

## Editorial

# Plastics – still young, but having a mature impact

A simple matter, yet it is so complicated. Plastic is in every aspect of our lives, from the morning toothbrush to the garbage bag that is carried out at the end of the day. Let us begin with a brief review of a couple of interesting facts about plastic. The first plastic sandwich bags were introduced around 1957, with plastic trash bags showing up in the US in the late 1960's. The first patent for a polyethylene terephthalate (PET) soda bottle was issued in 1973 to Nathaniel Wyeth. However, despite the fact that the PET bottle is a mere 25 years old, it has made a humongous impact on our society. One has to marvel how quickly plastic materials have infiltrated the day to day workings of our society and daily life routines, as well as becoming the rallying post for documenting environmental impacts of our human society.

It is estimated that each year 500 billion to 1 trillion plastic bags are used worldwide. This amounts to approximately one million plastic bags being used every minute globally, which is a clear indication of how dependent our day to day activities have become on plastic. However, the disappointing aspect of this is not in the “horrific” use of plastics, but is actually in the dismal recycling rates that are actually occurring. In particular for plastic bags, it is estimated by the US-EPA that a mere 1% of the plastic bags that are produced eventually are recycled in the US. Low recycling rates plague all potentially recyclable plastics. According to the National Association for PET Container Recycling (NAPCOR), there was an estimated 1.17 billion pounds (0.5 Tg) of PET bottles recycled in 2005 in the US, which is a quarter of the 5 billion pounds (2.3 Tg) of PET bottles produced in the US. One has to wonder why we are stuck at a recycling rate of 25% for consumer plastics in the US, particularly since the US peaked in 1995 with a PET recycling rate of nearly 40%. With so much plastic surrounding us, one would think we would be able to separate at least the plastics we use everyday for recycling or reuse. However, this is not a problem facing the US alone. Plastic has become prolific throughout developed countries due to the convenience and simplicity it offers manufacturers and consumers alike. In 2001, the UK Environmental Agency estimated that 80% of the post-consumer plastic ended up in a landfill and a mere

7% was recycled. However, some laws are being enacted to try to improve plastic's life cycle, and some improvements have been realized in recycling rates both in the US and other parts of the world. San Francisco, in March of 2007, became the first major city in the US to ban the use of petroleum based plastic bags at city grocery (and drug) stores and New York is considering similar legislation requiring collection and recycling at larger retail stores. This idea of banning plastic bags is not new. Other bans or taxes on plastic bags exist in communities in Australia, China, Ireland, Italy, South Africa, Taiwan and the UK. I am sure there are other countries that I am missing too. Taxes on plastic bags have been shown to be useful in reducing consumer use. Back in 2002, Ireland introduced a tax on plastic bags, which correspondingly reduced their use by 80–95%. The European Union has also enacted directives trying to promote the recycling of plastics used in packaging and commercial applications. There are a few bright spots in the world of PET recycling. For example, in Switzerland over 82% of PET sold is recycled, which just indicates that high recycling rates are indeed feasible.

Ever since its invention, consumers have been using more and more plastic. In the US, it is estimated that each person uses 80 kg of plastics per year. For Europe, the total reported consumption varies from 11 kg per person per year in Finland to 24 kg per person per year in Spain and Italy. One of the key reasons cited for this large variation is the relatively large consumption of water in PET bottles within these Southern European countries (similar to the US). Italians drink the most bottled water, with the average consumption being around 200 l per person annually. In the US alone, just from PET bottles, the household waste stream is handling 4 billion pounds (1.8 Tg) a year, and this will continue to increase if the current trends in recycling are not improved.

With the current attempts to reduce costs in manufacturing by promoting recycling of used materials, one would think that plastic recycling would be a gold mine of opportunity. However, this gold mine has not translated into reality. In the US, the demand for recycled plastic is severely lagging behind the source of the recycled plastic materials. This is also the case in the UK, where it is

estimated that the demand for recycled plastics is three-times higher than the current supply of recycled plastics. There are numerous new technological advancements and new market opportunities in the plastic recycling arena. However, without a source of recycled materials, the outlook is bleak in terms of the economic sustainability of these new plastic recycling enterprises.

The real culprit in this current situation is not plastic itself. It is what happens to plastic after it has served its intended use, and in particular the estimated 75% of all consumer plastics that are not recycled. There are emerging technologies to handle the recycling of these materials and

it is time to find a mechanism and/or motivation of consumers to improve the recycling rate, even if it is one bottle at a time.

K. Spokas

*Associate Editor, Waste Management,  
USDA–ARS,*

*Adjunct Professor, University of Minnesota,  
Department of Soil, Water and Climate,  
St. Paul, MN,*

*United States*

*E-mail address: [Kurt.Spokas@ars.usda.gov](mailto:Kurt.Spokas@ars.usda.gov)*