Desafíos críticos para avanzar hacia la circularidad de los plásticos

Desafío 1: Reducción en el uso de plásticos flexibles problemáticos y/o con mayor riesgo de fuga a la naturaleza

a. Descripción general/objetivo

Promover tecnologías, innovaciones y mejoras de diseño que permitan eliminar plásticos problemáticos o innecesarios y reducir el uso de envases y productos plásticos mediante estrategias de rediseño, minimización y nuevos modelos de negocio.

b. Contexto o desafío crítico a resolver

Actualmente, el empaque suele ser el protagonista en la experiencia del producto, influenciado principalmente por criterios de mercadotecnia, lo que puede derivar en un uso excesivo de materiales. Es necesario reenfocar la propuesta de valor hacia el contenido, promoviendo modelos de consumo más sostenibles y funcionales, sin comprometer la protección, integridad y vida útil del producto.

c. Áreas de interés prioritarias

- Envases reutilizables para productos concentrados o diluibles, diseñados para reemplazar formatos como doypacks, con soluciones que aseguren higiene, facilidad de uso y reciclabilidad al final de su vida útil.
- Alternativas funcionales al empaque flexible de plásticos convencionales, incluyendo multilaminados, con barreras avanzadas (aroma, humedad, oxígeno) pero de bajo impacto ambiental.
- Sustitutos para films de embalaje (stretch film) mediante soluciones reutilizables para transporte de mercancías.

d. Otras áreas de interés

- Sistemas de reúso y recarga (refill), en casa, comercios o en estaciones móviles, especialmente para productos de cuidado personal y del hogar.
- Soluciones innovadoras de envases reutilizables que reemplacen plásticos flexibles en eventos presenciales y patios de comida.

- Soluciones de trazabilidad para empaques reutilizables (marcadores químicos o físicos, códigos resistentes al lavado).

e. Consideraciones generales para las soluciones

Las soluciones deben alinearse con las recomendaciones locales para la eliminación de plásticos problemáticos y cumplir con la legislación vigente. Se priorizan aquellas con cadenas de suministro viables, prueba de concepto validada, enfoque inclusivo (que atienda a diferentes sectores de la población) y escalabilidad en mercados locales.

Challenge 2: Enabling the recycling of flexible plastics through design and intermediate technologies

a. Overview / objective

To promote innovation in the design of flexible plastic packaging and products that enable their recycling, prioritizing approaches such as monomateriality, the elimination of non-recyclable components (adhesives, inks, labels) and the use of technologies that facilitate their recovery, classification and processing.

b. Context or Critical Challenge to Be Solved

Many flexible packaging is not recyclable in practice due to multilayer designs or components incompatible with local recycling technologies. In addition, current infrastructure faces barriers to identifying, collecting, and processing these materials. It is necessary to advance in design solutions, such as monomaterials, that demonstrate their effective recyclability in real conditions, including their collection, classification and processing.

c. Priority Areas of Focus

- Mono-material packaging alternatives to facilitate recycling, including sachets, doypacks, bags and films.
- Labels, inks, adhesives, or other components that do not interfere with recycling streams or facilitate processes.
- Replacement of plastic barriers that are not recyclable in practice such as nylon or EVOH in bags and films.

d. Other areas of interest

- Circular solutions for face-to-face events and food courts, incorporating recyclable materials or those that facilitate recyclability.
- Traceability solutions for flexible packaging.
- Logistics solutions for the effective collection of these materials (especially small formats), including return mapping and reverse logistics.
- Sorting technologies that improve the identification and separation of flexible plastics (colour, density, infrared, etc.), reducing time and errors in the process.
- Smart coatings that improve product preservation and facilitate recycling (easy to remove, soluble, etc.).

e. General considerations for solutions

They should consider local recycling infrastructure, avoid difficult-to-separate mixed components, and facilitate material traceability. **Priority is given to solutions that already have functional or pilot tests in comparable contexts, as well as those that integrate eco-design and cost-effectiveness criteria from their conception.**

Challenge 3: End markets for recycled polypropylene (PP) and mixed polyolefins (PP/PE) material

a. Overview/Objective

To develop and scale market applications for recycled polypropylene (rPP) and/or polyolefin blends (PP/PE) that currently face large technical, economic, and demand barriers, especially in higher value applications.

b. Context or Critical Challenge to Be Solved

The recycling of PP and its mixtures is limited by material variability, lack of standardization in formulations, and low demand for recycled products with stable properties, especially in food contact or high-throughput applications.

c. Priority Areas of Focus

- Technologies that allow different resins to be combined while retaining mechanical properties and barriers comparable to virgin resins.
- Innovations in machinery and filling processes that adapt to variable calibers of recycled materials that allow the efficient use of these resins as raw materials.
- Advanced recycling solutions (by dissolution, dry cleaning) that improve the quality of rPP and eliminate odor, color, or contaminants.
- Development of end markets for rPP and mixed polyolefins (PP/PE) in rigid, secondary or industrial packaging applications, with traceability and quality control.

d. Other areas of interest

- Recycling systems for flexible post-consumer PP that are scalable.
- Design of products that integrate rPP/rPE stably in their formulations (non-food packaging, furniture, construction).

e. General considerations for solutions

Solutions are required to consider compatibility with local recycling infrastructure, the availability of waste as raw material. In the case of mixed polyolefins, it will be valued that they include mechanisms to identify the proportion of materials in the mixture or that they demonstrate their recyclability and integration into high-value products, regardless of this proportion. **The technical validation of the proposed solutions is**

key, as well as their commercial viability and compliance with quality regulations (especially if food contact is sought).