

Tools to find safer alternatives and identify regrettable substitutes

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Part 1

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Substitutionscentrum



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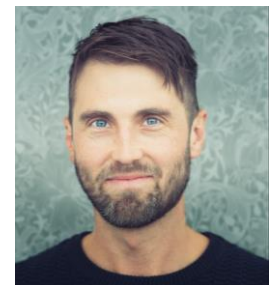
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Agenda



Tools and strategies to find alternatives to hazardous chemicals (Nina)



Tools to exclude hazardous, regrettable substitutes (Anna)

To consider before substitution:

Understand the function of the chemical you want to substitute

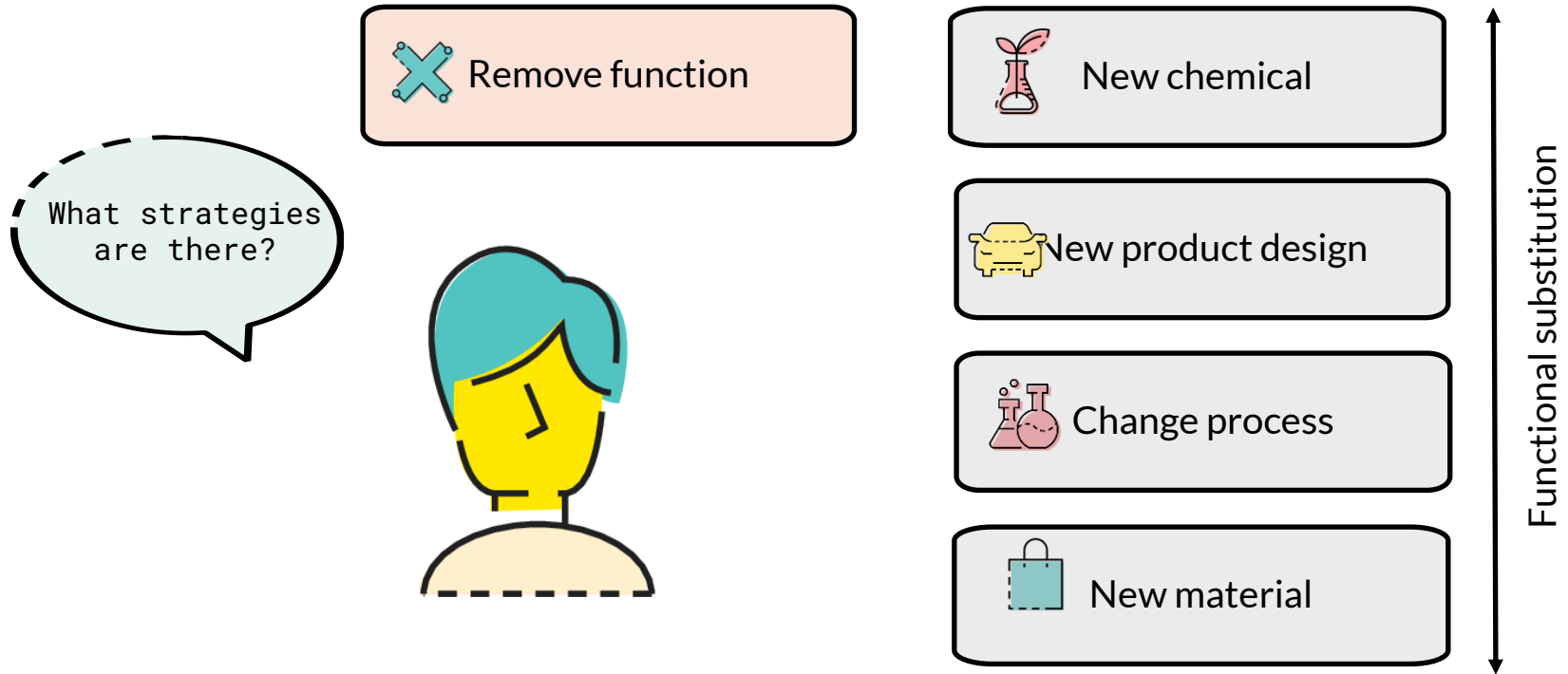
Challenge the need of a product, function and technical specification

Set criteria for alternatives

The furniture company IKEA has, for example, removed tablecloths with water and dirt-repellent properties from its product range as they did not find any good alternatives to the chemical group that fulfilled the same function...



Substitution strategies



Where do you find alternatives?



Interdisciplinary
WORKGROUP



Leverage your
NETWORK



Gather information
ONLINE



Stay creative and curious

Use online resources

- **Summary on our website**

<https://www.ri.se/sv/substitutionscentrum/verktyg-och-databaser/hitta-bättre-alternativ>

Don't forget to always do your own assessment.

The screenshot shows the RI SE website header with navigation links: 'Vi erbjuder', 'Branscher', 'Om RISE', 'Jobba hos oss', 'Press', and 'Logga in'. Below the header is a breadcrumb trail: 'Hem - Substitutionscentrum - Verktyg och databaser - Hitta bättre alternativ'. The main content area features a teal background with a grid of small green dots. The title 'Hitta bättre alternativ till skadliga kemikalier' is prominently displayed. Below the title is a paragraph in Swedish: 'Det kan vara svårt att veta vart du ska börja med att leta potentiella alternativ till skadliga kemikalier. Se till att engagera en bred grupp av intressenter som har olika kunskap och perspektiv och nyttja deras nätverk. Du kan även använda sökmotorer och webbverktyg som vi har listat på den här sidan.' To the right of the text is a photograph of a person wearing a white lab coat and a white glove, holding a small glass vial. Below the main text are several categories in rounded rectangular buttons: 'Marknadsplatser', 'Fallstudier', 'Verktyg', 'Positiva listor', 'Cirkulär ekonomi, biobaserat, produktdesign', and 'LinkedIn-grupper'. A 'Medlemsnätverk' button is also present. Below these buttons is the section header 'Att tänka på innan du letar alternativ', followed by a list of two bullet points. The first bullet point discusses understanding the function of the substance to be replaced and the importance of technical requirements. The second bullet point emphasizes engaging people with different competencies within the organization. On the right side of the screenshot, a vertical sidebar is partially visible with the heading 'Substitutionscentrum' and a list of menu items: 'Om oss', 'Vägledning', 'Event och kurser', 'Nyheter och nyheter', 'Om kemisk substitution', 'Substitutionsguide', 'Verktyg och databaser', 'Stödmaterial för...', and 'Hitta bättre al...', with the last item being partially cut off.

How to search in the databases

- **CAS number:** Numerical identification that is unique to chemical compounds, polymers, mixers eg: Bisphenol A: 80-05-7
- **Name:** Everyday name e.g. Bisphenol A, Bisphenol S (everyday name can, however, be spelled differently so start from CAS or test combinations)
- **Chemical group:** Name of a group of chemicals that often have similar properties and structure, e.g. bisphenols, phthalates, parabens
- **Function:** Emollient, water repellent, binder
- **Material:** Plastic, leather
- **Industry:** Construction, textile
- **Other:** "Non-toxic", "eco-friendly" "safer", "free from", "alternative to"





chemsec
MARKETPLACE

**Chemsec
Marketplace**
- alternatives
to hazardous
chemicals



Cradle2Cradle
- Ecolabelled
materials for
product designers

Kontakta
RISE
EEN-
rådgivare
för hjälp!
rise.se/sv/vad-vi-gor/projekt/enterprise-europe-network

**European
Enterprise
Network**
- Business
partners



UL Prospector
- Over 10 000
chemical products
with access to
SDS



WIPO
- Green
processes



MaterialDistrict
- R&D materials
with various
functions

Marketplace

For companies looking for or offering alternatives. There are marketplaces dedicated to substitution, but also to finding new business partners, green processes, patents, chemical products, environmentally certified or innovative materials.

Chemsec Marketplace

marketplace.chemsec.org/Alternative/Alpha-Free-163



Substituting Bisphenols

Use: Developer in customer receipts

Hazard: Toxic to reproduction, Endocrine Disruptor. Several replacement to Bisphenol A suspected to be endocrine disrupting. High presence in biomonitoring.



Alternative: Vitamin C

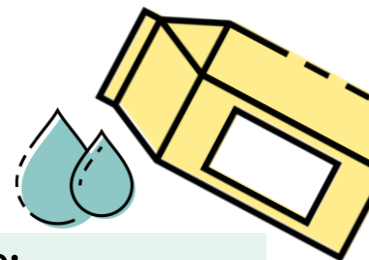
Hazard: Listed on US EPA "Safer chemical ingredients list" as "Verified Low concern"

Trade-offs: Yellow paper, slightly higher price, one supplier, limited technical applications.

WIPO Green

<https://msut.technologypublisher.com/technology/6096>
<https://www3.wipo.int/wipogreen/en/>

Example



Substituting Phtalates in PVC-flooring

Use: Plastisizer in PVC-flooring

Hazard: Many chemical compounds in the phtalate group are know to be endocrine disruptors and toxic to reproduction.



Alternative: Vegetable oil in PLA-flooring

Material: Biocomposite of poly lactic acid (PLA)

Plastisizer: Citrate, vegetable oil, filler of calcium carbonate and cellulose to improve elasticity and impact strength.



subsportplus
Substitution Support Portal

SUBSPORTplus-
Case studies
about
substitution



Regional Activity Centre
for Sustainable Consumption
and Production

MedClean –
“Cleaner
Production” –
mediterranean
countries

Case studies

Small-scale studies that focus on one or a few areas.

Case studies can describe a substitution in more or less detail, include information on alternatives or discuss aspects and insights during the substitution work.



Cleaner
Production
Germany – Green
processes



ECHA – Examples
from reality



TURI Fallstudier
– Substitution
or waste
reduction



ZeroWasteNetwork
– Waste
reduction

SUBSPORTplus

https://www.subsportplus.eu/subsportplus/EN/Cases/Case-story-database/case-story-database_details_node.html?idDatarecord=723649

Example



Replacing PFAS

Use: Baking sheet for water and oil repellancy

Hazard: Many chemical compounds in the PFAS-group are known to be persistent, accumulate in humans and environment and toxic.



Alternative: New process

Process: Nordic Paper produces baking sheets in low speed for compact refining giving a mechanical repellancy effect without chemicals.

Trade-off: More expensive due to lower production speed.

Alternatives Assessment

Transdisciplinary method to identify alternatives to hazardous chemicals with safety, function and economics in regard.

Information is usually presented in report format which describes the substance to be replaced, potential alternatives, hazard assessment but also performance, finances, stakeholders etc.



OECD Toolbox



IC2



TURI



US EPA

PFAS in food packaging

Publisher: Washington state department of Ecology

Assessment: Hazard, exposure, performance, cost and availability.

Type of products:

Wraps, liners, plates, food boats, pizza boxes, cartons, clamshells, bags, sleeves etc.

Type of alternatives evaluated:

Uncoated paper


Wax-coatings

Kaolin clay-coatings

Reusable plates and boats

Siloxane coatings

Polymer coatings



Per- and Polyfluoroalkyl Substances in Food Packaging Alternatives Assessment

Developed under
Chapter 70A.222.070 RCW

Hazardous Waste and Toxics Reduction Program
Washington State Department of Ecology
Olympia, Washington
Revised May 2021, Publication 21-04-004



<https://apps.ecology.wa.gov/publications/documents/2104004.pdf>





Nationella substitutionsgruppen – Lab & Health Care



TCO Certified
– flame retardants and plasticizers in electronics



INERIS
– Phtalates
– Bisphenols
– CMR



SP-listan
Greases and hydraulic oils
according to Swedish environmental standards



Cleaner Solutions
– Solvents assessed with Alternatives Assessment



2Probit
– Certification for chemicals in food manufacturing reviewed according to USDA and FDA 21 CFR

Positive lists

Positive lists usually contain a compilation of alternatives that have been examined on the basis of one or more toxicological criteria. The lists are a good tool for screening for potential alternatives - **but is not enough to replace your own proper review as the criteria differ.**

R&D Inspired by nature

Biomimetics are technologies and processes that mimic role models in biological life in nature.

Example: The inspiration for the Velcro strap came when the engineer Georges de Mestral hiked the Alps in 1941 and a seed from a velcro plant got stuck in his clothes.



Materiom



AskNature

BIOMIMICRY
TOOLBOX

Biomimicry
Toolbox

**3D printing + Mycelium from
mushrooms =
Compostable, bio-based,
chemical-smart packaging!**

<https://www.paradisepackaging.co/>