic and non-metallic remains, form construction - concrete, plaster, paving, etc.,), glass, pottery, clay, ash, soil).

**Based on reuse possibilities:** waste reuse per se (glass, metals ferrous and nonferrous, textiles, plastics, tannery, leather, fur, wood, cork, rubber); waste reuse as second basic materials (paper scraps, cardboard, glass, metals ferrous and nonferrous, textiles, plastics, tannery, leather, fur, wood, cork, rubber, food waste, vegetal waste, vegetables, fruits, manure)

**Based on the aggression towards environment :** dangerous waste, explosive, oxidizing, flammable, irritant, harmful, toxic, carcinogenic, corrosive, infectious, teratogenic, mutagenic, ecotoxic; the higher risk is due to the fact that if there are not properly managed the ecosystems can be seriously affected; inert waste are represented by that category that does not suffer any physical, chemical, or biological transformation, with a low pollution risk.

**Special waste :** ash derived from combustion of solid or liquid materials, also includes ash from waste incineration facilities; mud is waste due to municipal wastewater treatment; industrial mud is the outcome of treating industrial wastewater; medical waste are waste from medical institutions; bulky waste are large scale waste, hard to manage and are not included in any of above categories; other special waste that are not specified in above categories such as asbestos.

**Waste from construction and demolition:** concrete, construction material compound of sand, gravel, cement and water used in foundation construction of buildings, pavements, etc; asphalt used in road paving; building wood material used in making doors, windows, as pillars, beams, etc .; gypsum board made as a "sandwich" compound of a gypsum layer placed between two layers of paper. It is used for leveling walls, bridges, etc. This includes worn or damaged boards, gypsum boards walls, etc .;rocks, soil. Example: This category includes rocks, stones, gravel, sand, clay and soil; other construction and demolition waste includes waste that is not defined in the above categories. Usually these materials are composed of several building materials. Example: This category includes brick, ceramics, tiles, sinks, waste mixed with flat glass, wood, ceramics, tiles, etc.

The most important sources and categories of waste resulting from crop production, animal production and food industry and represent vectors of transmission of infectious diseases, raising serious problems in terms of pathogenic potential are: agricultural waste; waste and waste from livestock farms; waste and waste from the food industries; waste and residues from chemical and pharmaceutical industry; household waste, street and industrial; wastewater and sludge settling; waste and special waste. (Domuta C., 2011). The need to develop waste management strategies also results from the fact that along with increasing demands, the problems from waste management, become increasingly complex and requires different approaches. A serial of individual measurements need to be applied to satisfy an objective, an organization and a global coordination.

The most relevant guidelines are briefly explained beneath :

- implementation of specific measures for sanitation (selective collection of old material for recovery, separate collection and removal of hazardous organic waste, safety waste removal);
- the coordination and ordering of sanitation measures ( choosing a legal form suitable for the operation of waste management, searching and finding suitable private parties for the performance of operations on waste disposal and sanitation measures, along with the community, supporting and coordinating measures to marketing and safekeeping of recoverable materials);
- a periodic check-up of the sanitation service ( the elaboration of balance sheets with the quantities and material gathered and also a cost examination, as the basis for a possible continuation, change or improvement of waste management objectives);
- informing and advising waste producers to minimize the amount of waste generated, as well as encouraging recovery measures
- designing and issuing local provisions (decisions of the Local Council, rules and regulations) considered as the most important legal basis for achieving waste removal, with the possibility to influence citizens behavior in order to reduce quantities of waste (eg waste sanitation regulation, the obligation to have containers for scrap and to use the sanitation system, collection and transportation, taxes, etc.) as well as the formation of a consciousness in the spirit of a safer and ecological sanitation.

Waste disposal on regions should be established and coordinated with the surrounding towns and villages. In the future will more regional solutions will be necessary with wide applicability of waste management, which does not necessarily means that high technical installations are needed. We can think here for example at the collaboration of several towns and / or villages to organize a regional strategy.

Solutions based on wide range applicability does not exclude specific measures in cities and villages. Cities and villages may have an advantage due to citizen involvement in separate collection of recyclable waste. In a global concept, there must be established methods with a wide and narrow applicability. Also, in the global concept should be taken into account and integrated also the structures and the measurements of valorization either communal or private. The concept of integrated waste management may be useful in the authorization of manipulation and waste removal installations in order to prove the comprehension of waste management priorities - prevention prior to recovery before the organic removing - and to argument the need installation. We add here that the implementation of waste sanitation facilities, especially disposal areas and incineration, will be difficult also in Romania, due to the lack of environmental awareness of the population.

The need of a disposal area for waste management, for example, must be exposed, in a global concept, along with related measures, in a credible manner to the public. Finally, it must be avoided, in the adoption and implementation of waste management concepts, especially the wrong decisions due to uncoordinated action and action-oriented to individual measurements, that can create implementation problems in sanitation process.

**Plastic recycling**

This product has a wide using spread on global level, due to its advantages: low cost, low weight, cheap fabrication technology. Plastic represent a big problem for our country. Usually the highest percentage in waste is plastic.

The recycling process changes mechanical proprieties of plastic, so it is not possible to recycle large amounts of a certain type in order to be reinstated immediately in the same production process. For recovery of materials separation, sorting and cleaning different types of plastics is indispensible.

Plastic is made from oil, gas and coal. The bulk of the material used in plastic production from petroleum refining residues that would otherwise be burned or wasted. PET bottles can be easily collected and recycled, this can be done very easily by using special containers located.

*Table 2.*

Advantages and disadvantages of PET recycling

| Advantages | Disadvantages |
|---|---|
| Low weight | Big volume |
| Large variety of properties | Biodegradable war |
| Properties which cannot be attenuated by other materials | High pollution level at incineration |
| Longevity | High number of additives that pollutes |
| Easy to fabricate | Hard to recycle (high diversity, difficult decomposition process) |
| Low energy for production | Main substances are carcinogenic |

Recovery of plastic packaging is a big challenge, primarily due to the large number of PET (polyethylene terephthalate - is a sophisticated material high resistance) used very efficiency as a beverage container:- plastic bags are non-biodegradable. Once in the ocean, these bags cause the death of marine animals that become entangled in them or ingest them; - the ink used for printing bags contains cadmium and is highly toxic, metal is released into the air with burning bags; - recycling a plastic bottle is enough to save energy necessary to run a 60W bulb for 6 hours; - a third of the garbage collected annually and more than half of plastic waste is represented by packaging; -about 30% of the plastic produced is used for packaging; - Americans throw of 2.5 million plastic bottles every hour.

**CONCLUSION**

The main objective is to reduce as much as possible the waste quantity, to treat and to deposit all types of waste according to ecological techniques. Based on the category of waste there are different methods for storage, treatment and reuse the waste under other form. The measures and methods imposed, all the steps and the chronologically order must be part of a clear concept of integrated management waste. Plastic is one of the most spread types of waste and due to its characteristics is easy to recycle it and use it in various forms.

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