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A Provisional Reporting Completeness Index for Honey Sample Preparation and Its Pilot Application

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Abstract

Reporting completeness and environmental greenness are related but distinct properties of analytical methods: detailed reporting can support assessment, but does not itself demonstrate environmental performance. This study developed a provisional ten-domain Reporting Completeness Index for honey sample preparation (RCI-Honey) and applied a documentary rubric to four purposively selected publications. Each domain received a 0–2 documentary score; sources were reconciled when needed. The resulting normalized scores were 60% for Guo, 60% for Lasheras, 90% for Casado, and 75% for Lupu; the mean was 71.25% and the median was 67.5%. Across the reviewed publications, workflow descriptions and sample-transfer steps were consistently reported, whereas information on waste generation, energy use, and occupational safety was comparatively incomplete. To examine sensitivity to coding choices, sixteen alternative scenarios were evaluated. Their mean scores ranged from 70% to 75%, and the two highest-ranked studies remained unchanged across scenarios. Only two potentially matched AGREEprep assessments were available for comparison; this limited overlap did not support an inferential correlation analysis. The index therefore offers an auditable, structured account of reporting completeness within the specific evidence boundary of the four reviewed publications. It should not be interpreted as a validated measure of method greenness, environmental impact, or reproducibility, and its scores do not establish those outcomes. The findings identify reporting domains that may warrant clearer documentation and provide a transparent basis for further evaluation. Independent coding, external review of content validity, and application to a larger, more representative corpus are needed before RCI-Honey can be recommended for broader comparative use.

Keywords

AGREEprep;
Green Analytical Chemistry;
Honey;
Reporting Completeness;
Sample Preparation

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1. INTRODUCTION

The extraction and cleanup processes needed for honey contamination analysis might vary significantly in terms of materials, energy consumption, solvent use, and analyst involvement. Published techniques include miniaturised sorbent-based extraction (Casado et al., 2024; Lupu et al., 2026), micro-QuEChERS for bisphenols (Potortì et al., 2023), and traditional pesticide processes (Almeida et al., 2020; Lasheras et al., 2021). Clear explanations of the preparation procedures and their limitations are necessary for accurate comparisons.

A framework for minimising environmental effects is established by the ten green sample preparation principles (López-Lorente et al., 2022). AGREEprep uses weighted criteria to operationalise greenness (Wojnowski et al., 2022). Nevertheless, thorough reporting does not prove that a process is better for the environment. On the other hand, incomplete documentation does not prove that an unreported practice existed or was detrimental to the environment.

A more specific methodological need—an explicit record of the data available for assessing the processing of honey samples—is addressed by the current investigation. It proposes RCI-Honey, illustrates its use in four contexts, and examines if the related AGREEprep values facilitate further analysis. The contribution includes an initial coding tool and a verifiable pilot dataset; there is no assertion of a thorough literature review or instrument validation.

2. MATERIALS AND METHODS

2.1. Design and Case Selection

This was a pilot of documentary instrument-development based on four published studies: Lasheras et al. (2021), Casado et al. (2024), Guo et al. (2026), and Lupu et al. (2026). They offer contrasting workflows of QuEChERS, µ-SPEed and ultrasound-assisted sorbent. Selection was purposive and informed by the initial targeted search documented on 27 October 2026. The search concepts were honey, sample preparation, QuEChERS, solid-phase extraction, microextraction, and AGREEprep. No complete search exports, screening log or exclusion counts were kept; therefore, this is not a systematic review or representative sample.

Eligible examples were original experiments with recognised honey unique preparation workflow. Reviews and processes that could not be distinguished from other matrices were not scored. Poor reporting was not an exclusion factor in itself. Other studies informed the background but did not contribute to numerical summary. Source checks were updated on 09 November 2026.

2.2. Documentary Boundary and Evidence

The coding unit included an extract prepared for injection, honey measurement, and conventional conditioning, sanitation, and post-extraction processing. Chromatographic processes, upstream equipment production, royal jelly methodologies, and postponed development options were all omitted. Although reported gadget specs and reuse data were acceptable, manufacturing ramifications were not calculated.Casado's Supporting Information Table S3 and Figures S8–S9, Lupu's Figure S1 and Tables S6/S8, Guo's graphical abstract and Figure 2, and the main papers were all examined. Missing evidence was not considered to be present in unexamined supplements. The evidentiary boundary and all 40 item determinations are documented in Supplementary Material S1.

2.3. Index Construction and Scoring

Workflow (P1), reagents (P2), consumables (P3), waste (P4), sample transfers (P5), time and throughput (P6), automation and intervention (P7), energy (P8), final treatment (P9), and occupational safety (P10) are the ten domains. These reporting domains are not exact replicas of AGREEprep criteria; rather, they are informed by green sample preparation. P9 specifically addresses extract treatment as opposed to the downstream analytical tool.

Each item receives a score of 0 in the lack of relevant evidence, 1 when the documentation is

insufficient or unclear, and 2 when there is abundant domain-specific documentation. The complete collection of operational anchors is included in Supplementary Material S1. All components are maintained; no extraneous alterations are performed. Equal weighting serves as a conclusive preliminary standard rather than a choice that is substantiated by empirical evidence.

$$\text{RCI-Honey (\%)} = 100 \times (\Sigma\, s_i) / 20 \qquad (1)$$

where s_i is the score for domain i, summed over the ten domains. Therefore, a study's score is altered by five percentage points for every one-point coding modification. Equipment settings cannot determine per-sample energy, solvent inputs cannot determine total waste, and identifying a hazardous solvent does not satisfy the safety-reporting requirement.

Scoring was exploratory rather than blinded because the rubric was clarified during the pilot review. The clarified anchors and easily available sources were compared to the original coding provided by the author. It makes no claims about inter-rater reliability or independent human second-rater agreement.

2.4. Descriptive and Sensitivity Analyses

Descriptive calculations were made for study totals, mean, median, and range. The four dubious options that were altered individually and together were Lasheras P7 (0 or 1), Casado P4 (1 or 2), Lupu P2 (1 or 2), and Lupu P6 (1 or 2). These sixteen arrangements signify coding situations instead of confidence intervals. The AGREEprep values were preserved as shown, and the reweighted results were distinguished from the standard evaluations. Values that were absent were not substituted, and correlation coefficients along with significance tests were not derived from two possibly paired observations.

3. RESULTS AND DISCUSSION

3.1. Reporting Completeness

Reconciled scores are shown in Table 1. Lupu scored 15/20 (75%), Casado scored 18/20 (90%), while Guo and Lasheras both scored 12/20 (60%). The range was 60–90%, median was 67.5%, and mean was 71.25%. These ratings do not rank environmental performance or analytical correctness; instead, they quantify the documentation that is available inside the specified boundary. The study-level scores are summarised in Figure 1.

Table 1. Reconciled item-level scores and RCI-Honey totals.

Study	P1–P5	P6–P10	Total	RCI
Guo (2026)	2, 1, 1, 1, 2	1, 1, 1, 2, 0	12/20	60 %
Lasheras (2021)	2, 2, 1, 1, 2	1, 1, 1, 1, 0	12/20	60 %
Casado (2024)	2, 2, 2, 1, 2	2, 2, 2, 2, 1	18/20	90 %
Lupu (2026)	2, 1, 2, 1, 2	1, 2, 1, 2, 1	15/20	75 %

Items are listed in numerical order within each five-item block. Each item ranges from 0 to 2. Evidence and alternative decisions are provided in Supplementary Material S1.

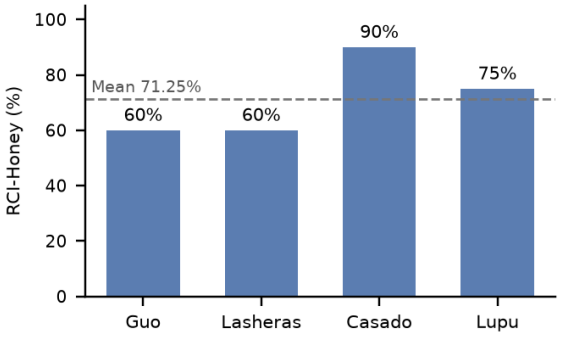


Figure 1. Reconciled RCI-Honey scores for the four pilot studies; dashed line marks the mean.

Each of the four cases presented comprehensive documentation regarding the sample-transfer domain and the overall workflow. All participants were awarded partial credit for waste accounting due to ambiguous units and accounting boundaries. Casado was the only one to offer an unambiguous per-sample energy computation. In any case, the paramount safety standard—which necessitates both evident dangers and safeguarding measures—was not achieved. Rather than prevalence estimates for honey-analysis articles, these patterns indicate reporting preferences within this dataset. The matching item-level scores for each of the ten domains are shown in Figure 2.

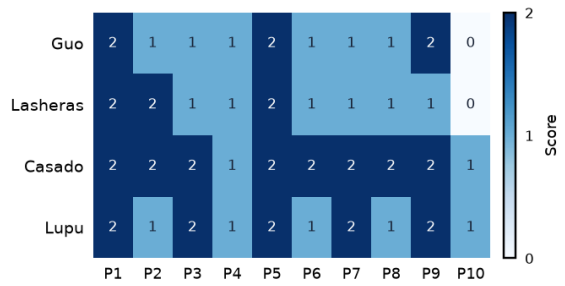


Figure 2. Item-level RCI-Honey scores (0–2) by study across the ten reporting domains.

3.2. Decisions Affecting Interpretation

The pertinent proof was provided by Guo's honey pretreatment section, optimisation results, and process visuals. The 20- vs 30-minute freezing statements were still disputed, and commercial cleanup volumes were not sufficiently indicated. Reconstitution to 1 mL methanol is identified in the graphical abstract, supporting P9 = 2. The royal-jelly protocol was kept apart from this proof.

Lasheras supported P3 = 1 by describing various cleanup quantities in Sections 2.1 and 2.4. P7 was changed from 0 to 1 because named shaking, transfer, and centrifugation processes offered useful intervention information. A completely integrated human or automated preparation boundary was not clearly established in the description. Instead of being counted again in P2, cleanup sorbent discrepancies were assigned to P3.

The waste input in Casado's Table S3 is 1.1; the field is labelled as mass in grams or volume in millilitres in Figures S8–S9. For a repeatable physical waste total, the allocation of reuse and the aggregation of liquid and solid components are still not sufficiently apparent. P4 was cautiously lowered to 1. For P8 = 2, the recorded energy estimate was still adequate: (5 W × 15/60 h) + (60 W × 3/60 h) = 4.25 Wh per sample, or 15.3 kJ. This is not a metered measurement; rather, it is a computation based on specified operating powers and times.

For conditioning with repetition, Lupu's main text calls for 1.5 mL of methanol, whereas Figure S1 displays 1 mL; P2 was lowered to 1. There is no specified batch size and two 20-minute sonication stages that coexist with about six samples per hour. Although Figure S1 shows several tubes, it does not specify the batch schedule; P6 = 1 was kept. Table S8 supports P4 = 1 by reporting about 9 mL of solvent waste without resolving conditioning and rinse contributions.

3.3. Sensitivity and AGREEprep Feasibility

The mean varied between 70% and 75% for the sixteen coding possibilities. Casado maintained the highest position (90–95%), succeeded by Lupu (75–85%), Guo (60%), and Lasheras (55%–60%). Due to the fact that the situations pertain to particular coding inconsistencies rather than encompassing all forms of uncertainty, even minimal stability fails to establish validity. The selected scores and scenario-based sensitivity ranges—which are not confidence intervals—are displayed in Figure 3.

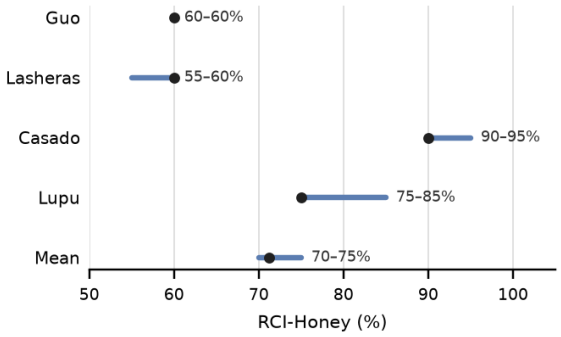


Figure 3. Baseline scores and alternative-coding sensitivity ranges; ranges are not confidence intervals.

Table 2. Availability of potentially corresponding AGREEprep assessments.

Study	RCI-Honey	AGREEprep	Interpretation
Guo (2026)	60%	Not established	No matched value identified
Lasheras (2021)	60%	Not established	No matched value identified
Casado (2024)	90%	0.61	Default; reweighted value 0.65
Lupu (2026)	75%	0.43	Reported preparation assessment

Casado's reweighted 0.65 is not a third observation, but rather a different evaluation of the same

workflow. Additionally, the assessment boundaries and underlying assumptions of the two accessible research are different. The data are shown in Table 2 as an availability table since neither a scatterplot nor a two-point correlation would provide any convincing inferential evidence.

3.4. Contribution and Limitations

RCI-Honey makes a distinction between inadequate data and deficient environmental performance, detailing verified assessments. It assists in guiding authors and reviewers to details that require elucidation, including quantities, schedules, safety declarations, and source references. Because a study's low score is concealed by a total, it ought to be provided with an item-level record.

Instead of reflecting a single latent property, the checklist's domains interact to create the reporting summary, which is constructive.Internal-consistency statistics would not address the actual problems of domain coverage, overlap, and weighting. Equal weighting, the safety standards, and the management of unpredictable throughput necessitate external evaluation.Instead of exclusions throughout the entire book, low ratings can also indicate limited access to supplements.

The limited purposive sample, lack of independent blinded coding, subsequent rubric clarification, and insufficient inclusion of supplementary sources all restrict generalisability. No technological advantage, causal relationship, or connection to actual repeatability can be derived. The manual must be finalised before sampling, all accessible supplements should be incorporated, independent assessments should be acquired, discrepancies in items should be documented, and varying weights and constraints should be evaluated across a larger corpus to ensure additional validation.

4. CONCLUSION AND RECOMMENDATIONS

The preliminary RCI-Honey yielded reporting-completeness rates of 60%, 60%, 90%, and 75%, resulting in an average of 71.25% over the four investigations analysed. Source verification uncovered uncertainties that affected individual evaluations. The results endorse the establishment of clear reporting obligations instead of a validated sustainability measure. The writers should provide specifics regarding waste units, energy estimation limits, temporal and batch considerations, and workplace safety measures. Independent validation must occur prior to the standard comparative implementation.

DECLARATIONS

Ethics approval: not applicable, only published research has been analyzed.

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Competing interests: The author declares no competing interests.

Hussein Obaid Mashhout is accountable for conceptualisation, choice of works, coding of documentaries, interpretation, and preparation of the paper.

All pilot scores, operational anchors, source locations, and sensitivity scenarios are within the manuscript and Supplementary Material S1. We have not generated new laboratory data.

I used AI as an editor, for source retrieving and checking, and to tabulate and calculate the data and the discussion of coding done on documents. Still, it doesn't validate the data, and I am the only one who has to validate the data and submit the correct data as required for the thesis.

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