PREFACE
The rapid industrialization of modern petrochemicals, and its interrelated plastic industry have introduced a large number of pollutants into the environment. In fact, the growth of plastic industry has been the most spectacular than any other industry in the last four decades. The versatility of plastic comes mainly from its use in a wide range of products. From a simple packaging and storage material for food and other items, its application ranges over a wide spectrum and goes up to its use in space craft. Thus, plastics are deeply rooted in every type of human activity in daily life. Its wide applications are due to certain preferable qualities such as, low price, light weight, wide range of colour acceptability, rustlessness, easy processability and design freedom resulting preference over other conventional raw materials like wood, glass and steel.

There has been an enormous increase in the production of plastic in India. It has increased very rapidly from 0.24 lakh tonnes in 1965 to 4.92 lakh tonnes in 1985 and is expected to be 24.4 lakh tonnes by the end of the century. The present indigenous capacity for different raw materials is about 3 lakh tonnes per annum and per capita consumption is 0.64 kg in India.

Plastics are basically the organic polymers constructed by chain like attachment of monomers along with some supplementary agents known as additives. The finished plastic products are generally considered to be inert, non
toxic and safe, if manufactured using standard chemicals and protocols recommended by national and international regulatory agencies. However, they may be harmful to the consumers due to leaching of certain chemical additives and unreacted monomers since some of the leachable compounds have been reported to be toxic.

Workers engaged in the production handling and processing of chemical additives and plastics have been found to suffer from diseases like dermatitis, allergic responses, hepatic and neuro disorders and even cancer. Besides industrial workers, the users of plastic products are also continuously exposed to varying concentrations of certain leachable chemical components of plastics e.g. plasticizers, stabilizers, heavy metals, unreacted monomers etc. as a result of their leaching from finished plastics and their ubiquitous presence in the environment.

India is a vast country where the physical and geographical conditions vary from one part to the other. The materials stored in plastic pouches/containers in most cases are often subjected to high temperature and sunlight during their transportations. In rural areas and also in some of the urban areas plastic containers are used for the storage of food materials which have an acidic pH like, pickles, vinegar, curd etc. and are also exposed to sunlight for curing. Usually fruit juices, vegetable oils, transfusion fluids are stored in plastic pouches/containers for prolonged period and may be exposed to higher
temperature during their delivery. However, the specifications of Bureau of Indian Standards for safety assessment of the plastic materials used for food packaging and drinking water have not taken into full account of these specific conditions.

Keeping this view in mind, attempts have been made to evaluate the safety and quality of widely used plastic materials under prevailing Indian conditions. The implication of physico-chemical factors such as, pH, temperature, storage time and chemical nature of extracting media on the leaching pattern of chemical additives from plastic wares have been studied. Moreover, the concentration of different phthalate plasticizers and monomers leaching out under such conditions were also quantified to know the levels to which consumers are likely to be exposed. These observations will serve as a baseline data and will help in formulating new guidelines/protocols for the safer use of plastics in our country.

Amongst the leachable additives, plasticizers and stabilizers have been of a great concern. Significant quantities of phthalate plasticizers (e.g. DEHP) and organotin stabilizers (e.g. DBTL) have been detected in commodities kept in plastic containers. Plastic dumps and wastes are also one of the ways of dispensing them in environment. Organotin compounds due to their wide applications as fungicide, biocide and insecticide, have
also entered as environmental contaminants. So, the general population is continuously exposed to these toxicants in variable quantities. Moreover, simultaneous leaching of phthalate plasticizer and organotin stabilizer from the plastic wares during their use adds to the toxicity of plastic.

Polyamines are the species which play important role in cell growth, proliferation and protein synthesis. In addition polyamines play key roles in controlling brain functions, such as, second messengers, modulation of synaptic transmission by influencing the neurotransmitter uptake and experience dependent brain growth. The present study was undertaken to evaluate effects of plasticizer DEHP, stabilizer DBTL alone and their combination on the regional brain, liver and kidney polyamine levels in adult rats. During co-exposure metabolism of one xenobiotic in the presence of other may be altered in the biological system due to the modifications in the activity of enzymes responsible for their metabolic disposition. In the light of simultaneous exposure from plastic and from environment, attempts have been made in the present study to assess the effects of the plasticizer DEHP and stabilizer DBTL and their combination on hepatic xenobiotic metabolising enzymes.