

RADAR

RENEWABLE AND SAFE AROMATIC COMPOUNDS

AS REPLACEMENTS FOR SUBSTANCES OF CONCERN



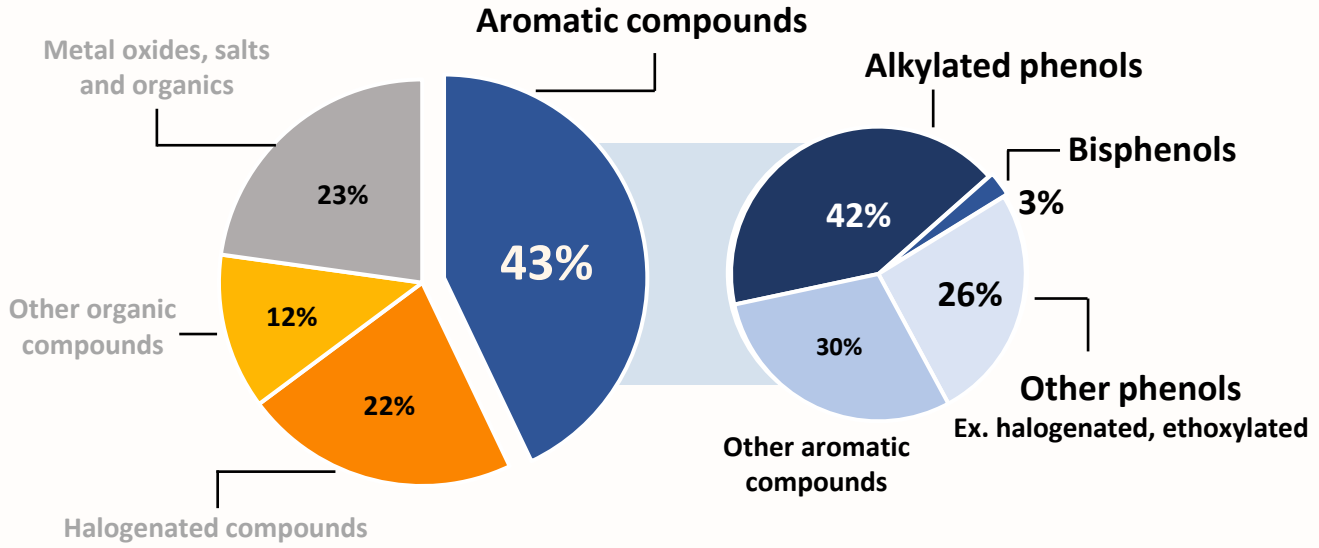
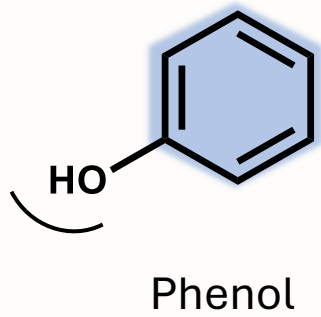
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FOSSIL-BASED SVHC AROMATIC COMPOUNDS

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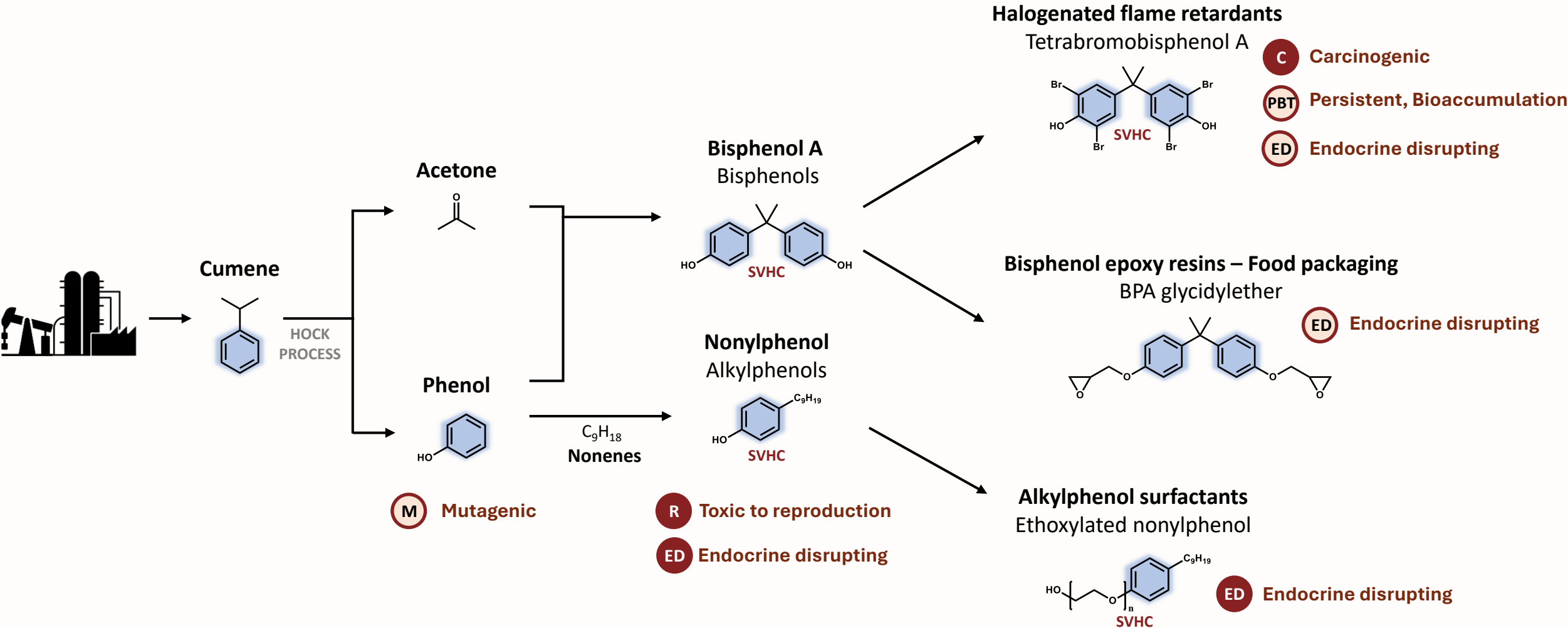
SUBSTANCES OF VERY HIGH CONCERN (SVHC LIST ECHA)



43% of SVHCs are aromatics

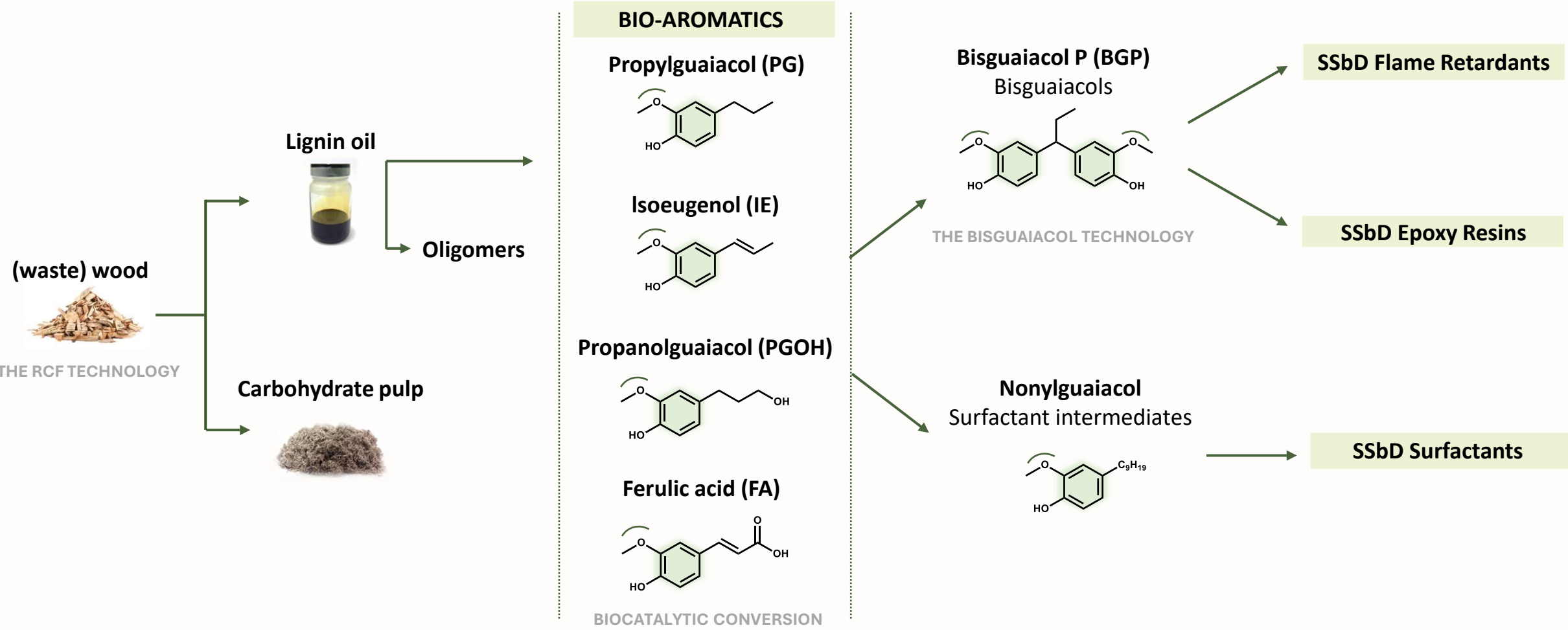
30% of SVHCs are phenols

CURRENT FOSSIL-BASED SVHC ROUTE



○ Suspected as
● Recognized as

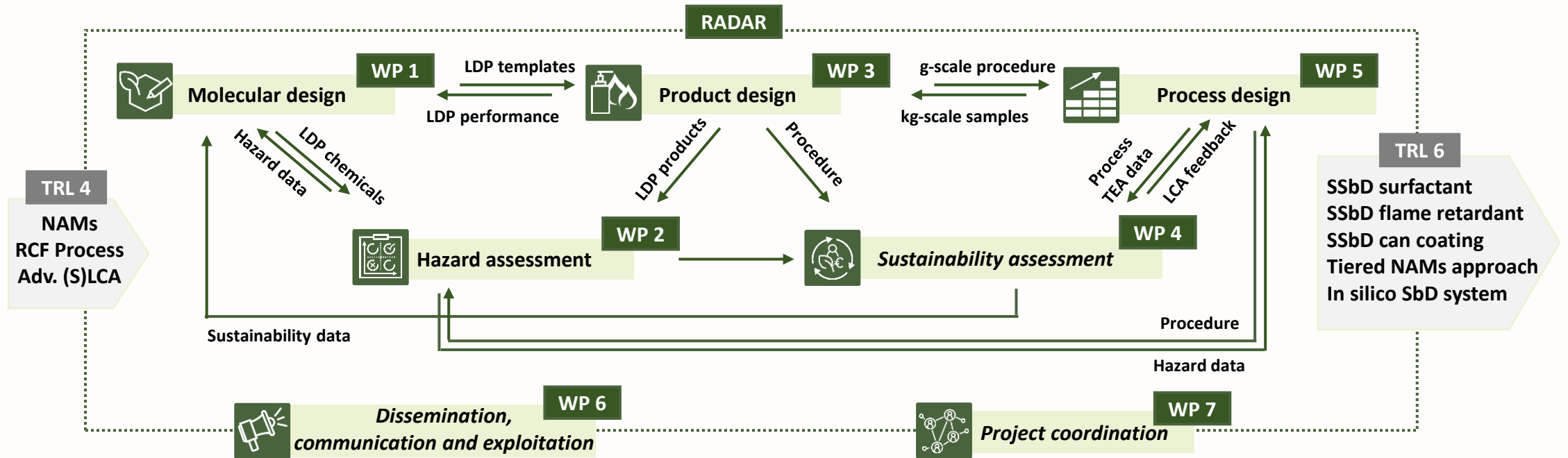
RADAR: TOWARDS SSBD ALTERNATIVES FOR SVHC AROMATICS



! Bio-characterizing functionalities in bio-aromatics induce safety, lowering the *in vitro* estrogen activity

Ref: Trullemans L. et al. Renewable and safer bisphenol A substitutes enabled by selective zeolite alkylation

FROM THE SSBD FRAMEWORK TO THE RADAR WORKPLAN



THE DESIGN PHASE



Isolation and design of bio-aromatic library



Biocatalysis for bio-aromatic conversion



Characterisation of supplied feedstock



In silico molecular design



Surfactant product design



Epoxy resins and food packaging product design



Flame retardant product design



SSbD Strategic support



particula group
CREATING LONG TERM VALUE

Valorisation of pulp stream



Biorefinery scale-up



Biocatalysis scale-up

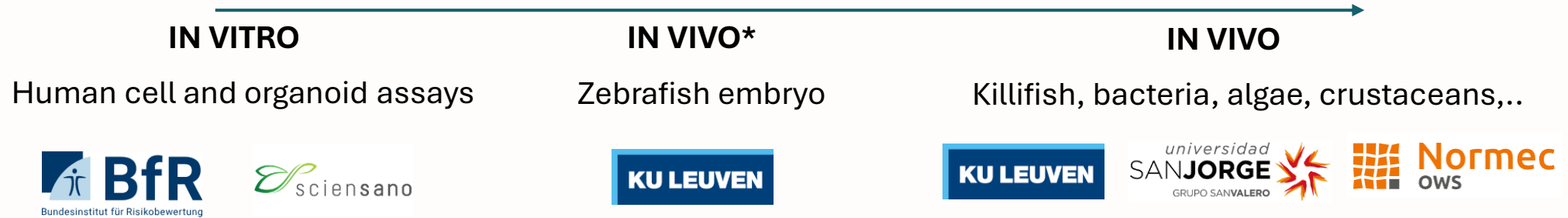


SSbD intermediate and product scale-up



A TIERED NAM-BASED HAZARD ASSESSMENT

An extensive hazard assessment has been foreseen



Including high throughput **New Approach Methods** and covering a wide range of relevant toxicity endpoints

Data generation on a set of >100 Bio-aromatics

This will allow the development of an accurate **IN SILICO** predictive algorithm



A tiered NAM-based testing strategy will be established for efficient S(S)bD pre-assessment

ADVANCED SUSTAINABILITY ASSESSMENT

Regression models to fill data gaps



Life-Cycle-Assessment
LCA



Life-Cycle-Cost
LCC



Exposure and impact assessment



Social-Life-Cycle-Assessment
S-LCA

Socio-economic consequences



RADAR OBJECTIVES:

01

Design and synthesize at least 50 lignin-derived templates for **toxicity data generation** and **redesign** of 5 lignin-derived compounds.

02

Apply hazard assessment including 15 toxicity endpoints to develop **tiered NAM strategy for efficient S(S)bD pre-assessment** of chemicals

03

At least **4 SSbD test products** including two surfactants, one epoxy resins and one flame retardant

04

Use **established and novel methodologies** to quantify the **environmental and social impact** of the 4 selected SSbD products

05

Techno-economic analysis and scale-up to kg-scale of at least one flame retardant, surfactant and can coating

06

Optimize the upstream biorefinery process for the production of lignin-derived templates and valorize the carbohydrate pulp

07

Increase public understanding of SSbD and the need to develop renewable alternatives to SVHCs

Thank you for your attention



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Open for collaboration



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