



Shriram Institute for Industrial Research

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Microplastics are now common in Human Blood causing Endocrine disruption, Cancer & Hormonal imbalance

Introduction

SIIR studies have identified Phthalate esters in toys and many packaging materials migrating to food. Phthalate esters. This is a serious and growing concern.

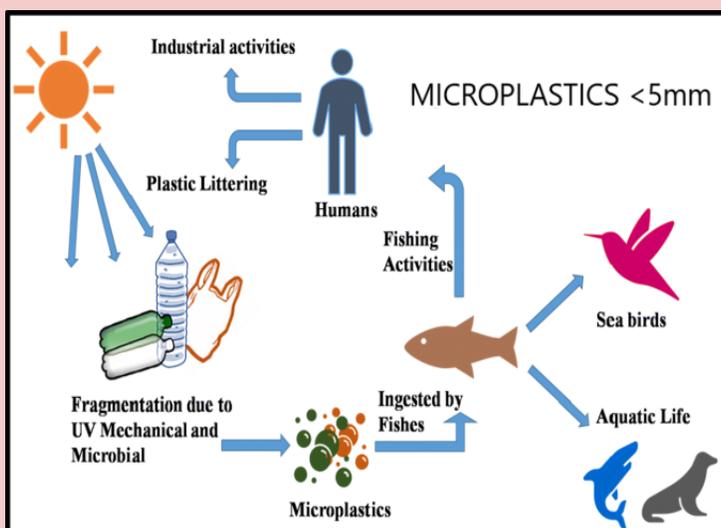
Phthalate esters are important industrial chemicals added to plastics to provide cheaper, lighter, stronger and safer products and consumer goods. These plastics can be designed for packaging so as to keep our foods fresh, provide therapeutic benefits through timed-release pharmaceuticals and prevent electronics and other household items from starting or spreading fires. They are used in children's toys, and childcare articles made of polyvinyl chloride (PVC). Industrially, phthalates confer flexibility, pliability and elasticity to plastics. Phthalates are also used as solvents in many applications and in cosmetics to hold fragrance, reduce cracking of nail polish, reduce stiffness of hair spray, and make products more effectively penetrate and moisturize the skin.

Frequently used phthalate plasticizers are:

- di (2-ethylhexyl) phthalate (DEHP),
- diisodecyl phthalate (DIDP),
- diisononyl phthalate (DINP),
- di-methyl phthalate (DMP),
- di-ethyl phthalate (DEP),
- di-n-butylphthalate (DBP),
- butylbenzylphthalate (BBP), and
- polyethylene terephthalates (PET).

Phthalates are used in many different consumer products and these chemicals migrate out easily. After

migration from food processing equipment and packaging, they are found in food products. Food is the leading source of exposure. Phthalates have been found in dairy products, meats, fish, oils & fats, baked goods, infant formula, processed foods and fast foods. They easily escape from food processing equipment, food packaging and food preparation materials and contaminate food at points all along the supply chain.



Recycled cardboard food packaging may have higher concentration of phthalates than virgin cardboard. The potential of phthalates to cause adverse effects in humans was evaluated by the National Toxicology Program Center for the Evaluation of Risks to Human Reproduction. The National Toxicology Program (NTP) panel concluded that there was "concern" about possible exposures to the most common phthalate, di-2-ethylhexyl phthalate (DEPH), in healthy infants, and "serious concern" for exposures in very sick infants, due to potential leaching from medical equipment. These concerns prompted the European

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Union to ban certain phthalates from cosmetics and children's products.

What are the possible health impacts?

This is concerning and alarming as exposure to phthalates is linked to a range of serious health issues as listed:

Endocrine disruption: Some phthalates are endocrine disrupting chemicals (EDCs) as they interfere with hormones that play very important roles in growth and development.

Abnormalities in the male reproductive system: Higher levels of phthalates exposure may damage DNA in sperm.

Effect on hormones: Large phthalate exposure leads to reduced testosterone levels and altered thyroid hormone production.

Neuro-developmental effects in infants or children: Pregnant women exposed to phthalates may give birth to children with behavioral and cognitive issues. These effects can include Attention-deficit / hyperactivity disorder (ADHD) like behaviors, aggression, depression, a lower IQ, and autism.

Cancer: Phthalates are linked to liver and other types of cancer and considered as possible human tumor-promoting agents

Asthma: Studies have linked phthalate exposure to asthma or other respiratory symptoms.

SIIR proposal to help in addressing this problem

According to Directive 2007/19/EC, specific migration limits for DEHP at 1.5 mg/kg; BBP at 3.0 mg/kg; DBP at 0.3 mg/kg; DINP/DIDP at 9.0 mg/kg in sum and overall migration limit of 60 mg/kg in food.

With centralized instrument facilities and extensive sample preparation techniques, Shriram Institute for Industrial Research, Delhi (SIIR) holds the capability to assess phthalate contamination in food products to ensure it does not contain excessive amounts of restricted phthalates. With the aim of ensuring continuous monitoring of food safety and mission to protect human health and the environment, SIIR pursues in addressing the issue of phthalate contamination and its adverse biological impact by conducting and supporting research to improve and provide testing capability to play an important role in the prevention of potential health risks for citizens.

A. Preventive Approach

As the leaching of phthalates into food products depends upon the type of plastics used for in its processing, packaging, storing and transportation, SIIR can perform sampling and quality check of:

Plastic items used in food processing;

- Packaging materials
- Air quality monitoring
- Shelf life study of food products after processing and packaging;
- Ready-to-eat food during storage period
- Ready-to-eat microwavable food.

B. Post-production Approach

On account of catering the needs of Food industries, SIIR propose:

- Bio-monitoring study;
- Data analysis and statistical analysis
- The surveillance by collection of different packaged food products
- Imparting training and sensitization to Industry personnel's and Small Scale Entrepreneurs for replacement of plastic packaging

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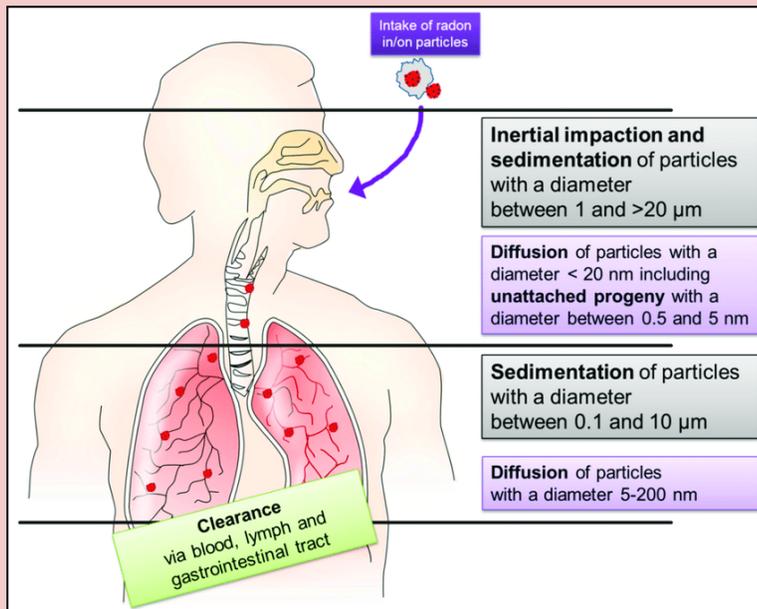
- Performing export inspection
- Performing rejection analysis and fault findings

C. Alternate technologies to address the problem:

Despite the size of the issue of Phthalate contamination, they are extremely and widely used. These cannot be replaced overnight. Hence, we need to use alternatives.

Infrastructure facilities at SIIR to address Phthalate contamination

As per address to the concern of phthalate contamination, at SIIR we have the facilities and method for determination of various phthalates by using Gas Chromatograph Mass Spectrometer (GC-MS/MS).



Why is SIIR the right agency to work with to protect and promote Indian export and “AtmaNirbhar Bharat”?

SIIR is an independent, self-sustaining, non-profit multi-disciplinary Indian institute established in 1947. SIIR is the only Institute in the country which has In-house world class infrastructure for various sectors which can offer inter-departmental and cross-functional capabilities and is a part of the journey of “Atma Nirbhar Bharat”.

Shriram Institute for Industrial Research is a single point solution provider for all technical requirements in the following areas:

SIIR has a Toxicology facility where a wide range of toxicological studies are being undertaken as per National and International guidelines. The facility can be used for generation of toxicological data of phthalates.

SIIR undertakes Research & Development of materials with tailor-made properties. Further, SIIR has Shriram Institute-Technology Business Incubator (SRI-TBI) which has been promoted by the Department of Science & Technology, Ministry of Science & Technology, Government of India to provide multi-dimensional services to Entrepreneurs in the field of Rubber & Plastics processing. These facilities can be used for developing alternatives to the banned phthalates.

- a. Industrial Training
- b. Skill development to meet buyers demand
- c. Research and Development
- d. Analysis Support Services
- e. Technical Seminars and Workshops

The way forward

- SIIR is undertake
- Please visit our facilities and witness the infrastructure developed at SIIR to solve this problem.
- SIIR will be happy to have a partnership with affected trade bodies to solve this problem.

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