Applying the SSbD framework for the development of bio-based PFAS-free alternatives for textile and packaging sectors – The ZeroF case study

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1. Introduction

The Chemical Strategy for Sustainability (EC, 2020) has introduced several ambitions in the innovation environment, through the introduction in 2022 of the "Safe and Sustainable by Design" (SSbD) framework (Caldeira et al., 2022 / EC, 2022), for chemicals and advanced materials. The framework is intended to support research and innovation (R&I) activities for the development of alternatives that are designed and produced with the use of available resources in a more ethical and sustainable way.

The SSbD framework has been developed by the Joint Research Centre (JRC) and is currently being tested in various, wide industrial applications and research projects for refinement and further development. The framework defines the general approach, provides guidance for the definition of safety and sustainability criteria, and describes the related evaluation procedures.

Within the ZeroF project (http://zerof.eu/), the application of the framework performed to support the development of the per- and polyfluoroalkyl substances (PFAS) alternatives for the packaging and textile coating applications and ensure their safety and sustainability. The project consortium aims at guiding the design of the new materials and verify their compliance with safety and sustainability criteria through the two main components of the framework: i) the (re)design phase, and ii) the safety and sustainability assessment phase. In this study we present in detail how the re(design) principles have been iteratively applied and how the safety and sustainability has been implemented in parallel with the innovation processes. Preliminary information of the safety and environmental sustainability assessments are presented, related to steps 1&2 (safety assessment) and step 4 (environmental sustainability assessment) of the SSbD framework. Initial plans related to the socio-economic assessment (step 5) of the ZeroF case studies are discussed. The application of the SSbD framework to real life innovation

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processes comes along with specific advantages but also with sets of challenges faced, mainly related to data availability and complex laboratory scale or industrial setups.

2. References

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