

REVIEWER'S REPORT

Manuscript No.: IJAR- 59586

Title: FOAM STABILITY AS A QUALITY PARAMETER FOR HERBAL SURFACE CLEANERS: CORRELATION WITH CONCENTRATION AND STORAGE CONDITIONS,

Recommendation:

Accept after minor revision

Rating	Excel.	Good	Fair	Poor
Originality		✓		
Techn. Quality			✓	
Clarity			✓	
Significance	✓			

Reviewer's ID: Bilqees Hamza

Detailed Reviewer's Report

This manuscript presents an empirical quality control study investigating foam stability as a non-destructive quality indicator for neem (*Azadirachta indica*) and lemon (*Citrus limon*) based herbal surface cleaners. The study evaluates five formulation concentrations (3%, 4%, 5%, 6%, and 7%) across three storage temperature conditions— 25°C (room temperature control), 30°C (mild accelerated stress), and 45°C (stress conditions)—over a 4-week monitoring period using the test tube dilution method.

Data extraction included weekly evaluations of initial foam height (cm), foam stability duration (minutes), formulation pH, organoleptic properties (appearance, odor, grittiness), total bacterial count (TBC), total fungal count (TFC), and triterpenic glycoside (saponin) qualitative presence. Statistical analysis employed one-way ANOVA, Tukey's post-hoc tests, and Pearson's correlation coefficients (r) with significance set at $p < 0.05$.

Key empirical findings include:

- **Initial Properties:** All baseline formulations (Week 0) tested positive for triterpenic glycosides/saponins, producing an initial foam height of $2.0 \pm 0.0 \text{ cm}$ and a stability duration $> 5 \text{ minutes}$.
- **Temperature-Mediated Degradation:** Storage temperature significantly accelerated foam breakdown ($p < 0.001$). While 25°C preserved foam stability near baseline

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levels through Week 4, stress storage at 45°C caused complete foam collapse (0.0 cm ; negative saponin test) in the 3% formulation by Week 4.

- **Concentration Optimization:** The 5% formulation exhibited optimal stability overall, maintaining strong foam performance (Score > 4.5 at 25°C) up to Week 4, serving as the ideal balance between surface activity, viscosity, and micelle formation.
- **Parameter Correlations:** Foam stability score demonstrated a strong negative correlation with an upward shift in pH ($r = -0.89$, $p < 0.001$), reflecting surfactant inactivation and saponin hydrolysis. Strong negative correlations were also established with microbial contamination loads (TBC: $r = -0.82$; TFC: $r = -0.77$).
- **Sequential Degradation:** Foam breakdown followed a distinct stepwise sequence across all tested batches: initial decrease in foam height, followed by a decline in stability duration, culminating in complete structural collapse.

The paper provides useful quality control data demonstrating that simple test tube foam metrics offer a viable, cost-effective substitute for complex analytical tracking during herbal cleaner stability testing.

Key Strengths

1. **Practical Non-Destructive QC Method:** Validates a simple, accessible test tube dilution assay that enables manufacturers to track herbal cleaner degradation without expensive instrumentation.
2. **Clear Multi-Parameter Correlations:** Systematically links physical foam collapse to chemical indicators (pH drift from saponin hydrolysis) and biological parameters (microbial degradation via TBC/TFC).
3. **Structured Degradation Framework:** Establishes a 5-stage evaluation scale (Table 7) mapping foam height, duration, pH ranges, and saponin test status for straightforward quality interpretation.

Recommendations for Improvement

While the manuscript is methodologically sound and logically structured, the author should address the following minor points prior to final publication:

1. **Reconcile Inconsistent Table and Text Citations:**
 - In Section 3.2 (Table 2 narrative), the text references "*For 3%, 25% and 30%...*", which appears to be a typographical error confusing temperatures and concentrations; correct this phrasing to accurately cite the 3% formulation.
 - In Section 3.8 (Table 8 header), the column heading lists " $35^{\circ}\text{C}/45^{\circ}\text{C}$ ", whereas the study design specifies

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30°C and 45°C ; align the table header with the experimental design.

2. Clean Up Graphic Axis Labels and Overlapping Text:

Figures 1 through 5 contain minor text overlaps (e.g., duplicated figure headers and misaligned legend entries in Figures 2, 3, 4, and 5). Ensure all figure graphics are clean, legible, and free from duplicate caption titles.

3. Clarify Positive Saponin Test Standard:

Section 2.3 notes that saponin content was confirmed via the presence of stable foam above the liquid level. Briefly add 1–2 sentences clarifying whether quantitative chemical marker testing (e.g., TLC or HPLC determination of azadirachtin/saponin peaks) is recommended to supplement qualitative foam height observations in formal regulatory filings.

4. Standardize Bibliographic Formatting:

Ensure all reference entries in Section 6 strictly follow standard APA 7th Edition formatting, verifying uniform journal titles, volume numbers, and page ranges.

Final Evaluation and Verdict

This manuscript delivers a clear, informative evaluation of foam stability as a quality parameter for herbal surface cleaners. The experimental design is appropriate, the statistical analysis is clear, and the findings provide practical guidance for formulation optimization and quality control.

The manuscript is **accepted with minor revisions**. Fixing table header typos, cleaning up graphic axis overlays, and standardizing the reference list will render the paper fully ready for publication.

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