

Text descriptions: PFAS in Food Packaging AA Figures

Text description for Figure 1

The general process of a simultaneous decision framework has four sequential steps: identifying the scope of the assessment, collecting information for the assessment modules, performing a simultaneous analysis of the information collected, and then drawing conclusions about the alternatives based on that analysis.

For this assessment, the scope was defined both by what potential alternatives were evaluated and what PFAS the alternatives were compared against. Information was collected for four assessment modules simultaneously: hazard, exposure, performance, and cost and availability. During the simultaneous analysis, the results of each assessment module were then compared to the pre-defined criteria for a safer alternative. Each alternative was determined to be a safer alternative, not a safer alternative, lacking the data needed to complete the analysis.

Text description for Figure 3

A flow chart describing the approach used to assess the hazards of chemical mixtures used to provide oil and grease resistance to food packaging. For each mixture, which could either contain PFAS or one of the chemical alternatives identified in Section 3, the following chemical components could have been included in the assessment:

- Polymers.
- Functional additives.
- Degradation products.
- Monomers that have greater than a 0.01% concentration.
- Byproducts or impurities that have greater than a 0.01% concentration.

Base materials consisting paper, paperboard, and plant-based pulp are assumed to low concern and were not assessed under this approach.

First, each chemical was screened using the GreenScreen List Translator™. If the chemical is determined to have a list translator score of 1 (LT-1) then it is a chemical of high concern and the chemical mixture is not evaluated further. If the chemical receives any other score the hazard assessment continues.

Next, the remaining chemicals are screened using the EPA Safer Chemical Ingredients List (SCIL). Chemicals that are designated with a green circle on SCIL is considered a chemical of low concern. If the chemical is identified as low concern, then the hazard evaluation for that chemical is finished. If a chemical is not on that list, then the assessment continues.

Finally, the remaining chemicals undergo GreenScreen® evaluation. The chemical will be assigned a benchmark score of 1 to 4 or a benchmark score of U (unknown) if there are inadequate data to evaluate the chemical under the benchmark criteria. Both the final benchmark score and the GreenScreen® evaluation report may be used to determine whether an alternative substance is safer than PFAS.

Text description for Figure 4

A flow chart describing the process used to compare the exposure concerns of an alternative chemical mixture to food packaging with PFAS. For this comparison, the following chemical components were considered:

- Polymers.
- Functional additives.
- Degradation products.
- Monomers that have greater than a 0.01% concentration.
- Byproducts or impurities that have greater than a 0.01% concentration.

Base materials consisting paper, paperboard, and plant-based pulp are assumed to low concern and were not assessed under this approach.

First, if an alternative was identified as a low hazard concern (*e.g.*, Benchmark-3 or 4) then no exposure assessment is required. If an alternative was not identified as a low concern, then the assessment continues.

Second, if the alternative was identified as high concern, or having highly persistent and/or highly bioaccumulative and/or toxic properties (vPvB, vPT, vBT, PBT), then no exposure assessment is required. If an alternative was not identified as a high concern, then the assessment continues.

Next, three questions are used to compare the alternative to PFAS using the physical and chemical properties and the likely exposure pathways of each. If the properties and pathways are similar, then the alternative has a similar exposure potential to PFAS and the assessment is complete. If the properties and pathways are not similar, then the assessment continues.

Next, using the same three questions, the physical and chemical properties of the alternative are reviewed to determine whether the alternative has a higher or lower exposure potential than PFAS. If the exposure potential is lower, then the exposure assessment is complete.

Finally, if the exposure potential is higher, then four additional questions, about biomonitoring studies, manufacturing criteria, and qualitative lifecycle information, are asked. These questions are used to determine whether an alternative has equivalent, lower, or higher exposure than PFAS. We may also conclude at this point that there are data gaps that prevent us from assessing the exposure risk of an alternative.