

REVIEWER'S REPORT

Manuscript No.: IJAR-59212

Title:, Microbiological quality assessment of "dègué" produced and sold in N'Djamena municipality, Chad ,

Recommendation:

Accept as it is

Accept after minor revision.....

Accept after major revision ...YES...

Do not accept (*Reasons below*)

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

Reviewer's ID: JPR-094

Detailed Reviewer's Report

Reviewer Report

Overall assessment

The manuscript addresses an important food-safety issue: the microbiological quality of *dègué*, a traditional fermented milk–cereal product increasingly produced and marketed in N'Djamena, Chad. The study has practical public-health relevance because it compares artisanal products with a commercial brand and investigates several microbiological indicators and potential pathogens.

However, in its present form, the manuscript requires **major revision**. The principal concerns relate to the sampling strategy and sample-size calculation, inconsistencies between the reported number of samples and the microbiological tables, insufficient description/justification of microbiological criteria, limited statistical analysis, and several conclusions that are stronger than the data support. The manuscript would benefit substantially from methodological clarification and careful language editing.

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1. Strengths of the manuscript

1.1 Relevant and important research question

The study addresses the microbiological safety of a locally consumed traditional food in N'Djamena. This is particularly relevant because artisanal dairy products may be exposed to contamination during production, handling, transportation, and storage.

1.2 Comparison between artisanal and commercial products

One of the strongest aspects is the comparison between:

- 38 artisanal/unlabelled dègué samples
- 22 DJAMIL-brand samples

The reported difference in overall non-compliance—72% in artisanal products versus 19% in DJAMIL products—is potentially valuable for understanding the relationship between production practices and microbiological quality.

1.3 Broad microbiological assessment

The study examines several useful indicators:

- Total aerobic mesophilic flora
- Total coliforms
- Enterobacteriaceae
- *Escherichia coli*
- *Staphylococcus aureus*
- *Bacillus cereus*
- Yeasts and moulds
- *Salmonella* spp.

This provides a relatively broad assessment of hygienic quality rather than relying on a single microbiological indicator.

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1.4 Use of recognized microbiological methods

The manuscript cites ISO/NF ISO methods for several analyses, including aerobic mesophilic flora, yeasts/moulds, coliforms, *S. aureus*, and *Salmonella*. This is a positive feature and improves methodological credibility.

1.5 Practical public-health implications

The findings have potential implications for:

- food-handler training;
- hygiene practices;
- cold-chain management;
- product traceability;
- regulatory inspection;
- consumer protection.

The study therefore has potential value for local food-safety authorities and producers.

1.6 Inclusion of both microbiological and survey data

Combining microbiological analysis with information on producers, sellers, and consumers is potentially useful. It provides a broader picture of the food-production environment.

2. Major weaknesses and concerns

2.1 Major inconsistency in the number of microbiologically analyzed samples

This is the most important issue requiring clarification.

The manuscript states that **60 samples** were analyzed:

38 artisanal + 22 DJAMIL = 60.

However, Table VII presents only **16 artisanal samples**, while Table VIII presents only **4 DJAMIL samples**.

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Thus, the tables shown in the manuscript account for only:

16 + 4 = 20 samples, not 60.

This discrepancy is substantial because the reported percentages appear to be based on the smaller subsets. For example:

- 87.5% corresponds to 14/16;
- 81.25% corresponds to 13/16;
- 19% appears to correspond approximately to 4/22.

The authors must explicitly explain whether:

1. all 60 samples were analyzed but only representative results are presented in the tables;
2. only 20 samples were actually analyzed;
3. the remaining results were omitted;
4. or the numbers in the tables are erroneous.

This issue must be resolved before the results can be considered reliable.

2.2 The sampling calculation is methodologically weak

The sample-size calculation is presented as:

$N = 600$, $P = 10\%$, $n = 600 \times 10\% = 60$.

This is not an adequate statistical sample-size calculation for a microbiological prevalence/quality study.

The manuscript needs to explain:

- How was the population of 600 estimated?
- What does the 10% probability represent?
- Why was 10% selected?
- Was the calculation based on expected prevalence?

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- What confidence level was used?
- What precision/margin of error was assumed?
- Was a design effect considered?
- Was the sample size calculated separately for artisanal and commercial products?

The equation currently presented is essentially a selection fraction rather than a conventional epidemiological sample-size calculation.

A proper calculation based on expected prevalence, confidence level, and desired precision would substantially strengthen the study.

2.3 Sampling is not sufficiently representative

The manuscript states that samples were collected from three districts, while the survey covered five districts.

This raises an important question: **Why were microbiological samples collected only in the 5th, 6th, and 7th districts?**

If the objective is to assess dègué marketed in N'Djamena generally, the authors should justify this selection.

The manuscript should clearly describe:

- how shops/vendors were selected;
- how producers were selected;
- how samples were selected within each location;
- whether sampling was random, systematic, convenience-based, or purposive;
- the sampling interval;
- whether the same producer/vendor could contribute multiple samples;
- the dates and times of sampling;
- storage temperatures at sampling;
- duration between purchase and laboratory analysis.

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Without this information, generalization to all dègué sold in N'Djamena is limited.

2.4 The microbiological criteria require stronger justification

The manuscript uses limits such as:

- $\text{TMAF} \leq 5 \times 10^4 \text{ CFU/g}$
- $\text{coliforms} \leq 10^2 \text{ CFU/g}$
- $\text{Enterobacteriaceae} \leq 10^2 \text{ CFU/g}$
- $E. coli \leq 10 \text{ CFU/g}$
- $S. aureus \leq 10^2 \text{ CFU/g}$
- $B. cereus \leq 10^2 \text{ CFU/g}$
- $\text{yeasts/moulds} \leq 10^3 \text{ CFU/g}$

However, the origin and applicability of these criteria need to be explained much more carefully.

The authors cite DSA (2018), but they should provide:

- the exact regulatory document;
- the food category to which the criteria apply;
- whether the criteria specifically apply to fermented milk/cereal products or dairy beverages;
- whether the criteria are mandatory regulatory limits or guideline values;
- whether the same criteria are appropriate for both artisanal and commercial dègué.

This is particularly important because **microbiological criteria are food-category and method dependent.**

2.5 The manuscript sometimes confuses hygiene indicators with pathogens

The presence of coliforms, Enterobacteriaceae, or total aerobic mesophilic flora indicates poor hygienic quality or microbial load, but these organisms should not automatically be interpreted as evidence of foodborne disease.

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Similarly, detection of *S. aureus* does not necessarily mean that staphylococcal enterotoxin is present.

The manuscript states that *S. aureus* contamination represents a health risk because certain strains produce enterotoxins. This is reasonable background information, but the study **did not test for enterotoxigenic strains or enterotoxins**.

The wording should therefore distinguish:

- microbiological non-compliance;
- hygienic contamination;
- potential pathogenicity;
- demonstrated foodborne risk.

2.6 The absence of Salmonella should not be described as proof of safety

The statement that no *Salmonella* spp. was detected in the samples is useful.

However, the conclusion should be cautious:

“The absence of *Salmonella* spp. in all samples is reassuring.”

This is acceptable if appropriately qualified, but it should not imply that the products are microbiologically safe.

A negative result can only indicate that *Salmonella* was not detected under the sampling and analytical conditions used. It does not establish absence from the entire production chain or product population.

The authors should also report the analytical detection limit and confirm that the method used was appropriate for the product matrix.

REVIEWER'S REPORT**3. Important issue concerning the comparison between artisanal and DJAMIL products**

The manuscript concludes that the DJAMIL product has better microbiological quality because of:

“better choice of raw materials,”

“equipment hygiene,”

“packaging,”

and “more controlled manufacturing practices.”

These explanations are plausible, but **they were not directly demonstrated by the study.**

The study appears to have measured microbiological contamination but did not systematically compare:

- raw materials;
- processing temperatures;
- fermentation conditions;
- equipment sanitation;
- worker hygiene;
- packaging procedures;
- storage temperatures;
- production environment.

Therefore, the authors should avoid presenting these factors as established causes.

A more scientifically appropriate interpretation would be that the **lower non-compliance observed in the commercial product is consistent with better-controlled production, but the specific causal factors were not investigated directly.**

4. Statistical analysis is insufficient

The data analysis section states that data were entered and organized using Microsoft Word and Excel.

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This is inadequate for an analytical cross-sectional study.

At minimum, the authors should provide statistical comparisons between artisanal and DJAMIL samples.

For example:

- proportion non-compliant in each group;
- 95% confidence intervals;
- chi-square or Fisher's exact test for categorical outcomes;
- appropriate comparison of microbial counts after logarithmic transformation;
- p-values where appropriate.

The central result—72% versus 19% non-compliance—is a comparative finding and should be statistically tested.

The authors should also report the denominator for every percentage.

5. The microbiological data should be presented more rigorously

The tables contain numerous values such as:

1.5×10^5

3×10^6

These indicate that values exceeded the quantification range.

The authors should explain:

- the dilution scheme;
- detection limit;
- limit of quantification;
- why particular values are reported as $>1.5 \times 10^5$ or $>3 \times 10^6$;
- how these censored values were treated statistically.

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For microbial enumeration, it would also be preferable to present log₁₀ CFU/g where appropriate, particularly when comparing groups.

6. Potential methodological problem with coliform/Enterobacteriaceae methodology

The manuscript states that total and thermotolerant coliforms were assessed using:

“VRBG and TBX media.”

The authors should carefully verify that the media and cited ISO methods correspond correctly to the organisms being enumerated.

In particular, the manuscript should distinguish clearly between:

- coliforms;
- thermotolerant coliforms;
- Enterobacteriaceae;
- presumptive *E. coli*.

The analytical methods should be described in sufficient detail to demonstrate that each reported organism was measured using the appropriate validated method.

7. The survey component is not adequately described

The manuscript reports that 247 people were surveyed and that 37.24% had “poor” hygiene knowledge.

However, the questionnaire itself is not described.

The authors should provide:

- number of questions;
- domains assessed;

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- scoring system;
- cut-off values for “poor,” “average,” and “good”;
- whether the questionnaire was validated;
- whether it was pre-tested;
- language used;
- method of administration;
- ethical approval/informed consent.

Without this information, the validity of the “37.24% poor knowledge” result is difficult to evaluate.

8. The survey population is heavily dominated by young consumers

The manuscript states that 58.3% of participants were aged 3–19 years and 51% were schoolchildren.

This is interesting but needs interpretation with caution.

The sample is **not representative of the N'Djamena population as a whole**. It appears heavily weighted toward consumers, especially schoolchildren.

Therefore, the statement that “the population of N'Djamena” has a particular level of hygiene knowledge should be avoided.

The authors should instead state that the observed knowledge distribution applies to **the surveyed participants**.

9. The claim that children and young people are particularly vulnerable needs qualification

The manuscript repeatedly emphasizes that children and young people are particularly vulnerable to foodborne illness.

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This may be generally reasonable, but the study did not measure:

- incidence of foodborne disease;
- clinical outcomes;
- exposure frequency;
- dose-response relationships;
- hospitalization or illness associated with dègué.

The manuscript should therefore avoid implying that the study demonstrated a specific elevated risk among these consumers.

10. Cold-chain information appears questionable

The manuscript reports that dègué can be stored for 2–3 days when refrigerated at:

“17–18°C.”

A temperature of 17–18°C would generally **not be described as adequate refrigeration**.

This point requires urgent clarification.

If the intended temperature was **1–8°C**, or another refrigerated range, it should be corrected.

If 17–18°C is genuinely the measured storage temperature, the authors must explain why it is described as refrigeration and discuss its microbiological implications.

11. The literature review is excessively long relative to the research question

Sections 2.1–2.4 contain extensive general information about milk, milk composition, dairy products, and classification.

For example, the detailed chemical composition table of cow, goat, and sheep milk is not directly necessary for interpreting the microbiological quality of dègué.

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The introduction/background should be shortened and refocused toward:

1. dègué production;
2. microbiological hazards;
3. previous studies on dègué;
4. food-safety concerns in Chad;
5. knowledge gap;
6. study objective.

This would make the manuscript substantially more focused.

12. Some conclusions exceed the evidence

The conclusion states that microbial contamination reflects shortcomings during:

“milk collection, processing, packaging, and storage.”

However, the study did not directly investigate contamination at all these stages.

The authors should distinguish **observed findings** from **hypothesized contamination sources**.

For example:

- High *E. coli* may suggest fecal contamination.
- High coliform counts may suggest inadequate hygiene.
- *B. cereus* may plausibly originate from cereal/raw materials and spores surviving processing.
- High total aerobic counts indicate high overall microbial load.

But the study cannot establish exactly where contamination occurred.

13. References require substantial correction

The reference list contains numerous problems:

International Journal of Advanced Research

Publisher's Name: Jana Publication and Research LLP

www.journalijar.com

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- inconsistent formatting;
- incomplete bibliographic information;
- typographical errors;
- duplicated references;
- inconsistent author names;
- inconsistent journal titles;
- missing volume/issue/page information;
- questionable or incomplete web references;
- inconsistent DOI formatting.

For example, references 31 and 32 appear to describe essentially the same study and may be duplicates.

Reference 1 also appears incomplete:

“Alimentarius, C. (2011). Lait et produits laitiers...”

The references should be systematically checked against the journal's required citation style.

14. Language and presentation need major editing

There are many problems with:

- spacing;
- capitalization;
- punctuation;
- English grammar;
- French/English terminology;
- inconsistent decimal separators;
- inconsistent abbreviations;
- typographical errors.

Examples include:

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"Results and discuss"

which should be:

"Results and discussion"

and:

"traditionalfermentedmilk-and-cerealfoodwidelyconsumed"

which requires proper spacing and grammatical restructuring.

A thorough professional language edit is strongly recommended.

15. Tables and figures need revision

The figure numbering is confusing.

For example:

- Figure 1 is described as the study-area map;
- later material appears to refer to "Figure 2" as concentration of germs;
- the manuscript contains figure-label inconsistencies;
- some figures appear poorly formatted;
- abbreviations such as US, S, and NS are not consistently defined.

The authors should renumber all tables and figures sequentially and ensure that every figure/table is cited correctly in the text.

16. Key points that should be addressed in revision

I would consider the following **essential revisions**:

REVIEWER'S REPORT**Major revisions**

1. **Resolve the 60-versus-20 sample discrepancy.**
2. Provide the complete microbiological dataset or clearly explain why only a subset is presented.
3. Recalculate and justify the sample size using an appropriate statistical method.
4. Describe the sampling procedure in sufficient detail.
5. Explain and justify every microbiological criterion used.
6. Perform appropriate statistical comparisons between artisanal and DJAMIL products.
7. Report confidence intervals and, where appropriate, p-values.
8. Clarify the microbiological analytical methods and detection/quantification limits.
9. Correct the apparent inconsistency concerning refrigeration at 17–18°C.
10. Moderate causal statements that were not directly tested.
11. Provide details of the hygiene-knowledge questionnaire and scoring system.
12. Clarify ethical approval and informed consent procedures.
13. Revise the conclusion so that it reflects the study's actual evidence.
14. Correct and standardize all references.
15. Undertake comprehensive English-language editing.

17. Significance of the study**Scientific significance: Moderate**

The study contributes data from an under-researched geographical setting and provides microbiological information on dègué marketed in N'Djamena. The comparison between artisanal and commercial products is potentially useful.

However, the scientific contribution is currently weakened by methodological uncertainties, especially the sample-number discrepancy and limited statistical analysis.

Public-health significance: Potentially high

The subject is important because dègué is consumed locally and may be exposed to microbiological contamination through raw materials, processing, handling, and storage.

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The high proportion of non-compliant artisanal samples reported by the authors warrants attention, although the magnitude of the public-health risk cannot be fully quantified from the current study alone.

Practical significance: High

The findings could potentially inform:

- food-handler education;
- hygiene interventions;
- monitoring of artisanal dairy products;
- regulatory surveillance;
- cold-chain practices;
- product traceability.

18. Recommendation to the Editor

Recommendation: Major Revision

The manuscript addresses a relevant and potentially important food-safety problem and contains potentially useful microbiological data. However, the manuscript is **not yet suitable for publication in its current form** because several fundamental methodological and reporting issues need clarification.

The most critical concern is the discrepancy between the stated **60 samples analyzed** and the **20 samples actually displayed in Tables VII and VIII**. In addition, the sampling calculation, statistical analysis, microbiological criteria, and interpretation of causal factors require substantial improvement.

If the authors can provide the missing methodological information, reconcile the sample numbers, perform appropriate statistical analyses, verify the microbiological standards, and substantially improve the presentation and interpretation, the study could become a useful contribution to the literature on food safety and traditional dairy products in Chad.

Suggested editorial decision: Major Revision / Resubmission encouraged.

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