



CHALLENGES IN PLASTIC RECYCLING

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Abstract

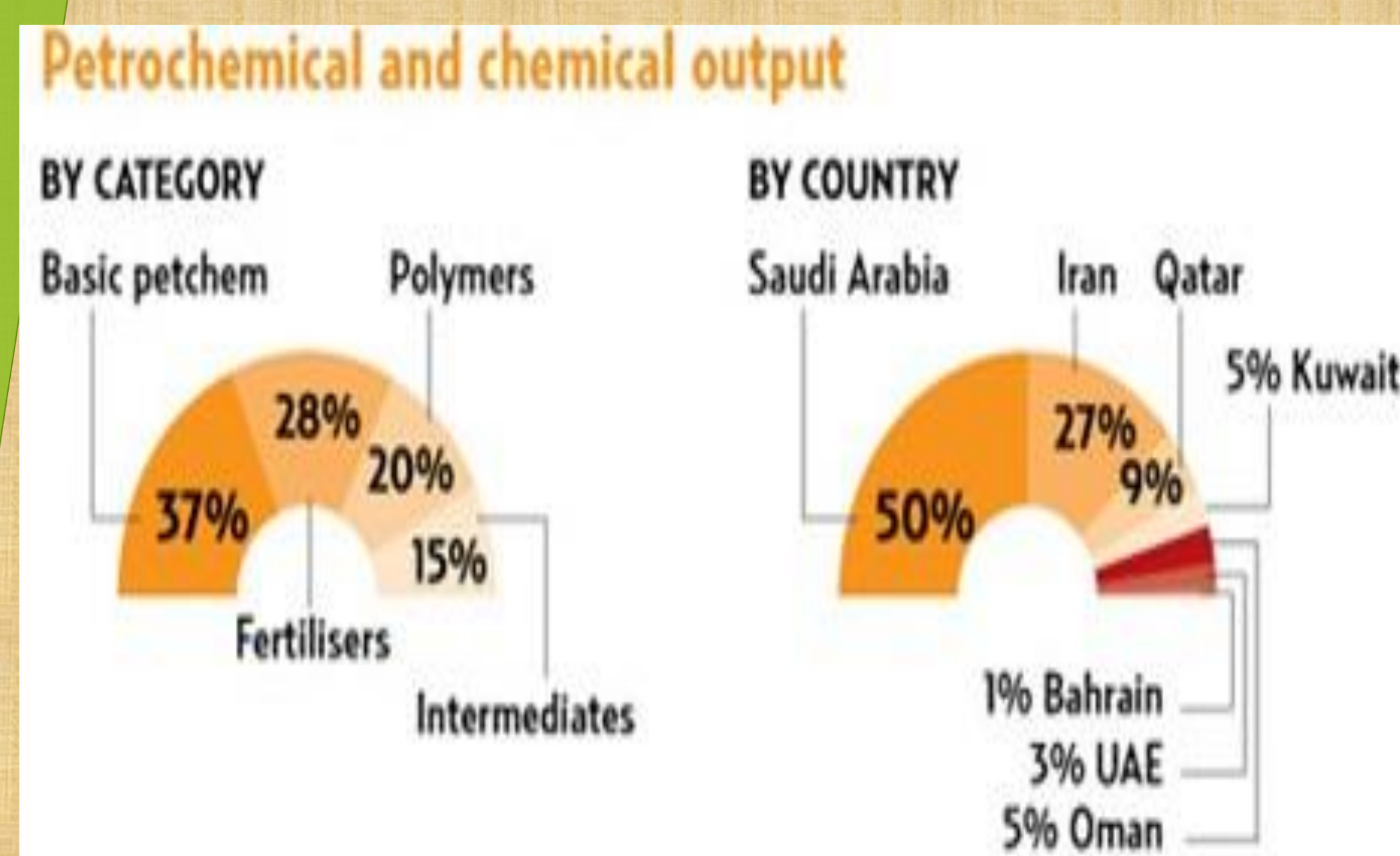
This paper presents an overview of the plastics and challenges in its recycling. Today plastic became a necessary thing in our daily life, so the wastage of plastic is also quite common but, plastic is one of the major cause for pollution. To reduce the plastic, recycling is one of the main method but there is also some problems in recycling. In this paper challenges in plastic recycling is discussed.

Plastics

Plastics are typically organic polymers of high molecular mass, but they often contain other substances. They are usually synthetic, most commonly derived from petrochemicals, but many are partially natural. Plastic is light, easy to store and transport, comes in an endless variety of textures and shapes, and can hold almost anything. These properties make plastic attractive to manufacturers.

Plastic is in almost everything we touch. Plastic will give good strength with energy requirement of 3.1KWH/kg which is much more less than that of the materials like glass, paper and aluminum. The process cost and versatile application of plastics attracted the manufacturers and as well customers to use it in many industries.

Today, plastics are almost completely derived from petrochemicals produced from fossil oil and gas



Around 4 per cent of annual petroleum production is converted directly into plastics from petrochemicals. The main disadvantage of the plastic is inertness, because of this property it won't degrade and polluting the environment. India plastic consumption is around 6.5 million tons, in which less than 1% is from carry bags. To reduce pollution by plastics REUSE and RECYCLE are the useful processes.

Plastic Recycling

Recycling of plastics is one method for reducing environmental impact and resource depletion. Fundamentally, high levels of recycling, as with reduction in use, reuse and repair or re-manufacturing can allow for a given level of product service with lower material inputs than would otherwise be required. Recycling can therefore decrease energy and material usage per unit of output and so yield improved eco-efficiency. Recycling is the process of collecting and making new products from it by means of heating the products. The main drawback in this process is we can't recycle every type of plastics what we used



A major challenge for producing recycled resins from plastic wastes is that most different plastic types are not compatible with each other because of inherent immiscibility at the molecular level, and differences in processing requirements at a macro-scale. Thermoplastics, including PET, PE and PP all have high potential to be mechanically recycled. Thermosetting polymers such as unsaturated polyester or epoxy resin cannot be mechanically recycled, except to be potentially re-used as filler materials once they have been size-reduced or pulverized to fine particles or powders.



Challenges In Recycling

For many years, communities and recyclers have struggled to create recycling programs for other types of plastics with little success because of these issues:

(a) Collection

Collection of plastic wastes can be done by 'bring-schemes' by the municipalities of the corresponding towns or through curbside collection. Bring-schemes tend to result in low collection rates in the absence of either highly committed public behavior or deposit-refund schemes that impose a direct economic incentive to participate most curbside collections are of co-mingled recyclables (paper/board, glass, aluminum, steel and plastic containers). In terms of the overall consumption typically only 30-40% of post-consumer plastic bottles are recovered, as a lot of this sort of packaging comes from food and beverage consumed away from home

(b) Sorting

Sorting of co-mingled rigid recyclables occurs by both automatic and manual methods. Automated pre-sorting is usually sufficient to result in a plastics stream separate from glass, metals and paper (other than when attached, e.g. as labels and closures). Generally, clear PET and pigmented HDPE milk bottles are positively identified and separated out of the stream



(c) Size reduction and cleaning

Rigid plastics are typically ground into flakes and cleaned to remove food residues, pulp fibers and adhesives. The latest generation of wash plants use only 2-3 m³ of water per tone of material

about one-half of that of previous equipment. Innovative technologies for the removal of organics and surface contaminants from flakes include 'dry-cleaning', which cleans surfaces through friction without using water

(d) Further separation

After size reduction, a range of separation techniques can be applied. Sink/float separation in water can effectively separate polyolefin (PP, HDPE, L/LLDPE) from PVC, PET and PS. Use of different media can allow separation of PS from PET, but PVC cannot be removed from PET in this manner as their density ranges overlap. Other separation techniques such as air elutriation can also be used for removing low-density films from denser ground plastics.

Public Responsibility In Recycling

The public should be aware of the plastic waste and its effects on environment. By voluntarily the public should support the recycling. Awareness of recycling should teach to the children. Everybody should aware of the plastic waste and its effect on environment



Conclusions

In summary, recycling is one strategy for end-of-life waste management of plastic products. Together we can recycle useful plastics to avoid pollution. Awareness of plastic pollution is also important.