

## Peer Review

# Review of: "Human Health Risks from Textile Chemicals: A Critical Review of Recent Evidence (2019-2025)"

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## General Comments:

This review article presents a timely and comprehensive synthesis of the emerging literature on hazardous chemicals in textiles and their potential human health impacts. It effectively updates and builds upon prior work (notably Rovira & Domingo 2019), providing a detailed analysis of dermal exposure pathways, chemical classes of concern (e.g., PFAS, phthalates, azo dyes, bisphenols, metals), and regulatory gaps. The manuscript is well-organized, methodologically sound, and technically rich, with clear relevance to public health, environmental toxicology, and regulatory science.

## Strengths:

**Extensive and Recent Literature Coverage:** The review systematically includes studies up to March 2025 and draws from multiple databases with clearly defined inclusion criteria.

**Focused Thematic Structure:** Each chemical group is treated in detail, and subsections provide mechanistic insights, risk assessments, and regulatory contexts.

**Quantitative Integration:** The use of exposure values (e.g., EDI, HQ), risk thresholds (e.g., TDI, HI), and biomonitoring data gives this review scientific rigor beyond qualitative syntheses.

**Regulatory Relevance:** The discussion of global regulatory discrepancies (e.g., EU vs. Brazil), certification limitations (e.g., OEKO-TEX®, GOTS), and analytical blind spots is insightful and policy-relevant.

**Clarity and Visual Aids:** Inclusion of schematic diagrams (e.g., exposure pathways) and summary tables (e.g., Table 1) enhances readability and practical use.

### ***Technical Suggestions:***

**Mixture Toxicity Models (MTMs):** While mixture toxicity is mentioned, the paper could benefit from deeper discussion on probabilistic or Bayesian mixture models currently applied in cumulative risk assessment.

**Statistical Rigor in Meta-Interpretation:** Where pooled metrics (e.g., hazard quotients or EDIs) are cited, clarify whether values represent means, medians, or upper-bound estimates. A table summarizing key values per demographic group could be valuable.

**Exposure Conversion Assumptions:** The paper uses multiple EDI and TDI conversions from different studies. Clarify dermal absorption assumptions (e.g., skin surface area, clothing wear time) for consistency and cross-study comparability.

**Dermal vs. Inhalation Route Prioritization:** While dermal contact is emphasized, inhalation exposure (especially from microfiber shedding) is increasingly documented. A comparative risk commentary would strengthen the argument.

**Use of Emerging Analytical Techniques:** The brief on advanced assays (e.g., dTOP, ATD-GC/MS) is appreciated; however, elaborating on their limitations and sensitivity/specificity for textile matrices would provide better critical perspective.

**Environmental vs. Human Toxicity Balance:** While focused on human health, environmental exposure data is occasionally referenced. Consider whether this inclusion adds value or dilutes the paper's focus.

### ***Minor Editorial Notes:***

**Reference Formatting:** Some references appear truncated or improperly linked (e.g., see references 6, 13, 58).

**Terminology Consistency:** Use consistent terms for chemicals (e.g., BPA vs. Bisphenol A) and analytical outcomes (e.g., EDI vs. Estimated Daily Intake).

### ***Conclusion:***

This manuscript makes a substantial contribution to the field of environmental health and textile safety. It bridges gaps in the current literature, applies robust risk frameworks, and sets the stage for policy-level discourse. With minor technical clarifications, it is **well-suited for publication** in a peer-reviewed journal focused on toxicology, public health, or environmental science.

**Recommendation:** Accept with Minor Revisions

## **Declarations**

**Potential competing interests:** No potential competing interests to declare.