

28 Oct 2007

Plastics for Environment & Sustainable Development

From practically zero in the fifties, humankind today consumes close to 175 million tonnes of plastics. We truly live in a 'Plastics Age', says Padma Shri Dr. S. Sivaram, Director, N. C. L. Pune

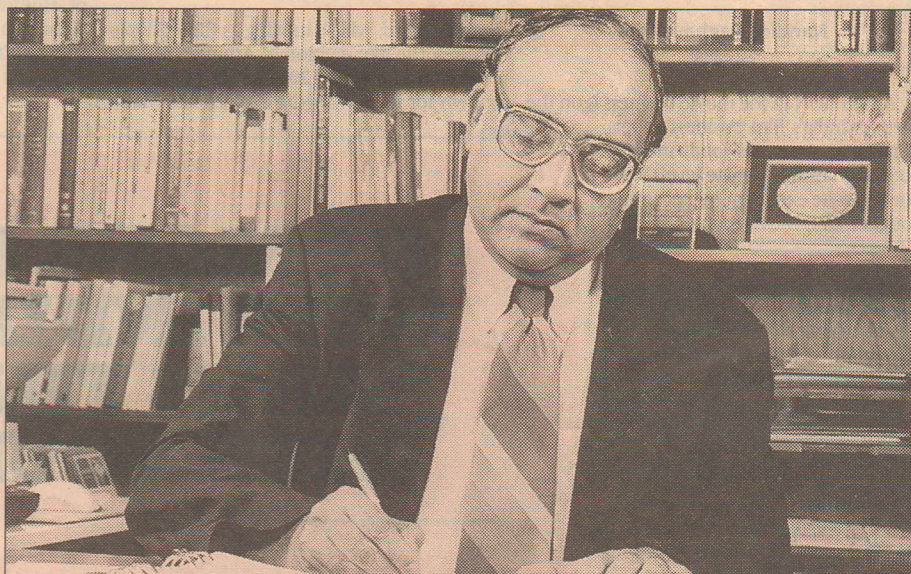
Plastics are ubiquitous in today's world and have contributed to the improvement in the quality of life. There is no human activity where plastics do not play a key role, from clothing to shelter, from transportation to communication and from entertainment to health care, opines Padma Shri Dr. S. Sivaram, Director, N.C.L., Pune. Plastics, because of its many attractive properties, such as lightweight, high strength and ease of processing, meet a large share of the material needs of man. From practically zero in the fifties, humankind today consumes close to one hundred and seventy five million tonnes of plastics. We truly live in a 'Plastics Age'. Our daily lives would be very much poorer without plastics, rubber and synthetic fibers.

Nature has produced 'plastic'-like materials for centuries. Silk and cellulose are example of natural polymers. Reference to Shellac, a thermoplastic can be found even in Mahabharatha!

Plastics are employed in myriad applications where they actually conserve natural resources.

For example, aseptic packaging of food in barrier packaging films will render refrigeration unnecessary, saving capital and energy. Edible oils and milk are packaged in flexible packages eliminating the use of tin and glass containers. Rigid HDPE barrels are used for bulk chemical storage instead of steel drums. Apart from conserving natural resources, use of plastics in these applications saves transportation fuel as plastics are substantially lighter than tin, glass or steel. This specific characteristic of plastics is especially made use of in industries like the automobile & aviation, resulting in fuel efficiency.

Modern buildings and constructions use plastic doors, windows, floor and wall coverings instead of wooden ones, ultimately saving trees. In Agriculture, plastics are used in irrigation pipes, tubes, hoses to better the micro-irrigation system



Padma Shri Dr. Swaminathan Sivaram—Director, National Chemical Laboratory, Pune

as well as in greenhouses, mulching films, increasing productivity. The health care sector uses plastics in blood bags, tubing, heart catheters, IV fluid bags, disposable products (gowns, masks, syringes) because it is both hygienic as well as easier to handle than other

materials. Lifestyle products like electrical appliances, furniture, luggage, toys are also made of plastic for similar reasons. Safe drinking water packaged in PET bottles is a very common sight now-a-days. They provide confidence to the consumer on the quality of water and help reduce waterborne diseases. The fact that plastics are made from hydrocarbons derived from petroleum, which is non-renewable, has raised questions concerning its sustainability. Nevertheless, the consumption of petroleum hydrocarbon for the production of plastics is less than 5%, the balance being consumed as fuels and energy source. Consequently, concerns about sustainability of plastic materials is somewhat exaggerated. On the contrary, processing of many natural materials (glass, paper, wood, metals) consume far more energy derived from fossil fuel. Additionally, research and development work currently in progress globally will provide future opportunities to make some of the plastics from biomass and other renewable resources. It is fair to say that plastics replace several natural materials, which are either scarce, consume more energy for processing or cause damage to the eco-systems during their production. Thus, use of plastics makes a positive contribution to the sustainability of earth's resources in myriad ways.

Another issue that is often discussed is whether because of their non-biodegradability, plastics will cause damage to our eco systems. The signature of all natural materials made by biological processes is that they are biodegradable and bio-assimila-

ble. The long life and desirability of plastics, which have made them a material of choice for many applications is seemingly a disadvantage when it comes to their disposal. However, when handled properly, plastics do little damage to our environment.

Plastics have the advantage that they can be easily reprocessed and recycled. In some cases, one can recover even the raw materials that were originally used in their manufacture. Plastics offer the unique advantage that one can recover the fuel value contained in the hydrocarbon polymer after its use. The overall eco-friendliness of plastics becomes apparent when one evaluates the total 'life cycle', namely, an analysis of raw materials, energy, effluents, methods of disposal, etc., of a material from its origin to its final disposal.

It is believed that established scientific data will set to rest any lingering doubts about the sustainability of plastics as materials or their adverse impact on our environment and will lead to more enlightened discussion on the role of plastics in the armoury of materials used by men.

Courtesy: Indian Centre for Plastics in the Environment

FACTS

- Plastics require minimal energy to process as compared to many natural materials, thereby conserving energy
- Easy to reprocess and recycle
- In some cases, it is also possible to recover back the monomer used or the calorific fuel value after the plastic has been subjected to use

THE ECONOMIC TIMES
POLYMERS
Magazine

Stretching possibilities and creating opportunities for the Plastics Industry.

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